InfoSphere :
NAVIGATING THE WORLD OF INFORMATION

Preserving the Past, Valuing Present, Enriching the Future

UNIVERSITI TEKNOLOGI MARA
Fakulti Sains Maklumat

InfoSphere:
Navigating the World of Information

Published by Universiti Teknologi MARA Cawangan Johor

Universiti Teknologi MARA, Cawangan Johor
Faculty of Information Science
Jalan Universiti, KM. 12, Off Jalan Muar,
85000 Segamat, Johor Darul Ta'zim, Malaysia

ISBN 978-629-7647-07-4

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
InfoSphere: Navigating the World of Information
2025

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By Nor Diana Abd Rahman, Rohayu Ahmad, Azura A.Jamil@Kamarudzzaman,
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1.0 Introduction

A framework and collection of procedures known as information governance (IG) are used to manage an organization's information assets over the course of their whole lifecycle, guaranteeing that data is accurate, safe, and used in a way that complies with the law and ethical standards to forward corporate objectives. In order to reduce risks and maximize information utilization, it entails developing rules, procedures, and controls for the creation, capture, storage, use, access, and deletion of information. It also entails collaborating across multiple departments, including IT, legal, and business operations.

2.0 The Early History of IG

The emergence of data security and records management procedures in the middle of the 20th century is where IG got its start. The origins of the term "IG" are much older, even though it only gained popularity in the early 2000s. Particularly after it was promoted by ARMA International and other professional organizations, the word "IG" gained widespread usage. In order to support corporate objectives, lower risk, and adhere to regulatory requirements, modern IG focuses on managing information across its whole lifecycle. Records management, IT, privacy, security, and compliance were all integrated under a single governance structure, emphasizing a comprehensive approach.

3.0 The importance of IG in Managing Information

Because it guarantees that data is accurate, safe, compliant, and used efficiently throughout its lifecycle to meet organizational objectives, IG is crucial to information management since IG are facing challenges especially in improving information quality and accuracy, implementing data ethic practices and digital transformation.

Assures Information Quality and Accuracy
IG creates guidelines and practices that preserve the dependability, consistency, and accuracy of data. Based on reliable information, this aids businesses in making better decisions.

Improves Privacy and Security
By establishing security controls, access permissions, and compliance procedures (such

as with data protection regulations), it safeguards private or sensitive information. By doing this, data breaches and information misuse are avoided.

Encourages Adherence to Regulations
Information governance guarantees that the company conforms to legal, ethical, and regulatory standards pertaining to information management, including regulations pertaining to privacy, copyright, and data retention.

Boosts Accessibility and Efficiency
IG frameworks increase operational efficiency by giving employees clear instructions on how to store, categorize, and retrieve information. This makes it simpler for employees to locate the information they need fast.

Lowers the RiskIG lowers the risk of data loss, duplication, or unauthorized access by controlling the creation, storage, sharing, and disposal of information.

Facilitates the Making of Strategic Decisions
An organization's data-driven planning, strategy, and innovation are strongly supported by high-quality, well-governed information.

4.0 Information governance provides record managers with clear guidelines to manage records effectively and consistently.

To guarantee that records are managed appropriately at every stage of their lifecycle, from creation to disposal, IG offers a very explicit framework of rules, guidelines, and roles. The following initiatives are ways that IG assists the Records Manager:

Clearly defines standards and policies
IG lays up rules and processes for the creation, classification, storage, access, and disposal of records. This aids the records manager in maintaining uniformity and adherence throughout the organization.

Assures Law and Regulation Compliance
Records managers are required to abide by legal and regulatory standards, including those pertaining to data protection, privacy, and retention.
By establishing compliance standards, information governance lowers the possibility of fines or data breaches.

Enhances the Integrity and Quality of Information
The records manager can keep accurate, authentic, and trustworthy records with governance principles in place, guaranteeing that data is still reliable for operational or evidentiary purposes.

Facilitates Effective Access and Recovery
Records managers may efficiently arrange and access information when needed thanks to information governance, which encourages appropriate classification and metadata standards.

Improves Risk Management and Security
It offers security measures to guard against loss, damage, and illegal access to records. This aids the records management in preserving the availability, confidentiality, and integrity of data.

Enables Lifecycle Management
IG establishes when records can be archived or destroyed as well as how long they should be kept. This guarantees that records managers can effectively manage the information lifecycle, preventing clutter and needless storage expenses.

5.0 IG in Malaysia
In Malaysia the IG implementation is done through the following legal and regulatory framework such as:

Personal Data Protection Act (PDPA) 2010 (Act 709)
Recent Amendments (PDPA Amendment Act 2024)
Data Sharing Act 2025
National Archives Act 2003 (Act 629)
Electronic / Records Management Policies

While in term of the practices, IG in Malaysia has been done through the initiatives especially from the public sector as:

Digitisation & Document Management in Govt	The Malaysian government has initiatives to standardize document/digital record systems, for example "DDMS 2.0" for digital document management across agencies, improving audit trails, traceability, cross-agency data sharing, efficiency.
Records Disposal Schedules	Under the National Archives Act, there are record disposal schedules for different kinds of public records (financial, general affairs, land records, etc.). Public agencies must dispose of records once they have fulfilled their retention period or are no longer serviceable
Policy & Standardization Roles of National Archives	The Policy, Standards & Quality Management Section of Arkib Negara Malaysia coordinates policy, guidelines, standards, archives and records management practices across public offices

6.0 Challenges of implementation of IG

The implementation of IG can be challenging for many organizations because it involves people, processes, technology, and compliance working together. The common challenges are:

Absence of Knowledge and Awareness
Many workers, including supervisors, are not quite aware of what IG is or why it matters. Low commitment, irregular behavior, and lax enforcement of IG policies result from this.

Inadequate Assistance from Leadership
Since top management is heavily involved in budget allocation and compliance enforcement, IG projects frequently lack the resources or authority they need to be successful in the absence of strong leadership.

Fragmented Information Systems
Email, cloud storage, databases, and physical files are just a few of the systems that frequently store information. It is challenging to implement uniform security, access, and retention regulations because of this fragmentation.

Lack of Clear Policies and Procedures
Formal policies for data exchange, privacy, and record keeping have not been created or updated by certain organizations. Staff members may handle information inconsistently in the absence of clear procedures, which raises the possibility of mistakes or breaches.

Limited Knowledge and Resources
Funding, technical tools, and skilled staff are needed to implement IG. Many organization suffer with tight funds or a shortage of qualified information specialists, particularly in the public sector.

Resistance to Change
Workers may object to new procedures, norms, or technology that IG programs introduce. Adoption and compliance are slowed by this cultural opposition.

Privacy and Data Security Issues
It's challenging to have a balance between security and accessibility. While guaranteeing that authorized individuals may effectively retrieve information, organizations must also protect sensitive data.

Compliance with Multiple RegulationsMany rules (such as those pertaining to data protection, records retention, and information freedom) frequently govern how organizations operate. Making sure all regulations are followed can be difficult and time-consuming.

Managing Digital Transformation
The transition from paper to digital records poses difficulties for long-term preservation, metadata management, and system integration. Effective and sustainable management of digital information is a challenge for many companies.

Monitoring and Continuous Improvement
Information governance calls for constant monitoring, auditing, and updating; it is not a one-time endeavor. Over time, many organizations are unable to maintain their IG initiatives.

7.0 Conclusion

The implementation of IG is essential for ensuring that information within an organization is managed effectively, securely, and in compliance with legal and regulatory requirements. Despite challenges such as limited awareness, lack of resources, and resistance to change, successful implementation can lead to significant benefits, including improved data quality, better decision-making, enhanced security, and greater operational efficiency. Effective IG requires strong leadership commitment, clear policies, staff training, and continuous monitoring. Ultimately, it provides a solid foundation for accountability, transparency, and the sustainable management of information as a valuable organizational asset.

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INFORMATION SKILLS IN STUDENT LEARNING AND DEVELOPMENT

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1.0 Introduction

Effectively finding, evaluating, and applying information is essential for thriving in both academic and professional environments. Despite unprecedented access to knowledge, individuals face significant obstacles, such as misinformation and information overload (Xu et al., 2020). Cultivating robust information skills is vital, not only to meet academic standards but also to enable critical thinking, problem-solving, and continuous learning throughout life. These competencies equip students to become autonomous learners, discerning consumers, and proactive citizens who shape society meaningfully.

2.0 Definition of Information Skills

Information skills, often called information literacy, have evolved considerably in response to changes in information access and societal needs. In the past, the focus was mainly on how to find and use information, particularly in libraries.

The American Library Association (ALA) provided a foundational definition in 1988, characterizing information literacy as:

> "The ability to recognize when information is needed and to locate, evaluate, and use effectively the needed information." (Syracuse University iSchool, 2025)

This definition highlighted the processes involved in using information, such as identifying the need, finding relevant sources, checking authenticity, and using what you learned. It is understandable that the students get a lot of information and pictures, and they really need to learn how to verify the facts they obtain (Brewer, 2023). It was especially important at a time when most information was kept in libraries in physical form, and librarians were very important in helping people find what they were looking for.

3.0 How Information Skills Support Student Learning & Development

In today's academic setting, it's very important for students to learn to use knowledge effectively to help them learn and grow as a whole. These abilities are not just extras; they are essential for doing well in school, thinking critically, and developing lifelong learning habits. Research systematically shows a strong, beneficial link between engaging in information literacy activities and getting students more involved, as well as students reporting that they are learning more (Fosnacht, 2020).

In a time when so much information is available, being able to search for, use, and critically analyze it is an important skill for the 21st century. Students who have these skills are better able to navigate the complexity of the digital world, distinguish between trusted and untrustworthy sources, and stop the spread of false information. This skill is commonly regarded as a vital university academic outcome, necessary for equipping students for the challenges of higher education and beyond.

There are a few ways to support student learning and development, which are;

3.1 Lifelong learning

Information skills help people learn about every aspect of their lives, not just in university. People can keep up with changes in knowledge areas and society by finding and processing new information on their own. This ability to learn on your own is important for your personal growth, your career, and making smart choices throughout your life.

3.2 Institutional responsibility

Educational institutions are crucial to developing these skills. According to student engagement theory, institutions must highlight and teach students how to use information while providing enough resources. This requires establishing learning environments where students spend time seeking, assessing, and using information sources. Engaging in educational activities that support learning and growth (Fosnacht, 2020). Institutions may help students become competent, ethical, and critical information consumers and creators by integrating information literacy education throughout the curriculum and providing resources.

4.0 Challenges and Barriers

Information skills are crucial, yet students typically experience several challenges. Institutional issues, resource constraints, student behaviors, and changing information might cause these barriers. Another significant challenge is;

4.1 Lack of structured information literacy training

Information literacy training is sometimes restricted to brief orientations for new students or is not explicitly incorporated into the curriculum, resulting in a lack of thorough advice on how to effectively acquire and apply these essential skills (Baidoo & Jones, 2024). This lack of structured instruction can cause differences in how well students learn new skills.

4.2 Limited access to resources

A lack of relevant, high-quality information sources, such as up-to-date desktop computers and dependable internet connections at libraries and computer centers, might limit skill development. Manual libraries that don't subscribe to e-resources limit students' exposure to different and current information forms, which are increasingly important in academic study (Baidoo & Jones, 2024).

4.3 Socioeconomic factors

Additionally, socioeconomic factors contribute to a growing digital divide. Socioeconomic status, gender, and age all affect digital access. Students from higher socioeconomic backgrounds have more home technology and information, which gives them an advantage over their peers. This gap may worsen inequality in developing information skills (Baidoo & Jones, 2024).

4.4 Self-perceived learning abilities

Student traits, including self-perception, learning anxiety, and confidence, affect information literacy learning. Studies show that anxiety and low self-confidence can distract students from studying, making information-seeking difficult. Self-efficacy, or confidence in one's ability to succeed, can either help or hinder the development of information literacy skills (Baidoo & Jones, 2024).

5.0 Strategies to Enhance Information Skills in Student Learning

Multi-faceted educational strategies and institutional support are needed to improve students' information skills. Moving from isolated instruction to a comprehensive and embedded strategy is required. There are several ways to enhance students' information skills.

5.1 Explicit Instruction and Integration

Information literacy should be included in the curricula of many specialties. This includes direct teaching on research questions, keywords, and search tools. Educators should demonstrate how to use academic databases, search engines, and complex search operators. Hands-on, active learning activities that teach information skills, such as evaluating sources, synthesizing information from diverse perspectives, and quoting correctly, are essential. One-on-one consultations, workshops, and labs can also address students' needs and provide specialized instruction.

5.2 Critical Evaluation Frameworks

Students should learn to use the TRAAP Protocol, which evaluates the timeliness, relevance, authority, accuracy, and purpose of information sources. Teaching students how to spot bias, commercial motive, and authority in information sources helps them evaluate its trustworthiness and usefulness.

5.3 Resource Provision and Access

This includes providing students with a choice of knowledge resources and the infrastructure to use them. Desktop computers and dependable internet in libraries and computer centers are essential. Libraries should also subscribe to several academic databases, journals, and e-books. Online learning communities and toolkits containing films, handouts, and interactive activities help improve information skills and accessibility.

5.4 Promoting Lifelong Learning

Promoting Lifelong Learning emphasizes that information skills are crucial for academic performance, daily life, the job, and civic engagement. These comprehensive approaches can help educational institutions foster an environment where students learn and develop critical thinking and evaluative abilities to flourish in an information-rich world.

6.0 Conclusion

Information skills are essential for helping students thrive in the 21st century (Donovan, 2009). The ability to locate, evaluate, and apply information is crucial for excelling academically, thinking analytically, and acting as informed citizens. These skills motivate students to engage, achieve, and remain lifelong learners. They also enable students to identify credible sources, recognize misinformation, and appreciate diverse perspectives in today's complex landscape.

Teaching robust information skills equips students for tomorrow. These abilities empower students to adapt, think critically, and thrive in a constantly evolving world. They also enable students to contribute positively to their communities and foster ongoing learning. As information proliferates, these skills are increasingly vital in education (Framework for Information Literacy for Higher Education, 2016).

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DIGITAL TRANSFORMATION IN INFORMATION MANAGEMENT

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1.0 Introduction

In the twenty-first century, information has become one of the most valuable resources in the world. It fuels progress, connects societies, and defines success across industries. Every day, billions of pieces of information are created, shared, and stored. Yet, information by itself is meaningless unless it is transformed into knowledge and used wisely. This transformation is what gives rise to knowledge power is the capacity to act intelligently and effectively through understanding.

Information Management (IM) is the systematic process of collecting, organizing, storing, and distributing information so that it can be used efficiently. In other words, it is about making sure the right information reaches the right people at the right time. When information is managed properly, it becomes knowledge; and when knowledge is applied, it becomes power.

As Choo (2002) explains, organizations that manage information effectively can reduce uncertainty, create value, and strengthen decision-making. This shows that IM is not only a technical matter but also a human and strategic one. It combines technology, organization, and culture into one ecosystem that supports learning and innovation.

2.0 The Concept and Scope of Information Management

Information Management is not simply about storing files or maintaining databases. It involves the entire life cycle of information, from creation and classification to preservation and sharing. An effective IM system ensures that information remains accurate, relevant, secure, and accessible throughout its use.

In practical terms, IM includes both information technology (IT) and knowledge management (KM). IT focuses on the tools and infrastructure used to handle data, computers, servers, networks, and cloud systems. KM, meanwhile, focuses on how people share, apply, and create new knowledge from that data. Together, they enable organizations to capture not just explicit knowledge (what is written down), but also tacit knowledge (what people know through experience).

Nonaka and Takeuchi (1995) famously describe knowledge creation as a spiral process that moves between tacit and explicit knowledge. For example, when employees discuss a problem and develop a new solution, they are turning experience into formal knowledge. IM provides the structure that makes this process possible, through documentation, communication platforms, and databases that store organizational memory.

Effective IM also supports transparency and accountability. For instance, when governments publish open data, citizens can analyze policies, track spending, and contribute to innovation. In this way, information becomes a public resource that strengthens democracy and social development.

3.0 The Knowledge Society and the Rise of Information Power

We now live in what sociologists call the knowledge society, a world where knowledge has replaced land, labor, and capital as the primary source of wealth. The shift toward information-based economies means that organizations compete not only on products or prices but also on ideas, expertise, and innovation.

The saying knowledge is power has never been more relevant. But in today's world, it is more accurate to say that managed information is power. Data without context leads to confusion; data that is well-managed and analyzed leads to insight and control.

This transformation has deep implications for both developed and developing nations. As highlighted by the IDS Bulletin (1998), the global flow of information remains unequal: the North still dominates the production and control of knowledge, while the South often depends on imported expertise and technology. This imbalance reinforces economic and cultural disparities, making information a form of geopolitical power.

However, recent movements towards open access and participatory research are slowly changing this landscape. Communities are beginning to create their own data, share local knowledge, and influence global conversations. This democratization of information represents a new kind of empowerment is one that allows people to define their own realities through shared understanding.

4.0 Information, Knowledge, and Power: Theoretical Perspectives

The relationship between information and power is not new. Thinkers from Bacon to Foucault have explored how knowledge shapes authority, freedom, and control. Michel Foucault (1980) argued that power and knowledge are inseparable; every exercise of power depends on knowledge, and every form of knowledge produces power relations. In modern organizations, this means that whoever controls information often controls decision-making.

Building on Foucault, other scholars have developed nuanced theories of power relevant to information management. Among them, the works of Barnes (1988), Clegg (1989), Giddens (1979, 1984), Haugaard (1997), and Flyvbjerg (1998) stand out for connecting power to institutions, communication, and human action.

Haugaard (1997) proposes a concept of practical consciousness is the unspoken knowledge people use in their daily routines. Every organization has its own practical consciousness: a hospital, for instance, operates according to codes and assumptions

quite different from a retail store. Understanding this dimension helps information managers design systems that fit an organization's culture and purpose.

Flyvbjerg (1998) adds that knowledge is never neutral; it always reflects values and interests. Therefore, managing information is not just a technical activity but a political and ethical one. The way data is collected, stored, and used can reinforce or challenge existing power structures. In development work, for example, data about marginalized communities can either empower them or be used to control them depending on who interprets the data and for what purpose.

5.0 The Role of Information in Decision-Making

In both public and private sectors, decisions are only as good as the information behind them. Reliable, timely, and relevant data allow leaders to plan effectively, allocate resources, and predict future trends. Without good information management, decision-making becomes guesswork.

Davenport and Prusak (1998) explain that information turns into knowledge when it is combined with experience, context, and reflection. A company that collects customer feedback but never analyses it gains little. But if that information is processed, compared, and shared, it becomes actionable knowledge that can guide strategy and innovation.

However, decision-making processes are rarely neutral. Each actor, government, NGO, or corporation uses information to support its own agenda. In many cases, information about poor or vulnerable communities is collected but not returned to them in meaningful ways. This imbalance reveals the political nature of information: access itself is a form of power.

Modern information management aims to correct this imbalance through transparency and participation. Open-data platforms, for instance, allow citizens to track development projects and hold authorities accountable. In organizations, knowledge-sharing platforms encourage collaboration and reduce hierarchy. These practices shift power from individuals to networks, fostering collective intelligence.

6.0 Information Management in the Digital Age

The twenty-first century marks the complete digitization of human knowledge. From cloud storage to artificial intelligence (AI), technology has reshaped how we collect, store, and use information. Organizations no longer rely on physical archives; instead, they depend on digital repositories that can be accessed anywhere in the world.

Modern information management aims to correct this imbalance through transparency and participation. Open-data platforms, for instance, allow citizens to track development projects and hold authorities accountable. In organizations, knowledge-sharing platforms encourage collaboration and reduce hierarchy. These practices shift power from individuals to networks, fostering collective intelligence.

This shift has made information management faster and more dynamic, but also more complex. The sheer volume of data often called big data requires advanced systems to process, analyze, and protect it. AI tools can now recognize patterns, forecast trends, and even generate insights automatically. Yet, these systems still depend on human judgment to interpret results responsibly.

As Tiwana (2000) reminds us, technology is only as good as the people who use it. The success of information management therefore depends on the balance between automation and human wisdom. A digitally literate workforce, guided by ethical awareness, is essential for ensuring that information power benefits rather than harms society.

7.0 Technology, Collaboration, and Learning Organizations

Modern institutions are evolving into learning organizations places where people continuously acquire and share knowledge to adapt to change. Knowledge Management Systems (KMS) form the backbone of this transformation. These systems integrate tools such as databases, intranets, and collaborative platforms to support communication and creativity.

For example, universities that maintain digital libraries and research repositories empower both students and academics to access updated materials instantly. Corporations use internal KMS to capture lessons learned from projects, preventing repeated mistakes and encouraging innovation. Governments use e-governance systems to share information across departments, improving transparency and efficiency.

Rowley (2007) situates this development within the DIKW hierarchy Data, Information, Knowledge, and Wisdom. Each level builds upon the previous one: data becomes meaningful when structured into information; information gains context when applied as knowledge; and knowledge becomes wisdom when used ethically and insightfully. Effective information management ensures smooth movement across these levels.

However, collaboration also introduces cultural challenges. People may hesitate to share knowledge for fear of losing status or control. Overcoming this requires building trust, recognition systems, and an organizational culture that values openness. Leadership plays a key role in modelling such behaviour.

8.0 Challenges and Ethical Dimensions of Information Management

While information technologies bring efficiency, they also raise serious ethical and security concerns. Three major challenges dominate the modern IM landscape.

Information Overload: With data multiplying exponentially, individuals often struggle to distinguish what is relevant. Poorly curated information leads to confusion and decision fatigue.

Data Privacy and Security: Cyber-attacks, identity theft, and surveillance threaten both personal and institutional trust. Protecting sensitive data is no longer optional; it is a moral and legal obligation.

Digital Divide: Not everyone has equal access to technology or digital literacy. This gap widens social inequality, as those without access remain excluded from the knowledge economy.

Ethical information management therefore demands transparency, accountability, and respect for privacy. Foucault's notion that knowledge produces power reminds us that whoever holds data holds influence. Responsible IM means distributing that influence fairly, through open data policies, consent-based information sharing, and respect for intellectual property.

Moreover, the rise of misinformation highlights the importance of critical thinking and verification. AI can help flag false content, but human discernment remains the best safeguard. Education systems must therefore emphasize information literacy, the ability to evaluate sources, interpret evidence, and apply knowledge ethically.

9.0 Information Management for Sustainable Development

Information plays a vital role in achieving the United Nations' Sustainable Development Goals (SDGs). From climate monitoring to public health surveillance, accurate data underpins every major initiative. When managed effectively, information can bridge gaps between governments, researchers, and citizens.

For instance, open data on deforestation enables communities to monitor environmental changes; health-information systems allow early detection of disease outbreaks; and education databases support policies to reduce inequality.

However, these systems must respect cultural diversity and local knowledge. Development experts increasingly recognize that local data community stories, traditional practices, and indigenous observations are as valuable as statistical reports. Integrating these perspectives transforms information management from a top-down exercise into a participatory process that empowers people directly affected by decisions.

Thus, IM becomes not only a technical tool but also a catalyst for social justice. It gives voice to the marginalized, transparency to the powerful, and direction to policymakers.

10. The Future of Knowledge Power

The future of information management lies in integration combining human intelligence, machine learning, and ethical governance. As digital transformation accelerates, organizations must learn to adapt continuously. The leaders of tomorrow will not merely collect information; they will interpret, share, and apply it creatively.

Emerging technologies such as blockchain promise tamper-proof data storage, while quantum computing could revolutionize data processing. Yet, even the most advanced systems will fail without trust. Human empathy, moral reasoning, and critical reflection remain irreplaceable.

In the long term, knowledge power must serve collective well-being. This means designing information ecosystems that are inclusive, transparent, and sustainable. Education, collaboration, and integrity will define success more than technological sophistication.

11. Conclusion

Information Management is both an art and a science the art of making sense of complexity, and the science of structuring knowledge for human progress. It transforms raw data into wisdom, connecting the technological with ethical, and the global with the local.

From Foucault's theories of power to modern AI analytics, the same truth endures: information is only powerful when used responsibly. Managing information means managing society's capacity to learn, decide, and act.

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UNDERSTANDING SOCIAL MEDIA FOR INFORMATION PROFESSIONALS

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1.0 Introduction

Social media has become one of the most transformative forces in the information age, reshaping how people create, share, and consume knowledge globally. Defined as digital platforms that facilitate communication, collaboration, and user-generated content, social media enables individuals and organizations to interact dynamically within online communities (Kaplan & Haenlein, 2010; Verishagen, 2018). From Facebook and Instagram to emerging platforms such as TikTok and Threads, social media landscape continues to expand, influencing not only social behavior but also the way information professionals engage with users.

For information professionals—such as librarians, archivists, and digital curators—social media is more than a communication tool; it is a strategic medium for knowledge dissemination, community engagement, and professional visibility (Quesenberry, 2020; Tuten, 2020). The rise of Web 2.0 has transformed information agencies from gatekeepers of information into active participants in a participatory digital culture (Zhixian, 2016). In this environment, information professionals must develop competencies in social media literacy, analytics, and ethical communication to remain relevant in the digital ecosystem (Kingsnorth, 2019; Manca, 2021).

Moreover, the convergence of information and social technologies has redefined the nature of credibility and authority in information exchange. Traditional information gatekeeping—once centralized in libraries or agencies—has shifted toward decentralized, user-driven environments. This transformation calls for professionals who can balance openness with critical evaluation, fostering information integrity while embracing participatory innovation (Jeyasekar & Saravanan, 2019). Understanding the evolution, categories, and strategic use of social media therefore becomes vital for every information professional operating in today's knowledge-driven world.

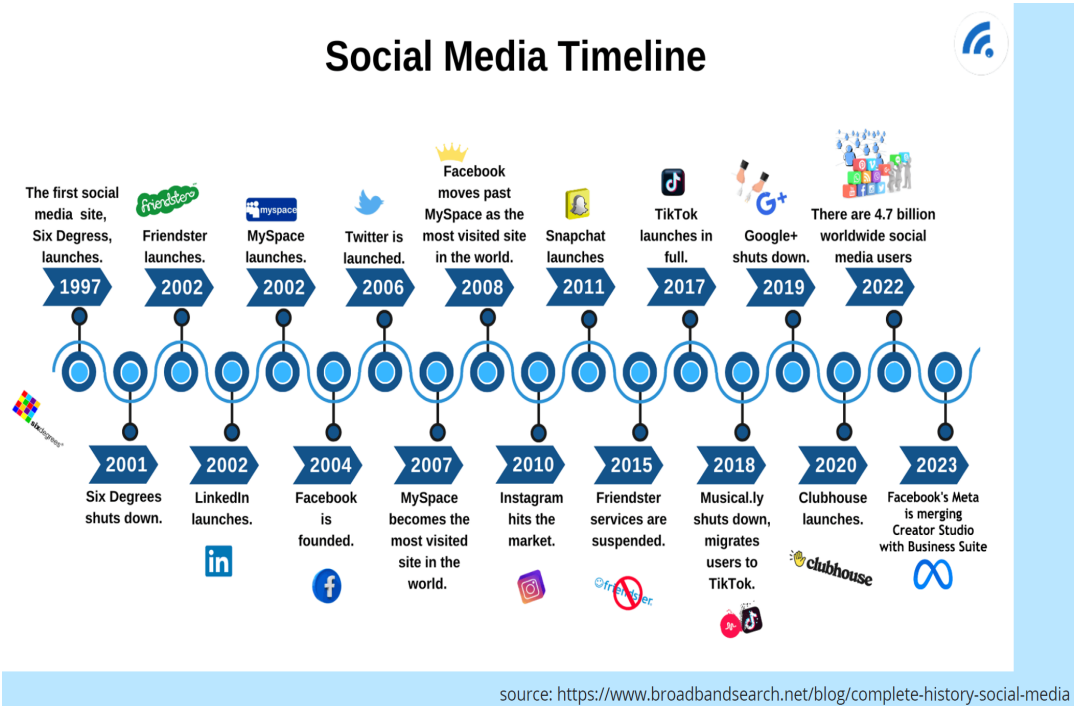
2.0 The Evolution of Social Media

The development of social media can be traced through three broad phases: early beginnings (1970s–1990s), mainstream growth (2000s–2010s), and diversification in the present era. Each phase reflects technological innovation and changing user behaviour, progressively shaping how societies create and share knowledge online.

Early Beginnings (1970s–1990s).
Social interaction occurred primarily through bulletin board systems (BBS) and early networking communities that allowed message exchange and file sharing. Platforms such as SixDegrees (1997) introduced profile-based networking, while LiveJournal (1999) encouraged early blogging and community discussions (Nurul Huda Izzati bt Jamil, 2024). Although limited by bandwidth and accessibility, these early tools laid the groundwork for social connectivity.

Mainstream Expansion (2000s–2010s).
Friendster (2002) and MySpace (2003) popularized online communities, followed by Facebook (2004), YouTube (2005), and Twitter (2006), which revolutionized networking, video sharing, and microblogging (Nurul Huda Izzati bt Jamil, 2024). Each reflected Web 2.0's participatory engagement—users as both consumers and creators. Each of these platforms reflected the Web 2.0 principle of participatory engagement—where users became both consumers and creators of information. This period also saw the rise of professional networks such as LinkedIn (2003), transforming how professionals connect and collaborate globally (Boateng & Liu, 2023).

Diversification (2010s–Present).
Social media landscape expanded into multimedia and immersive experiences. Instagram (2010) emphasized visual storytelling, Snapchat (2011) introduced ephemeral content, and TikTok (2016) redefined creative engagement through short-form videos. Meanwhile, Meta's investment in the metaverse and Horizon Workrooms reflects a shift toward **Augmented Reality (AR)** and **Virtual Reality (VR)** as tools for immersive social interaction (IMD164 Chapter 1, 2024). These technologies allow information professionals to explore new dimensions of outreach—such as virtual library tours, 3D learning environments, and interactive exhibitions.



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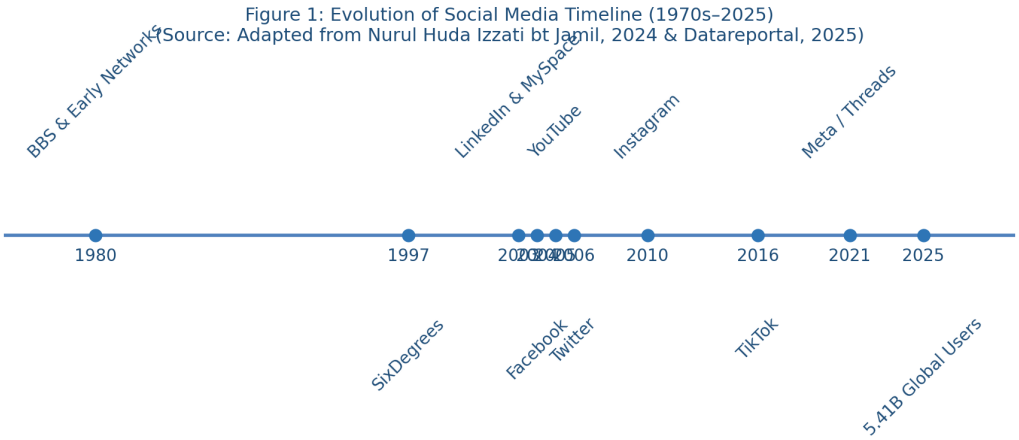

Figure 1: *Evolution of Social Media Timeline (1970s–2025)*
Source: Adapted from Nurul Huda Izzati bt Jamil (2024) & Datareportal (2025).

By **2025**, global social media users reached approximately **5.41 billion**, representing more than two-thirds of the world's population (Datareportal, 2025). Facebook remains the most dominant platform, followed by YouTube, WhatsApp, Instagram, TikTok, and WeChat. This widespread adoption underscores the urgency for information professionals to understand the evolution, affordances, and implications of social media use in organizational and educational contexts. As social media becomes more intertwined with artificial intelligence (AI) and extended reality (XR), its potential to redefine information work continues to grow (Kingsnorth, 2019; Quesenberry, 2020).

3.0 Mainstream Social Media Categories and Their Relevance to Information Work

Social media today can be categorized into several mainstream types, each serving unique communicative and informational purposes. Understanding these categories helps information professionals identify which platforms best support their institutional goals and user engagement strategies.

Video-based and visual-first media now dominate information consumption. Information professionals' harness these to promote resources, educate users, and cultivate institutional identity (Boateng & Liu, 2023).

Table 1: *Categories of Mainstream Social Media and Their Relevance to Information Work*

Category	Examples	Information Use by Professionals
Social Networking Sites	Facebook, LinkedIn	Community engagement, networking
Video Hosting	YouTube, TikTok	Tutorials, outreach, e-learning
Media Sharing	Instagram, Pinterest	Visual storytelling, digital exhibitions
Blogging / Microblogging	WordPress, X (formerly Twitter)	Updates, research highlights
Messaging Apps	WhatsApp, Telegram	Real-time reference services
Discussion Forums	Reddit, Quora	Knowledge exchange, crowdsourcing

Source: Adapted from Nurul Huda Izzati bt Jamil (2024).

4.0 The Role of Information Professionals in the Social Media Era

The contemporary role of information professionals has evolved from custodians of knowledge to digital communicators, content strategists, and data analysts. In the era of participatory media, these professionals must integrate social media literacy into their daily functions to remain relevant and impactful (Al-Daihani & Abrahams, 2018).

4.1 Social Media Literacy and Digital Citizenship

Social media literacy encompasses the capacity to evaluate, verify, and ethically manage information online. Professionals act as *digital stewards* guiding communities against misinformation (Manca, 2021).

4.2 Expanded Job Scopes

- **Digital Engagement Librarian / Social Media Curator** – manages an organization's online presence, develops multimedia content, and monitors engagement analytics.
- **Digital Marketing & Outreach Specialist** – designs campaigns to promote digital resources, reading programs, and library services through platforms like Instagram and TikTok.
- **Information & Media Literacy Trainer** – conducts workshops to strengthen public competencies in evaluating online information and combating misinformation.
- **Online Community Manager / Knowledge Facilitator** – nurtures digital communities (e.g., book clubs, alumni networks, or research groups) to encourage continuous engagement.
- **Data & Analytics Officer** – interprets user engagement data to optimize content strategy and service delivery.
- **Content Creator / Multimedia Archivist** – produces infographics, podcasts, and short videos to transform static collections into interactive narratives.

These emerging roles require multidisciplinary expertise that blends communication, data analytics, and design thinking with core information science principles (Boateng & Liu, 2023). Professional associations such as the American Library Association (ALA) and the International Federation of Library Associations (IFLA) have also emphasized digital fluency, online collaboration, and ethical content management as essential competencies for the twenty-first-century information workforce (ALA, 2023).

4.3 Strategic Use of social media in Information Services

Social media also supports the strategic goals of libraries and information centers through branding, community engagement, and service innovation. By adopting frameworks such as Quesenberry's (2020) *social media strategy model*, institutions can integrate consistent content planning, audience segmentation, and performance measurement into their operations. The emphasis is no longer on "posting for visibility," but on building authentic relationships and fostering participatory knowledge exchange.

Furthermore, analytics tools provided by platforms like Facebook Insights, Instagram Analytics, and TikTok Business Suite allow professionals to assess reach, engagement, and impact (Kingsnorth, 2019). Data-driven insights help librarians evaluate which content resonates most with users, enabling adaptive learning and evidence-based decision-making.

4.4 Ethical and Professional Challenges

Despite its benefits, the integration of social media in information work poses challenges related to privacy, data ownership, and ethical communication. Information professionals must ensure that user data collected through social platforms complies with institutional and legal standards (Jeyasekar & Saravanan, 2019). They must also uphold professional integrity by maintaining neutrality, avoiding biased content, and respecting cultural sensitivity in digital interactions (Tuten, 2020).

Ultimately, the effectiveness of social media use depends on the professional's ability to merge ethical awareness with innovative engagement. When strategically managed, social media becomes a bridge between institutions and the communities they serve—transforming libraries and information centers into dynamic, interactive knowledge hubs.

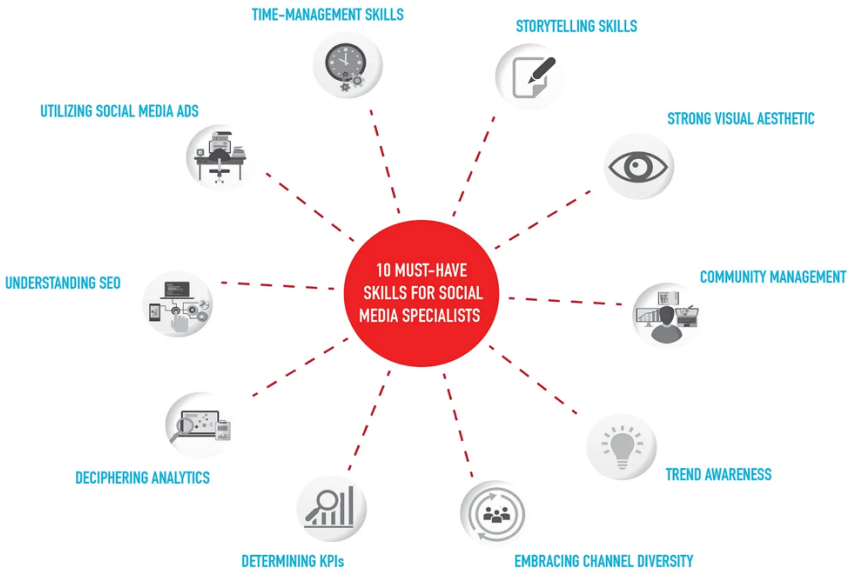

Figure 2: *Social Media Skills Framework for Information Professionals*
Source: https://medium.com/academyusmc/10-must-have-skills-for-social-media-specialist-a010ad817dee

5.0 Challenges and Ethical Considerations

While social media offers vast opportunities for communication, it also presents complex challenges that directly affect information professionals. Among the most pressing are **information credibility, data privacy, digital burnout, and ethical content management** (Manca, 2021). The open nature of social media blurs the line between verified information and misinformation, making it essential for professionals to assume the role of *digital gatekeepers* who guide users toward credible sources. Librarians and archivists now find themselves combating fake news and algorithmic bias while promoting media literacy within their communities (Parveen et al., 2016).

Another major concern involves **privacy and data ethics**. The collection of user data by social platforms for analytics and advertising raises questions about informed consent and data ownership (Jeyasekar & Saravanan, 2019). Information professionals who manage institutional accounts must comply with privacy laws such as the *General Data Protection Regulation (GDPR)* and local data policies to ensure that user information is handled transparently and ethically (Al-Daihani & Abrahams, 2018). They are expected to balance outreach efforts with confidentiality, ensuring that institutional communication remains respectful of user rights.

Additionally, the **rapid pace of digital change** can lead to professional fatigue and skills gaps. Continuous technological evolution demands constant learning—analytics dashboards, algorithmic updates, and emerging platforms require ongoing adaptation (Kingsnorth, 2019). To address this, institutions should invest in staff training and foster a culture of digital resilience. Ethical social media use also requires emotional intelligence,

inclusivity, and cross-cultural awareness to ensure that content reflects the diversity of audiences and avoids reinforcing stereotypes.

The **ethical dimension of engagement** extends to tone, representation, and advocacy. Social media allows professionals to voice institutional values, but this power must be used responsibly. Every post, image, or comment contributes to the public perception of an institution. Thus, ethical stewardship of digital identity has become an integral aspect of professional accountability in the information field (Tuten, 2020).

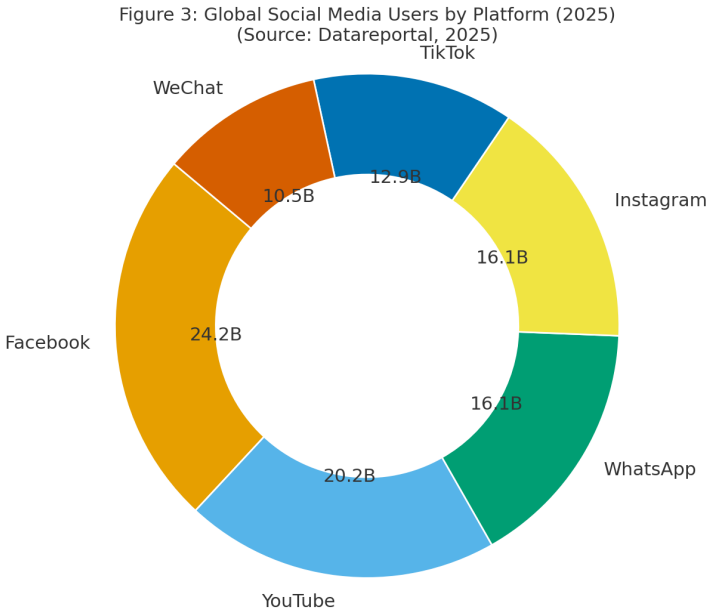

Figure 3: Global social media users by platform 2025
Source: Datareportal (2025).

6.0 Conclusion and Future Trends

Social media continues to redefine the information landscape by bridging boundaries between institutions and their communities. For information professionals, mastery of these platforms is not optional—it is a core competency that influences visibility, credibility, and service effectiveness. From disseminating scholarly communication to engaging marginalized audiences, social media empowers professionals to extend the reach and relevance of information services (Quesenberry, 2020).

Looking ahead, the **future of social media in information work** lies in the integration of *artificial intelligence (AI)*, *extended reality (XR)*, and *semantic web technologies*. AI-driven personalization will enable libraries to tailor services according to user profiles,

while XR will support immersive knowledge experiences such as virtual archives, augmented exhibitions, and 3D learning spaces (IMD164 Chapter 1, 2024). These developments will push information professionals to adopt hybrid roles—part technologist, part educator, and part community advocate.

Ultimately, the effective use of social media depends on professional ethics, digital literacy, and a deep understanding of human interaction. When guided by these principles, social media ceases to be a mere promotional tool; it becomes an instrument of empowerment, connecting knowledge institutions with the people they serve. As the digital era advances, information professionals who embrace innovation, inclusivity, and integrity will continue to shape the future of global information exchange.

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INTRODUCTION TO METADATA

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1.0 Definition and Importance of Metadata

Metadata is often referred to as "data about data" because it is information that describes and provides context for other data. More formally, metadata is structured information that describes, explains, locates, or otherwise facilitates the retrieval, use, or management of an information resource (Duval, Hodgins, Sutton, & Weibel, 2002; National Center for Education Statistics, 2025). One of the most fundamental elements in managing digital information is metadata, and its importance cannot be over state. Simply put, metadata provides the context needed to understand and manage data, acting in the most basic sense as an information wrapper around content. A digital photograph has metadata that describes it which includes the date it was taken, the model of the camera, and the GPS coordinates of the photograph. Each of these data helps to furnish the photograph and put it in context. More formally, metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource (Duval, Hodgins, Sutton, & Weibel, 2002; National Centre of Education Statistics, 2025)

Good metadata practices ensure that resources are discoverable, identifiable, and usable over time (ANSI/ INSO, 2004; National Centre of Education Statistics, 2025). Metadata allows users and systems to find relevant information by title, author, keywords, dates, and other criteria, much as a library catalog record (a classic form of metadata) helps locate a book resource (National Centre of Education Statistics, 2025). It also helps distinguish similar items and organize resources into meaningful categories (ANSI/ INSO, 2004). Critically, metadata is *key to the long-term preservation and access* of digital resources, as it documents essential information that helps future users verify authenticity and understand a resource even as technologies change. For instance, metadata that records *file format* and *creation date* can be crucial if one needs to migrate an old digital file into a new format years later. With the advent of the big data era and the surrounding chaos of information, effective metadata is required to manage and structure data for easy sharing and retrieval within and across systems over time. The absence of metadata would render digital content analogous to physical content in a library with a missing index, existing but effectively hidden and inaccessible.

2.0 Types of Metadata

For the purpose of describing and managing information resources, metadata can take several forms. The major categories include:

- **Descriptive Metadata:** This refers to the content of metadata elements used to enable the identification and discovery of a tangible resource. Descriptive metadata includes attributes such as title, author, abstract, keywords, and subject matter. An instance is the bibliographic information on a library catalog card or

the title and description within a data repository record. These data elements are stored in the descriptive metadata, enabling users to locate the resource and understand its content.

- **Structural Metadata:** Structural metadata conveys how the parts of an information resource relate to and interact with one another. It reveals something about the resource's internal structure, for instance, the order of elements, or book pages, or the arrangement of chapters, sections, and subsections, which is a part of a document (NFES, 2009). For digital objects, structural metadata might describe how a set of image files together constitutes a multi-page scanned report, or how database tables relate to one another. For digital objects, structural metadata might describe how a set of image files together constitute a multi-page scanned report, or how database tables relate to one another. This type of metadata is crucial for navigation and display – for instance, a table of contents for a digital textbook is enabled by structural metadata.

- **Administrative Metadata:** concerns the management and processing of resources and can be further subdivide into analytical types with respect to technical aspects, rights, and preservation. This essentially covers the administrative 'who, what, when, and where' aspects of any process, including the file type, file size, file creation date, and the entire process of file modification. This is sometimes referred to as 'technical metadata' when discussing such details as systems (CCSDS, 2012). This also includes rights metadata (also known as administrative access control and the individual management of copyright and usage rights to the information resource) and preservation metadata (which includes data resources to be kept and maintained for future resource time). For instance, administrative metadata of a PDF document might as well include the software version and the document's checksum (technical metadata), the copyright and the license (rights metadata), and other actions accomplished for its preservation, such as a change from another format (also referred to as obsolete format preservation). Every organization has specific administrative metadata for each resource, enabling it to store, secure, and preserve the resource with proper administrative metadata.

- **Preservation Metadata:** A subset of administrative information often highlighted on its own due to its importance, preservation metadata includes all the details necessary to sustain and protect a digital resource in the long term. he protective administrative access to the document is partially classified and simultaneously contains administrative metadata that indicates the document should not altered. This metadata includes description information and details of actions taken to preserve the document, such as backups or changes to the document's format. Preservation metadata standards, such as PREMIS (Preservation Metadata: Implementation Strategies), identify entities like objects and events, and culminate in maintaining a record of this information. Preserving such records and maintaining access to this information is essential, alongside the metadata that ensures, at the very minimum, the digital materials can be relied upon to be authentic and accessible throughout the advancement and emergence of new technologies.

- **Provenance/Usage Metadata:** This form of metadata describes how resources have evolved, their usage patterns, or the case histories of owners, including access, modification, and usage characteristics such as downloads and ratings (Idan, 2025). Provenance metadata is especially useful for tracking the lifecycle of data and establishing trust: for instance, a dataset's provenance metadata might detail the dataset's original creator, subsequent alterations or annotations, and references to derived works. In library and archival contexts, usage metadata could include circulation records (e.g., the frequency with which a book or digital item has checked out. This type of metadata helps assess the *impact and authenticity* of resources by providing a usage history.

Table 1 below summarizes some of these metadata types with their typical content, description and examples:

Type of Metadata	Description	Example
Descriptive	Information that *describes* the content of a resource to support discovery and identification. Includes bibliographic details and content summaries.	Title, author, and abstract of an academic article (helps users find and understand the article's topic).
Structural	Information that indicates how a resource is *organize or structured* internally. Describes relationships between parts of a resource (NFES, 2009).	The hierarchy of chapters and sections in an e-book, or the sequence of images in a scanned manuscript, enables proper navigation and display (enables proper navigation and display).
Administrative	Metadata used for *managing* a resource. Includes technical details (format, size, creation date), as well as rights and preservation information necessary for long-term management.	File format (e.g., PDF/A), file size, creation/modification dates; access rights (e.g., Creative Commons license); preservation actions taken (migration from an older format).
Preservation	Information that supports the *long-term preservation* and authenticity of a resource. Often records provenance, technical environment needed,	A digital image's metadata includes its original format (TIFF), checksum hash for integrity, the date it was last successfully copied to a new storage medium, and the identity of the

Type of Metadata	Description	Example
	and preservation actions.	archivist who performed the copy.
Provenance/Usage	Metadata captures the history and usage of a resource. Documents the origin, ownership, and how the resource has been used or altered and often used to establish authenticity and track changes.	A dataset's version history showing it was created by researcher A, later updated by researcher B; or library usage logs indicating a document was downloaded 200 times in the past year.

3.0 Conclusion

Metadata serves as one of the new pillars of digital information management. It is metadata that elevates data from a simple collection of bits to something comprehensible, accessible, and credible. In libraries, archives, data repositories, and content management systems, metadata connects users to the necessary information, uniformly describing resources and enabling their effective retrieval. Information in the form of metadata provides the context and evidence needed to manage digital resources over time, from their creation to various stages of use, preservation, and final disposition. In other words, good metadata converts data into a resource, which is then appropriately integrated into the knowledge network of an organization or a community.

At the same time, the challenges associated with generating and sustaining high-quality metadata continue to evolve. As a systematic review of metadata practices observed, "*metadata can be a powerful tool for identifying, describing, and processing information, but its meaningful creation is costly and challenging" (Ulrich et al., 2022)*. Ensuring metadata quality requires investment of time and expertise; decisions about how detailed metadata should be (the principle of refinement) must balance cost and benefit. In addition, the metadata associated with content continues to grow at a high speed and become more diverse, resulting in the need for increasingly sophisticated and specialized metadata frameworks that must continually adapt in new and more sophisticated ways . Configurations that arise in new formats (such as social media status updates and sensor data streams) are associated with emerging metadata standards and, in some cases, even the need for new extensions to existing standards. The principles of modularity and extensibility are more relevant than ever, and metadata schemas can evolve without losing the foundational concepts of interoperability. Interoperability itself remains a substantial concern, as organizations continually attempt to aggregate, share, and exchange metadata between systems (to share research data and its associated metadata through aggregators, library catalogs, and systems that enable users to perform web searches, etc.). Collaborative Interoperability suffers from a lack of Interoperability, the need for Interoperability with shared standards (such as Dublin Core

or schema.org), and the application of controlled vocabularies that have been developed. Other ongoing and relevant challenges include integrating and automating metadata. The generation of automated systems that can create technical metadata or automatically generate technical block systems can change the cost dynamic. However, automation systems of this nature do, in and of themselves, raise concerns about accuracy and consistency. The evolution of metadata is likely to include an engagement of automated systems with human specialized systems to manage the information overload and volume associated with data.

To summarize, metadata plays a crucial role in managing digital information. It is the basis of each activity, from a simple search to a search over an archiving system. Metadata provides the connective tissue that enables information to be organized into collections, understood in context, and preserved as authentic evidence of activities. As technology advances, metadata standards and practices will continue to mature, addressing current challenges such as scalability, semantic interoperability, and multilingual access. In this case, the information society can ensure that metadata meets the challenges by respecting and applying appropriate frameworks, utilizing diverse professional and contemporary techniques and tools. Ultimately, without proper metadata, digital information would not be accessible or valid for future endeavors that support digital research, education, knowledge growth, and the preservation of cultural and ideological heritage.

***Note**: These categories are not always mutually exclusive – for instance, some technical details (an administrative aspect) can also serve preservation purposes, and provenance metadata is often considered part of administrative or preservation metadata. Nonetheless, this classification illustrates the multifaceted nature of metadata, addressing different user needs and management requirements.*

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INFORMATION PROFESSIONAL IN LIBRARY CONTEXT

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1.0 Introduction

Information has become one of society's most valuable resources in this age of rapid technological and digital change. To keep track of all this information, you need skilled professionals who can gather, sort, evaluate, and share it quickly. These individual are referred as information professionals. They work in a number of fields, such as libraries, archives, research institutes, organizations, and digital platforms. Their job is to make sure that information is accurate, easy to find, and used responsibly. The information professional's job goes beyond just managing data; it also includes understanding what users need, putting information technology into action, and helping people make decisions and learn new things. As the world of information changes, organizations and society as a whole need information professionals more and more.

An Information Professional is someone who knows a lot about organizing, managing, and finding information, and they often work in environments where technology changes quickly (Miller, 2017). Winterburn (2023) describes the information professional as an important link between huge data stores and the information needs of the end user. This job requires not only technical knowledge of data management and retrieval systems but also a deep understanding of information literacy and user centered service design (Jorgensen & Weis-Fogh, 2024).

An information professional is someone who are train to manage information resources and services. In library context they might be called a:

- Librarian

  Is a keeper of knowledge, a curator of collections, and a teacher who helps people find their way through information landscapes. This profession has changed a lot over time encompass task of preserve digital files, create metadata, and use new technologies to make things easier to find and access (Tait et al., 2016).

- Information specialist

  A professional who analyzes, organizes, and disseminates information within specialized domains, often using advanced technological tools to make it easier to access and understand (Hjorland et al., 2013).

- Knowledge manager

  Is a professional in charge of organizing the creation, sharing, and use of organizational knowledge to encourage new ideas and better efficiency and productivity (Schope, 2020).

- Digital librarian

A digital librarian is a specialist that manage and protect digital resources so that they can be accessed and used for a long time viability within an increasingly digital information environment (Zeiller, 2022).

- Data curator

Is a specialist in charge of organizing, preserving, and maintaining research data in a systematic way to make sure it is accurate, usable, and accessible for a long time (Varalakshmi, 2006).

2.0 Emerging of the Information Professional

In today's swiftly advancing digital landscape, knowledge is crucial to all facets of modern existence. The creation, storage, and utilization of information have evolved due to the abundance of data, developments in information and communication technology, and an increasing reliance on knowledge-based decision-making. These specialists are essential for the management, preservation, and accessibility of information across diverse contexts, including libraries, archives, corporations, and digital platforms. The emergence of the information professional reflects both technological innovation and society's evolving demands for accurate, reliable, and ethical information management. Comprehending the evolution, competencies, and obstacles of this emerging profession is crucial for recognizing its importance in the information era.

The responsibilities of information professionals must be continuously reassessed inside contemporary libraries, transitioning from conventional custodianship to the embrace of new roles in advancing knowledge infrastructures (Zhang & Liu, 2025) (Miller, 2017). This transition is primarily attributable to swift technical progress. It has transformed the methods by which individuals acquire, disseminate, and employ information (Adigun et al., 2024). Due to these changes, information professionals must master the navigation of intricate digital ecosystems and facilitate user engagement with diverse information sources (Zhang & Liu, 2025). As a result, information professionals are transitioning from static repositories of information to dynamic agents of knowledge creation and exchange. They are assuming additional responsibilities, such as employing advanced technologies and supporting open access initiatives (Onunka et al., 2023) (Ramesh, 2025). This redefinition aims to enhance academic discourse and pedagogical methods by cultivating new competencies, especially in data management and artificial intelligence (Kaur, 2024).

A prime example of this technical advancement is the rise of artificial intelligence. It is instigating substantial alterations in the operations of Library and Information Science and is revolutionizing several sectors worldwide (Alam et al., 2024). As a result, the essential competencies of librarians are transforming. They need to be able to understand the limits of technology, combine knowledge from different fields, and keep ethical standards in a society that is driven by algorithms. To address the requirements of its clients and remain current with creative pedagogical approaches, libraries are adopting new technology, such as artificial intelligence (Enakrire & Oladokun, 2023). This integration

seeks to revolutionize information management methods, improve user experiences, and streamline processes (Kumar & Jyoti, 2024).

To maintain relevance and efficacy in an era where technology and automation is transforming knowledge production and accessibility, information professionals must actively develop advanced skills, especially in artificial intelligence (Sousa, 2025) (Cox, 2022). Comprehending AI's capabilities, limits, and ethical implications is crucial for leveraging technology to improve library operations and services (Oladokun et al., 2025). From this progressive viewpoint, information professionals must employ AI-driven solutions like chatbots and recommendation systems to improve and tailor individuals' information-seeking experiences (Chandrashekara & Mulimani, 2024). Furthermore, academic libraries need to quickly change from being just places to get information to being important places to learn about artificial intelligence. This will help people become better citizens who don't let algorithms take over and support cognitive justice.(Sousa, 2025).

The rise of the information professional signifies a substantial transformation in societal perceptions and management of knowledge. The demand for skilled individuals capable of organizing, analyzing, and protecting information is rising as it emerges as the principal driver of social, educational, and economic progress. Currently, information professionals function as essential intermediaries linking data, technology, and human understanding. They guarantee that information is trustworthy, accessible, and utilized ethically. The swift transformations in the digital era demand ongoing education, flexibility, and adherence to professional standards, as seen by their changing role. In the end, the rise of the information professional represents not only a new career path, but also an essential reaction to the difficulties and opportunities that our information-driven world presents.

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RECORDS MANAGEMENT'S ROLE IN ORGANIZATIONAL MEMORY

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1.0 Introduction

Records management plays a crucial role in building and sustaining organizational memory by capturing, preserving, and providing access to the documented evidence of an organization's activities and decisions. Organizational memory refers to the collective knowledge and information embedded within the records, practices, and culture of an organization that supports ongoing operations and future decision-making.

Organizational memory emphasizes knowledge as an explicit asset, records management focuses on the creation and preservation of reliable, authentic, and accessible records that serve as the foundational evidence from which knowledge can be derived. Records become explicit organizational knowledge through a process of documentation, codification, and systematic organization that transforms raw information into accessible, structured knowledge. Initially, records serve as recorded evidence of activities, decisions, and transactions within an organization, containing factual data that is captured and preserved. When these records are properly managed and organized into manuals, reports, databases, policies, and procedures, they crystallize as explicit knowledge, which is defined as knowledge that can be clearly articulated, shared, and transferred across the organization.

2.0 The Importance

Managing and preserving institutional memory is critically important because it ensures continuity, enhances decision-making, and supports organizational learning and improvement over time. Institutional memory encompasses the collective knowledge, experience, best practices, and lessons learned accumulated within an organization, often stored in documents, databases, archives, and the minds of experienced employees.

By protecting this memory, organizations avoid losing valuable insights when staff leave or retire, preventing costly knowledge gaps. It helps organizations avoid repeating past mistakes and wasting resources "reinventing the wheel," thereby improving efficiency and fostering innovation. Preserved institutional memory also maintains an organization's identity, culture, and shared values, which strengthens employee morale and engagement.

Moreover, it safeguards competitive advantage by retaining critical information about strategies, industry trends, and customer preferences. Especially in public organizations, preserving institutional memory facilitates transparency, accountability, and good

governance by maintaining documented evidence of policies and decisions. To sustain long-term success, organizations must adopt strategies like documentation, mentoring, knowledge sharing, and technology-enabled recordkeeping to ensure institutional memory remains accessible, secure, and useful for future generations. Without diligent preservation, organizations face operational inefficiencies, weakened culture, resistance to change, and loss of strategic value.

3.0 The Process

This transformation involves processes such as metadata tagging and classification, enabling efficient retrieval and use. By integrating these documented records into knowledge management systems, organizations make the information available and reusable for decision-making, training, and operational consistency. The conversion of records into explicit knowledge enables institutional memory, fostering transparency and continuity, especially in complex or regulated contexts like public organizations. Essentially, records provide the foundational evidence that, when interpreted and organized, become formalized knowledge assets that support organizational learning, innovation, and governance.

Technologies such as document management systems, content management platforms, and semantic analysis tools further support this conversion by facilitating the extraction and refinement of meaningful knowledge from stored records. Moreover, advancing technologies such as electronic records management systems and cognitive tools facilitate the extraction and reuse of knowledge embedded in records, bridging gaps between information storage and knowledge application.

In the digital era, integrating records with knowledge management systems further enhances organizational memory by enabling intelligent reuse, data mining, and analytical extraction of insights from records, thus transforming them from static archives into dynamic knowledge assets that drive innovation and strategic planning. Therefore, records management acts as the structural framework that underpins an organization's memory, enabling it to safeguard its history while adapting and evolving to future challenges.

4.0 The Implication

Managing organizational memory offers multiple significant benefits that contribute to an organization's effectiveness and long-term success. First, it improves decision-making by providing easy access to historical data, lessons learned, and best practices that help avoid repeating mistakes and guide strategic planning. This leads to increased efficiency and consistency, as employees follow standardized procedures and avoid redundancies, thus boosting productivity. It also fosters innovation by enabling the organization to build on existing knowledge to develop new ideas and adapt to changing market conditions.

Strong organizational memory supports smooth onboarding and training by transferring critical knowledge to new employees, reducing the learning curve and maintaining operational continuity. Additionally, it preserves the organization's culture, values, and identity, which strengthens employee engagement and loyalty. In contexts such as public organizations, managing organizational memory enhances transparency, accountability, and governance by maintaining reliable records of policies and activities. Furthermore, it supports business continuity by protecting against the loss of knowledge from staff turnover or crises, ensuring resilience.

Overall, organizations that actively manage their memory gain a sustained competitive advantage, improved problem-solving capability, and greater adaptability in dynamic environments.

5.0 Conclusion

In conclusion, records management plays a vital role in the construction and sustenance of organizational memory by serving as the foundational source of documented evidence and institutional knowledge. While records provide reliable and authentic traces of past activities, transactions, and decisions, their systematic management ensures that this information is preserved, accessible, and transferable over time, effectively transforming raw data into explicit knowledge that informs future actions. The integration of records management with organizational memory systems enhances the organization's ability to capture valuable lessons learned, support transparency, accountability, and improve decision-making based on historical insights. Thus, effective records management not only safeguards an organization's intellectual capital but also enables ongoing learning, innovation, and resilience, making it a strategic asset in both public and private sector organizations. The continuous development of skills among records managers and alignment of records management practices with organizational knowledge needs are essential to maximizing the contribution of records to organizational memory.

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SIGNIFICANCE OF ELECTRONIC RECORDS IN HIGHER LEARNING INSTITUTIONS

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1.0 Introduction

Electronic records are a crucial part of how higher learning institutions manage their information. They include electronic copies of academic, administrative, and research-related data that have been made, saved, and kept electronically. The integration of electronic record management systems (ERMS) has completely changed how higher learning institution work by making departmental service delivery, efficiency, and transparency better. Electronic records management systems (ERMS) have changed higher learning institutions for the better by making them more efficient, open, and able to provide better service in all areas of academics, administration, and research.

ERMS function as centralized electronic repositories that adhere to recordkeeping regulations and standards, facilitating secure collection, access, tracking, management, and long-term preservation of higher learning institution documents, including contracts, student files, budgets, policies, and research data. The solutions enhance administrative efficiency by enabling effortless retrieval, fostering improved collaboration, ensuring data security, minimizing errors, and aiding compliance with legal and organizational mandates. Obstacles to adoption encompass user training and resistance to change; yet, the overall implementation of ERMS markedly enhances operational efficiency and accountability in higher learning institution.

Electronic records encompass any information or data documented in a machine-readable digital format, including numeric, graphic, audio, video, and textual modalities. Records may be generated, received, preserved, or communicated digitally via files including emails, word processing documents, databases, scanned photographs, and multimedia files. They can be classified as born-digital records (produced digitally, such as emails or PDFs) and digitized records (converted from physical documents, such as scanned papers).

Electronic records necessitate meticulous maintenance to guarantee their authenticity, secrecy, and integrity, and they must adhere to applicable rules and regulations when representing public or official information. They provide advantages including enhanced accessibility, efficiency, and adherence to regulations, however, necessitate specific concerns such as metadata management and safe storage on network drives or authorized cloud services.

2.0 Administrative efficiency

One of the primary significances of electronic records is their role in enhancing administrative efficiency. They enable faster retrieval, storage, and sharing of information, reducing reliance on manual processes (Chinyemba & Ngulube, 2021). This efficiency supports effective decision-making, minimizes delays, and enhances productivity among academic and administrative staff.

Tsvuura and Ngulube (2020) stated that electronic records are documents created and maintained by digital technology. Technology itself has created the possibilities to improve the quality of service delivery in most, if not all, organisations around the world. Today, the ability of any organisation to perform well hinges on its adoption of technology and how that organisation infuses into sustainability of that technology.

3.0 Accountability and transparency

Higher Learning Institutions are also more responsible and open when they preserve electronic records. Electronic records that are accurate and easy to find make it possible to check decisions and actions, which builds trust and honesty in the way institutions are run (Katuu, 2018). For instance, keeping electronic records of students, money, and research results makes it easier to follow the rules and keep track of things.

4.0 Research preservation and dissemination

It's also very significant to preserve and share research online. Higher Learning Institutions are good places to learn about assignment. Electronic records management protects research data and results and makes it easy to find them later (Chigariro & Mnjama, 2020). This helps preseeve information alive and makes it easier for academics to find.

5.0 Sustainability and cost-effectiveness

Also, electronic recordkeeping has the benefits of being environmentally friendly and cost-effective. They reduce the need for physical storage, paper use, and manual processing, which makes institutional operations more environmentally friendly and cost-effective (ISO, 2022).

6.0 Student services

More over, electronic records improve student services by making it easier to access academic transcripts, registration systems, and other administrative tasks online. This makes the whole student experience better and encourages digital change in colleges and universities.

7.0 Conclusion

In conclusion, the use of electronic records in higher learning institution is necessary to improve the efficiency of administration and the governance of the institution. Electronic records help businesses be more open, follow the rules, protect the environment, and keep improving the way they deliver services. To improve institutional accountability, protect intellectual property, and maintain high standards of operation, it is important to build strong electronic records management systems.

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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.

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CLOUD COMPUTING IN INFORMATION MANAGEMENT

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1.0 Introduction

Cloud computing is a revolutionary idea that has altered how businesses handle, store, and analyze data in the ever-changing world of information technology. For university students majoring in Information Management, understanding cloud computing is now a necessary ability instead of an optional one. The purpose of this chapter is to present a complete image of cloud computing by talking about its key ideas, distinct models, and a critical look at its merits and cons, especially when it comes to managing information. Students will have a better understanding of the challenges and be able to take advantage of the benefits of cloud technologies by delving at these different areas.

2.0 Getting to Know Cloud Computing

Definition and Important Features

Instead of using local computers or actual data centres, cloud computing is a contemporary method of delivering computing services. These services include storage, servers, databases, networking, and software. As with electricity, which we use from a power grid instead of producing our own, it enables people and organisations to access powerful digital resources at any time and from any location. A vital component of today's digital revolution, this technology offers cost effectiveness, scalability, and flexibility.

Cloud computing is the on-demand delivery of IT resources such servers, storage, databases, networking, software, analytics, and intelligence over the Internet, with a pay-as-you-go price model (Gilbert, 2025). Companies have to acquire, maintain, and upgrade their own hardware and software in a traditional on-premises infrastructure. This strategy is considerably different from that. The main idea behind cloud computing is that it lets people use computational power and storage when they need it, without having to worry about the infrastructure that makes it all work. This is because it provides scalable and adaptable resources as a service (Gilbert, 2025).

Some of the most important things that make cloud computing what it is are:

- **Self-service on demand:** Users can automatically get computational resources like server time and network storage when they need them, without having to go to each service provider (Gilbert, 2025).

- **Wide network access:** You can get to capabilities via the network using standard techniques that make it easy for different types of thin or thick client platforms to use them (for example, mobile phones, tablets, laptops, and workstations) (Gilbert, 2025).

- **Resource pooling:** The supplier employs a multi-tenant approach to combine its computing resources so that many clients can use them at the same time. The supplier dynamically assigns and reassigns different physical and virtual resources based on consumer demand (Gilbert, 2025).

- **Rapid elasticity:** You can swiftly add and remove capabilities, sometimes automatically, so that they can grow and shrink as needed. Customers typically think that there are no limits on how much they may take and when they can take it (Gilbert, 2025).

- **A metering feature** that is right for the type of service (such storage, processing, bandwidth, and active user accounts) lets cloud systems automatically control and optimize resource utilization. Both the service provider and the user can see how resources are being used by monitoring, regulating, and reporting on them (Gilbert, 2025).

Service Models (IaaS, PaaS, SaaS)

Cloud computing works through several service models that show how users can get to and use computing resources. Each model gives the user and the service provider a different amount of control, freedom, and responsibility. Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) are the three main service models. They build on each other, from giving you the maximum control over hardware resources to giving you ready-to-use apps. There are three basic types of cloud computing services:

- **Infrastructure as a Service (IaaS):** This concept lets you use virtualized computing resources over the internet. IaaS gives users the most power over their IT resources, like apps, operating systems, and network settings. Google Compute Engine, Amazon Web Services (AWS) EC2, and Microsoft Azure Virtual Machines are all examples.

- **Platform as a Service (PaaS):** PaaS lets customers create, run, and administer apps without having to worry about the trouble of creating and keeping up the infrastructure that is generally needed to make and launch an app. Google App Engine, AWS Elastic Beanstalk, and Heroku are a few examples.

- **Software as a Service (SaaS):** SaaS lets you get software programs over the Internet when you need them, and you normally pay for them on a subscription basis. Users don't have to install or execute the program on their own devices; they can utilize it through a web browser or a client application. Salesforce, Google Workspace, and Microsoft 365 are a few examples.

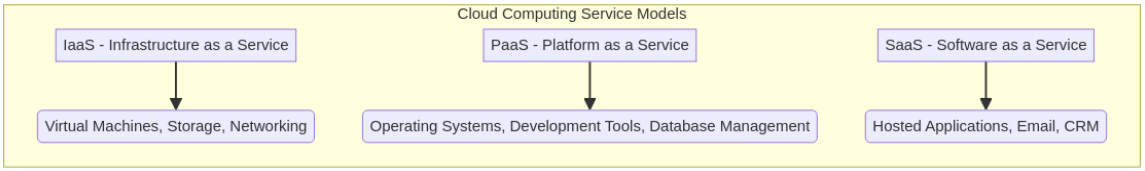

***Figure 1**: The three main types of cloud computing services: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), along with the parts that make them up.*

Deployment Models (Public, Private, Hybrid, Community)
Cloud deployment models explain how consumers can access cloud services:

- **Public Cloud:** Anyone can buy services over the public internet. In a public cloud, everyone uses the same hardware, storage, and network devices. The infrastructure is owned and controlled by the providers. Some examples are AWS, Google Cloud, and Microsoft Azure.

- **Private Cloud:** Only one business uses the cloud infrastructure. Someone inside the firm or someone else can take care of it, and it can be hosted on-site or off-site. You have more control and safety with private clouds.

- **Hybrid Cloud:** A combination of two or more different cloud infrastructures (private, communal, or public) that stay separate but are connected by proprietary or standardized technology that lets data and applications move between them. This architecture allows organizations use the best parts of both public and private clouds.

- **Community Cloud:** A group of organizations works together to support a specific community with similar goals, such as mission, security needs, policy, and compliance challenges.

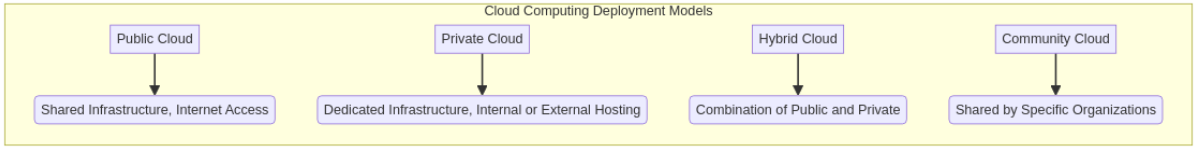

***Figure 2**: The four primary types of cloud computing deployment models: Public, Private, Hybrid, and Community Cloud. It also points out what makes each one unique.*

3.0 Benefits of Cloud Computing

Cost-Effective

One of the best things about cloud computing is that it may help you save money. When companies shift to the cloud, they can stop spending a lot of money on hardware and infrastructure (CapEx) and start spending money on things like rent and utilities (OpEx) that they can plan for (Ma, 2021, Gilbert, 2025). This means you don't have to spend a lot of money on servers, data centers, and the upkeep, cooling systems, and physical

security that go along with them (Gilbert, 2025). Cloud providers handle the infrastructure, so businesses don't require as many IT workers or the fees that come with them (Gilbert, 2025). For instance, small businesses can save between $15,000 and $30,000 a year on IT infrastructure by embracing cloud solutions (Gilbert, 2025).

Adaptability and Scalability

Cloud computing is incredibly adaptable and scalable, which means that businesses may easily modify the amount of computer power they need. Public cloud resources can immediately scale up when demand is strong, so e-commerce sites and other organizations can handle traffic spikes without slowing down (Gilbert, 2025). Because of this flexibility, firms only pay for the space they require. They can save money on hardware that isn't being used by increasing capacity when demand is high and lowering it when demand is low (Shahar, 2024; Gilbert, 2025). This capability is extremely helpful for firms that are growing because they can start with little and expand throughout the world without having to overhaul their systems (Gilbert, 2025).

Better Teamwork and Easier Access

Cloud computing makes it easier for individuals to work together and get to data and apps by giving them a single place to do so. Employees can get to data and apps from anywhere if they have an internet connection. This lets people work from home and makes them more productive (Gilbert, 2025). People can collaborate on documents, presentations, and spreadsheets collaboratively in real time from anywhere with Google Workspace and Microsoft 365 (Shahar, 2024; Gilbert, 2025). This is highly significant for schools since it lets teachers and students use learning materials and software from anywhere and at any time. It also helps pupils learn from home (Ma, 2021; Shahar,2024).

Business Continuity and Disaster Recovery

Cloud computing gives businesses a lot of good choices for staying in business and recovering from disasters. Cloud storage includes built-in backup and recovery options, and data is often stored in more than one place to keep it safe (Gilbert, 2025). This decreases recovery periods from days to hours by a lot, which is a major difference from traditional disaster recovery solutions that can be hard to set up and cost a lot (Gilbert, 2025). Cloud systems are intrinsically trustworthy, and their comprehensive disaster recovery management features help keep enterprises going even when things go wrong (Gilbert, 2025).

Automatic Updates and Maintenance

Cloud service providers handle all system upgrades, security patches, and regular maintenance on their own, so the infrastructure is constantly up-to-date and safe without getting in the way of corporate operations (Gilbert, 2025). This helps in-house IT staff work on more important initiatives and come up with fresh ideas instead of executing normal maintenance (Gilbert, 2025). This means that schools' IT departments will have less work to complete, which will help them use their resources better (Tozzi, 2024).

Global Reach and Environmental Sustainability
There are data centers for cloud services all over the world, so apps load rapidly no matter where the user is (Gilbert, 2025). Businesses can swiftly service clients all across the world thanks to this global infrastructure, which means they don't have to develop their own (Gilbert, 2025). Cloud data centers are also generally more energy-efficient than traditional installations that are on-site, saving up to 80% on energy costs (Gilbert, 2025). Cloud computing is good for the environment because it lets businesses pool resources and put money into renewable energy, which lowers their carbon footprint (Gilbert, 2025).

4.0 Problems with Cloud Computing

Concerns About Privacy and Security
Even if cloud security has gotten better, people are still quite worried about their data's safety and privacy. Cloud providers invest a lot of money on security systems, but users are also accountable for some of the security effort because of the shared responsibility model. Misconfigurations are a common cause of security problems in cloud settings (Gilbert, 2025). You lose some control and transparency when you submit data to a third party. This can make it tougher to meet data protection requirements like HIPAA, PCI-DSS, or GDPR (Tozzi, 2024; Gilbert, 2025). Schools and institutions that handle private student data need to make sure their security measures are solid and that their staff knows how to utilize digital technologies properly (Arkansas State University, 2023; Shahar,2024).

Problems with Internet Dependency and Connectivity
One fundamental concern with cloud computing is that it needs an internet connection. If the internet is down, cloud services won't work, which could mean that work stops and productivity drops (Ma, 2021; Gilbert, 2025). When you're doing a lot of data-heavy chores or using real-time apps, slow internet speeds might also make things less reliable (Gilbert, 2025). This dependence can be a concern, especially in regions where the internet isn't very dependable or for remote learning scenarios where students might not have enough bandwidth (Ma, 2021; Tozzi, 2024).

Little Control and Vendor Lock-In
A lot of people worry about vendor lock-in since cloud service providers generally use their own formats and APIs, which makes it hard and expensive to migrate between them (Gilbert, 2025). Transferring enterprise apps from one cloud provider to another can take a lot of time and money (Gilbert, 2025). This makes it tougher for a corporation to manage its infrastructure and could impair its capacity to negotiate, since changes to the platform could change how the business functions (Ma, 2021; Gilbert, 2025). Organizations may also have less control over upgrades, training, and other features when solutions are handled "as a service" (Ma, 2021).

Ongoing Costs and Cost Management
At initially, cloud computing can save you money, but if you don't keep track of your subscriptions, the expenses can build up and become greater than the costs of traditional infrastructure over time (Gilbert, 2025). 82% of firms believe that keeping track

of their cloud costs is one of their top worries (Gilbert, 2025). Usage spikes, data transfer fees (egress fees), API requests, and premium support can all add up to costs that go over budget (Gilbert, 2025). It's crucial to effectively optimize and manage the lifespan of data and resources so that you don't waste money and resources.

Concerns About Following the Rules and Laws

For regulated businesses like higher education (Tozzi, 2024; Gilbert, 2025), following all the rules on data privacy and security (including HIPAA, PCI-DSS, GDPR, and the HECA compliance matrix) is a huge difficulty. International restrictions about data sovereignty can make it much harder to use public clouds. Some rules, for instance, dictate that data must stay inside particular geographic bounds (Gilbert, 2025). It is hard to check that cloud providers are following the rules, and the organization is ultimately responsible for compliance, even if they employ outsourced infrastructure. This means that careful preparation and due diligence are essential (Gilbert, 2025).

Issues with Moving and Putting Together

It might be hard and take a lot of time to move current systems and data to the cloud. Organizations, especially those with limited IT resources, may find it hard to plan and carry out a successful cloud migration (Tozzi, 2024). When trying to link outdated apps to cloud, there can be challenges with integration, and not all specialized systems function with ordinary cloud platforms (Gilbert, 2025). For major firms, moving data can be expensive and take a lot of planning to make sure the change happens well and doesn't cause too many problems for business (Gilbert, 2025).

Strategic Implications of Cloud Computing in Information Management

Cloud computing has a big effect on how information is managed from a strategic point of view. It allows businesses stop worrying about their physical infrastructure and start thinking of new ways to use data and apps. If university students who are studying Information Management want to do well in their jobs, they need to know about these effects. Big data analytics and artificial intelligence (AI) apps can store and process more data on the cloud, which makes it easier to make decisions based on data (Shahar, 2024)]. It helps develop cloud-native apps and microservices architectures, which makes it easier to be agile and get new services to market faster (Gilbert, 2025). Cloud computing also changes how we manage information, which means that in a distributed environment, we need new ways to keep data safe, obey the laws, and manage it throughout its life cycle. Using global cloud infrastructure might help you reach more people and give them better service, but it can also make things harder because of restrictions about data across borders and political problems. To handle strategic information in the cloud, you need a thorough plan that takes into account the organization's policies, risk management, and the requirement to stay up to date on new cloud services and risks.

6.0 Conclusions

Cloud computing is a huge revolution in how we store, analyze, and send data. It is a fantastic choice for many fields, including higher education, because it has numerous

benefits, such as saving money, being more scalable, making it easier to work together, having robust disaster recovery, and being easier to maintain. But these benefits come with some huge problems, like worries about security and privacy, reliance on the internet, the danger of vendor lock-in, complicated cost management, and problems with obeying the rules. If you are a college student who wants to work in Information Management, you should know all the good and bad things about cloud computing. By carefully dealing with these problems and making the most of the capabilities of cloud technology, future information professionals may use the cloud to its fullest potential to promote creativity, efficiency, and resilience in their businesses.

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INFORMATION ANALYTICS : INFLUENCE OF CRUCIAL DATA PRE-PROCESSING PHASES.

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1.0 Introduction

Information analytics is one crucial process in any organization on obtaining insights based on existing data to facilitate data-driven decision making (Koukaras & Tjortjis, 2025). While data and information were crucially influencing the sustainability of organizations operation and productivity, the whole process of data would so much rely on how such data is being processed (Martins et al., 2025). However, while many look towards the information or data processing, the pre-processing stage influences the quality of data to be prepared for the actual data processing phase (Lopez-Miguel, 2021).

Pre-processing phases is an operation whereby raw data is prepared to be structured in enabling it to be analyzed (Martins et al., 2025). This phase happened before the process of the ETL (extract, transform and load) stage. It involves major pre-processing operations such as Data Cleaning, Data Integration, Data Transformation and Data Reduction (Koukaras & Tjortjis, 2025).

2.0 Influence of Pre-processing Phase towards Information Analytics

The pre-processing phase started earlier before ETL stage and the accuracy, timeliness and fitness to be used by organizations during analysis would influence the findings from the analytics process (Martins et al., 2025). Table 1 provides the goal and key activities of the pre-processing phase which highlight the major focus of each step in structuring the raw data before engaging any data analysis process (Lopez-Miguel, 2021).

Data Cleaning

Essential focus on the data cleaning is to focus on accurate and consistent data. This is the initial stage where we structure the datasets appropriately to guarantee its quality and reliability. To achieve this, the key activities are the crucial elements which involve identifying and rectifying errors, removing inconsistencies, and handling missing values (Côté et al., 2023). Some analysts may use popular software like PowerBi and Google Refine to execute data cleaning activities before engaging in any data analysis (Martins et al., 2025).

Table 1
Goal and Key activities of the pre-processing phase.

Pre-processing Phase	Primary Goal / Purpose	Key Activities / Focus	Important Notes / Tools
1. Data Cleaning	To achieve **accurate and consistent data**.	Error detection and correction, handling missing values and outliers, consistency checks, label / feature cleaning (for ML) (Côté et al., 2023)	Tool performance matters (e.g. PowerBi, OpenRefine, PyJanitor, Great Expectations) when data is large and domains vary (Martins et al., 2025)
2. Data Integration	To create a **unified data set**.	Combining various data sets.	This step is essential when working with multiple sources of raw information. An example is combining date, month, and year into a single, cohesive unit.
3. Data Transformation	To ensure data is adequately prepared to "provide and generate **valuable data and understandable data**".	Converting the data, **adjusting the format of the data**, standardizing the units, and normalizing the variable.	This process standardizes and adjusts the format of the variables.
4. Data Reduction	To **reduce the dimensionality of the data** while ensuring that all of its **essential information** is retained.	Trying to describe emptiness in the data, addressing irrelevant data, and performing structural reduction.	This process **does not** mean deleting or changing the original data. It manages the volume and relevance of the data.

Data Integration

Once a cleansed data is achieved, unified and compiled datasets are very important when the information or data that you have coming from multiple sources and a holistic perspective are required to be churned out from the data. However, the challenge comes in the aspect of harmonizing the data into cohesive and logical structure. Part of the challenge is the schema matching where data from multiple sources may have a variety of data schemas and structures which harmonization of data would become difficult to prevent misintegration of data. This is commonly due to the known cause called entity identification where data from different systems, schemas and structures could possibly represent similar data representation or vice versa (Wang et al., 2022).

Data Transformation

After the unification of the data completed, standardization and adjustments for the appropriate data format should be executed for optimum processing. Data transformation ensures the objective of preparing data for the processing stage with intention of generating valuable and insightful findings is achievable. Data will be converted or adjusted to the format of the required operation, standardizing the units, and normalizing the variable to ensure optimization of data preparedness for major analysis (Koukaras & Tjortjis, 2025).

Data Reduction

While maintaining the essential information retained in the data, dimension of the data requires reduction which intends to reduce and manage the data complexity and computational cost. As the volume of data explodes, the complexity of analysis may increase and prohibit analysis to be done thoroughly with less time consuming. Although reduction may be defined as deleting or changing data, but instead of deleting, data reduction can be rectified as summarizing information without deleting important aspects of original data. Besides, its major focus is to describe emptiness in the data, addressing irrelevant data, and performing structural reduction (Hancock et al., 2024; Zhang et al., 2023).

3.0 Conclusions

In data science, the pre-processing stage is the "behind-the-scene" operation that lies beneath any effective and accurate information analytics. The quality information derives from the final insights entirely depends on these four initial steps whereby ignoring part of them would expose the data to bias and inaccurate or flawed analysis. These foundational works are essentially required to avoid data chaos to generate reliable analytical information (Koukaras & Tjortjis, 2025; Martins et al., 2025

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ISBN 978-629-7647-07-4