# InfoSphere :
# NAVIGATING THE WORLD OF INFORMATION

Preserving the Past, Valuing Present, Enriching the Future

UNIVERSITI TEKNOLOGI MARA

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# InfoSphere:
## Navigating the World of Information

# Preface

It gives me great pleasure to present *InfoSphere: Navigating the World of Information*, a collective effort that brings together insightful discussions, empirical findings, and critical reflections from academics in information management, library management, records management, and information and communication technology (ICT).

In today's digital era, the vast and complex landscape of information continues to expand at an unprecedented pace. The convergence of technology and information systems has transformed how data is created, organized, stored, and utilized. This book aims to navigate that dynamic "infosphere" , a term that reflects the interconnected environment in which information flows seamlessly across platforms, disciplines, and contexts.

The chapters compiled here explore diverse perspectives and contemporary issues shaping the management of information resources and services. From emerging trends in digital librarianship and knowledge governance to innovations in ICT applications and recordkeeping practices, each contribution highlights the growing importance of integrating technology, policy, and human expertise in managing information effectively.

This publication also serves as a reflection of our faculty's commitment to advancing scholarship and practice in the information domain. It showcases the intellectual depth and interdisciplinary collaboration among academics who continue to shape the future of information work.

As the Chief Editor, I wish to express my sincere appreciation to all the contributing authors for their dedication and scholarly rigor, and to the editorial team for their meticulous effort in ensuring the quality and coherence of this volume. Special thanks are also extended to the Faculty of Information Science and Universiti Teknologi MARA Cawangan Johor for their continuous support and encouragement in realizing this publication.

I hope that *InfoSphere: Navigating the World of Information* will inspire readers among students, educators, researchers, and practitioners alike to engage critically with the evolving information landscape and to contribute meaningfully to its advancement.


**Azura Abdul Jamil @ Kamarudzzaman**
Chief Editor
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# Internet of Things (IoT): The role of an information literacy skills

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## 1.0 Introduction

The Internet of Things (IoT) is a gigantic network of appliances, sensors, and digital systems that can collect, send, and process data with little help from people (TechTarget, 2025). As IoT applications grow from traditional ways to automation, the amount, variety, and speed of data collection have all grown by a huge amount. So, in this case, information literacy has become very important since it is the basis for people and groups to find their way around, understand, and critically assess information in environments with a lot of sensors and tools available nowadays. Information literacy has expanded from its conventional foundations in library and academic settings to encompass skills in data literacy, metadata interpretation, digital ethics, and algorithmic awareness (Trixa et al., 2024). These abilities give people the power to not only find and assess information, but also to make smart, moral choices based on data streams from the Internet of Things (IoT).

In the Internet of Things (IoT) world, being information literate helps people understand and use data in a responsible way. It lets people see where data originates from, how reliable it is, and if they can trust it. Instead of taking all IoT outputs at face value, information literacy also educates users how to place complicated data from multiple sources in the correct context.

Moreover, it also raises people's knowledge of ethics by helping them comprehend issues related to privacy, consent, and data openness. As IoT devices gather increasing amounts of personal data, information literate individuals can challenge inappropriate data utilization, safeguard their rights, and promote responsible technology application (Emerging New Information Literacies, 2025; Reddy & Sharma, 2023). To help people, professionals, and students act sensibly and ethically in today's data-driven environment, it is important to improve their information literacy.

## 2.0 Role of Information Literacy in IoT Ecosystems

On the Internet of Things (IoT) world, millions of smart devices and sensors are always collecting and sharing information. Due to this, an individual need new skills to understand origin of data, checking the truth and relevancy, and know to use it responsibly. An information literacy helps people think carefully about the data around them, make smart decisions, and protect their privacy. It ensures that users do not just accept all data blindly but can question and understand how smart systems work.

The Internet of Things (IoT) is a network of millions of connected devices that are always gathering, sending, and processing data. People need to be very good at information literacy so they can interpret, assess, and use data from the Internet of Things (IoT) in a responsible way. One important part of being information literate is *being able to track the origin of data*, which means figuring out where it came from, how it was made, and whether it has been changed. For example, if a smart home thermostat gives strange temperature readings, a person who knows how to use information would wonder if the sensor was properly calibrated or if the data went through more than one device that could have changed its accuracy. Knowing where data comes from helps people not blindly trust sensor outputs and make smarter choices.

It is also important to *be able to read and understand sensor data*. IoT devices can make complicated, real-time data that might be hard to grasp without the right context. For instance, in a smart agriculture system, moisture-sensor readings could change because of rain, uneven soil, or even broken sensors. People who know how to use information can look at the context, find possible problems, and ask important questions regarding the accuracy of the sensors, how often they measure, and the environment. These skills help people make sense of data instead of just taking the raw sensor outputs at face value.

Another important part of being information literate in the IoT is knowing how to *use data in a way that is ethical and keeps people's privacy safe*. IoT devices frequently gather private data, including location, health metrics, and everyday routines. A user who knows how to use information knows how personal data is collected, who can see it, and what hazards it might pose. A smart home system might, for instance, keep track of when people are in or out of the house. If data is not handled ethically, it could be used for bad things. Individuals are better able to protect their privacy and push for good data governance when they grasp the ethical issues that come with using IoT data.

Also, IoT environments can create a lot of data, which might cause information overload if it's not handled well. Being information literate *helps people go through, prioritize, and understand huge amounts of data, making sure they only pay attention to what is important*. For instance, smart city systems might keep track of things like traffic patterns, pollution levels, and how much energy is being used. Decision-makers could get overwhelmed and not be able to act effectively if they can't tell the difference between important information and useless noise. Users with good information literacy abilities can tell which data sets are valuable for making certain decisions and which ones aren't.

On the other hand, information literacy *helps people be responsible digital citizens in IoT environments*. People need to know their roles, rights, and duties whether they use smart technologies at home, at work, or in public locations. This means comprehending how personal data fits into bigger systems, how IoT technologies change society, and how individuals can use them in a safe and ethical way. For instance, a person who knows what sharing data means with fitness trackers may make smart decisions regarding privacy settings, consent, and how to use the device responsibly. Information literacy gives people the power to not only be consumers of IoT data, but also to be active, ethical members of the digital world.

## 3.0 Competencies for IoT Information Literacy

In today's world, information literacy is more than just finding and checking written information. It now includes understanding, interpreting, and using complex data produced by machines and smart devices. The Internet of Things (IoT) creates huge amounts of real time data from connected sensors, devices, and systems. This means people need stronger analytical, ethical, and technical skills to handle this information responsibly (UNESCO, 2025). These skills empower students, professionals, and everyday citizens to navigate and make sense of the smart, data driven technologies that are becoming part of daily life (Echtenbruck et al., 2025). The main competencies of information literacy in IoT can be divided into five connected literacies, as explained below.

| | |
|---|---|
| **Data Literacy** | The ability to understand and analyze IoT data structures, sensor logic, and analytical outputs. |
| **Digital Ethics Literacy** | Awareness of ethical issues such as privacy, consent, surveillance, and algorithmic bias in IoT data use. |
| **Technical Literacy** | Familiarity with IoT architectures, platforms, and communication protocols. |
| **Critical Literacy** | The ability to interpret and evaluate machine generated information critically. |
| **Collaborative Literacy** | The capacity to collaborate across disciplines such as IT, data science, and information management. |

**Table 1:** Core Competencies of Information Literacy in IoT Contexts

## 4.0 Challenges and Ethical Implications

The inclusion of Internet of Things (IoT) technologies in libraries, archives, and information-service settings presents a multifaceted array of problems and ethical considerations that necessitate sophisticated information-literacy skills. One of the most important issues is how to protect people's privacy, get their permission, and ethically handle the constant flow of data that smart gadgets create. IoT sensors work all the time and often without

being seen, which means that users may not know what data is being collected or how it will be utilized. This brings up serious moral questions, especially in places that are supposed to protect users' privacy and intellectual freedom. Consequently, information workers must cultivate the capacity to comprehend privacy agreements, evaluate the ramifications of data-sharing activities, and promote transparent governance frameworks that emphasize user rights and autonomy (Dhinakaran, 2025). Without these skills, adopting the Internet of Things might make surveillance routine, erode trust, and give consumers less control over their personal information.

Another big problem is algorithmic bias, fairness, and the growing threat of fake news, which all get worse in data-driven IoT ecosystems. Algorithms that analyze sensor data or facilitate automated decision-making may utilize datasets that are incomplete, biased, or historically skewed. This can lead to unfair results or unequal access to services, especially for groups that are not well-represented. For instance, recommendation algorithms that use metadata or automated processes for allocating resources may unintentionally favor some groups of users over others. The ethical implication is that IoT technologies, if not audited, can quietly make social inequalities worse. Therefore, information workers need to be very good at using algorithms. This means they should be able to question model assumptions, spot patterns of bias, critically assess data quality, and properly interpret analytics dashboards (Matsieli et al., 2025). This problem is not only technological; it is also quite moral because biased algorithms can make it harder for people to get information and go against institutions' promises to be fair and inclusive.

The digital gap is another ethical problem because many IoT-driven services presume that people have a certain degree of digital proficiency, device availability, and connectivity. Communities who don't have enough infrastructure, money, or digital skills have a harder time getting the benefits of IoT-enabled information services. This makes the divide between people who are digitally enabled and those who are still left out of new technology bigger. From an information-literacy standpoint, this signifies that interventions must transcend skill-based training to tackle systemic imbalances in access, affordability, and participation. To make sure that everyone can fully exploit IoT-enhanced surroundings, ethical use of IoT requires focused interventions including inclusive training programs, fair device-access schemes, and community-based digital support (Ganesh Bajirao, 2025). If you don't, you could make the gaps even bigger and hurt the democratic purpose of libraries and other public information institutions.

Last but not least, the lack of common frameworks and strong assessment models for figuring out the ethical concerns of using IoT is a big problem. Even though IoT technologies are moving quickly, standards on how to use them responsibly, especially in information settings, are still all over the place and not very clear. A lot of organizations don't have clear ways to judge how transparent, accountable, or responsible algorithms are, or how they affect users. This lack of clarity makes it hard for professionals to make sure that IoT systems follow human-centered values or responsible AI principles. Creating uniform frameworks is necessary not only to help people make ethical choices, but also to make sure that accountability is built into the design and monitoring of IoT infrastructures (Khan et al., 2021). Without these mechanisms, institutions run the risk of using technologies that are efficient but not in line with ethical standards. This could hurt the integrity and social responsibility of information services.

## 5.0 Conclusions

The Internet of Things (IoT) connects millions of smart devices and sensors that are always collecting and sharing data. This changes how libraries, archives, and record management systems work. This change in technology has many benefits, like automation, real time insights, and better decision making. However, it also creates new problems with ethics and literacy. As surroundings become more intelligent and data driven, information literacy needs to go beyond just knowing how to search for and evaluate content. Being information literate nowadays means being able to understand where data comes from, check its accuracy, make sense of sensor based data, and use moral judgment when dealing with personal or environmental data. To make people and professionals more responsible, ethical, and critical when using IoT technology, it is important to strengthen their information literacy abilities. This is especially true in today's data driven culture, where people can go from being passive consumers of information to active decision makers.

## References

Alkhalil, A. (2017). *IoT data provenance implementation challenges*. Procedia ComputerScience. https://www.sciencedirect.com/science/article/pii/S18770 50917311183

Brous, P., Janssen, M., & Herder, P. (2020). The dual effects of the Internet of Things (IoT): A systematic review of the benefits and risks. *International Journal of Information Management,46*. https://www.sciencedirect.com/science/article/pii/S026840 1218309022

Chataut, R., et al. (2023). *A comprehensive review of IoT applications and future prospects.* PMC.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10458191/

Chen, Z., et al. (2023). *Ethics and discrimination in artificial intelligence-enabled recruitment practices. Humanities and Social Sciences Communications, 10*, 567. https://doi.org/10.1057/s41599-023-02079-x

Dhinakaran, D. (2025). Ethical and legal challenges with IoT in home digital twins. *Journal of Industrial Information Integration*. https://www.sciencedirect.com/science/article/pii/S22150161250 02559

Dhinakaran, D. (2025). *Ethical and legal challenges with IoT in home digital twins*. PMC. https://pmc.ncbi.nlm.nih.gov/articles/PMC12370150/

Dhinakaran, D., et al. (2025). *Ethical and legal challenges with IoT in home digital twins. Journal of Future Systems.*https://www.sciencedirect.com/science/article/pii/S221501612500255 9

Echtenbruck, M. M., Fühles-Ubach, S., Naujoks, B., & Kaliva, E. (2025). *A Data Literacy Competence Model for Higher Education and Research. arXiv.* https://arxiv.org/abs/2504.15690

Emerging New Information Literacies – A Conceptual Outlook. (2025). *Emerging New Information Literacies.ResearchGate.*

Faraj, O., Megías, D., & García-Alfaro, J. (2024). *Security approaches for data provenance in the Internet of Things: A systematic literature review. arXiv.* https://arxiv.org/abs/2407.03466

Ganesh Bajirao, K. (2025). *Navigating ethical challenges in the adoption of new technology in libraries. International Journal of Humanities Social Science and Management*, 5(2), 1002-1006.

Ghashim, I. A., et al. (2023). *Internet of Things (IoT)-Based Teaching and Learning: Opportunities and Challenges.Sustainability, 15*(21), 15656. https://www.mdpi.com/2071-1050/15/21/15656

Hu, R., et al. (2020). *A survey on data provenance in IoT. World Wide Web, 23,* 2231–2261. https://link.springer.com/article/10.1007/s11280-019-00746-1

Hu, R., et al. (2020). A survey on data provenance in IoT. *World Wide Web.* https://link.springer.com/article/10.1007/s11280-019-00746-1

IBM. (2025). *What is the Internet of Things (IoT)?* https://www.ibm.com/think/topics/internet-of-things

Khan, A. A., Badshah, S., Liang, P., Khan, B., Waseem, M., Niazi, M., & Akbar, M. A. (2021). *Ethics of artificial intelligence: A systematic literature review of principles and challenges.* arXiv. https://arxiv.org/abs/2109.07906

Lo, L. S. (2025). *AI Literacy: A Guide for Academic Libraries. College & Research Libraries News.*https://crln.acrl.org/index.php/crlnews/article/view/26704

Matsieli, M., et al. (2025). Generative AI and the information society: Ethical considerations for libraries. *Information*, 16(9), 771.

Pinto, G. P., et al. (2024). A systematic review on privacy-aware IoT personal data solutions. *Sensors, 24*(7), 2197. https://www.mdpi.com/1424-8220/24/7/2197

Reddy, P., & Sharma, R. (2023). *Information literacy and data ethics in the age of the Internet of Things. Journal of Information Science and Technology, 49*(2), 210–225.

TechTarget. (2025). *What is IoT (Internet of Things)? Definition & overview.*https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT

Trixa, J., et al. (2024). *Information literacy in the digital age. PMC.*

Trixa, J., Kurbanoğlu, S., & Boustany, J. (2024). *Information literacy in the digital age: Expanding competencies for data-driven societies. Information and Learning Sciences, 125*(5/6), 412–427.

UNESCO. (2019). *The ethical implications of the Internet of Things (IoT).* UNESCO Publishing. https://unesdoc.unesco.org/ark:/48223/pf0000387201

UNESCO. (2025). *Media and Information Literacy and Digital Competencies.*

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