UNIVERSITI TEKNOLOGI MARA

DIGITAL INFORMATION LITERACY (DIL) INDEX FRAMEWORK TOWARDS SUSTAINABLE COLLABORATION BETWEEN MALAYSIAN STATE PUBLIC LIBRARIES AND SCHOOL RESOURCE CENTERS

HAIZATUL AFNI BINTI BAKHTIAR

PhD

August 2026

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HAIZATUL AFNI BINTI BAKHTIAR

Thesis submitted in fulfilment
of the requirements for the degree of
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I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

In the context of rapid technological change, digital information literacy has become a critical component in teaching, learning, and reading promotion within both schools and libraries. Equally important is the readiness of state public libraries and school resource centers to implement digital information literacy, ensuring that the national education ecosystem remains responsive to ongoing technological advancements and innovations. This study investigates the role of digital information literacy (DIL) in fostering sustainable collaboration between Malaysian state public libraries and school resource centers. DIL is increasingly important in contemporary information environments because it enables users to access, evaluate, and use information effectively, supports lifelong learning, and strengthens competencies required for participation in digital society. Using a qualitative case-study approach, this research involved officers from 14 state public libraries and 13 officers from the Educational Resources and Technology Sector (SSTP) in Malaysia. Data were collected through online interviews conducted via Google Meet and were analysed thematically. The study aimed to examine existing DIL initiatives in state public libraries and school resource centers, identify implementation factors that support sustainable collaboration, explore collaborative dynamics that influence joint initiatives, and propose a Digital Information Literacy Index Framework for use in the Malaysian context. The findings indicate that sustainable collaboration depends on institutional commitment, shared expertise, resource readiness, digital infrastructure, and clear programme alignment between partner institutions. Based on these findings, the study proposes a DIL Index Framework that offers a structured approach for planning, implementing, and evaluating collaborative DIL initiatives. The framework contributes practical guidance for policy, programme development, and capacity building, and provides a foundation for strengthening digital information literacy ecosystems in Malaysia.

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LIST OF ABBREVIATIONS

Abbreviations

ALA	American Library Association
ADHD	Attention Deficit Hyperactivity Disorder
AI	Artificial Intelligence
COVID	Coronavirus Disease
DEC	Digital Enhancement Center
DELIMa	Digital Educational Learning Initiative Malaysia
DIL	Digital Information Literacy
DILP	Digital Information Literacy Program
DTI	Digital Transformation and Innovation
EC	Ethical Principles
IFLA	International Federation of Library Associations and Institutions
ICT	Information, Communication, and Technology
IR 4	Fourth Industrial Revolution
JSTOR	Journal Storage
LIS	Library and Information Science
LMM	Information Literacy Programme
LMT	Library and Media Teacher
MARA	Majlis Amanah Rakyat
MCMC	Malaysian Communications and Multimedia Commission

MIL	Media and Information Literacy
MCO	Movement Control Order
MOE	Ministry of Education
MLIS	Masters in Library and Information Science
MQA	Malaysian Qualifications Agency
NGOs	Non-Governmental Organizations
NEP	New Economic Policy
NLM	National Library of Malaysia
NILA	National Information Literacy Agenda
NILAM	Nadi Ilmu Amalan Membaca
PANDei	People Accessible Network for Digital Empowerment and Inclusivity
PCG	Per Capita Grant
PERPUSTAM	Melaka State Public Library
PIBG	Parent-teacher Associations
PKG	Pusat Kegiatan Guru
PKL	Kuala Lumpur Library
PNM	Perpustakaan Negara Malaysia
PNS	Sabah State Library
PPAJ	Johor State Public Library
PPAK	Kedah State Public Library
PPAK	Kelantan State Public Library

PPANPk	Perak State Public Library
PPANPs	Perlis State Public Library
PPANS	Negeri Sembilan State Public Library
PPAP	Pahang State Public Library
PPAPP	Pulau Pinang State Public Library
PPAS	Selangor State Public Library
PPAT	Terengganu State Public Library
PPC	Pay-per-click Marketing
PPM	Persatuan Pustakawan Malaysia
PSPP	Program Sijil Pembantu Pustakawan (Librarian Assistant Certificate Program)
SDGs	Sustainable Development Goals
SPL	State Public Library
SPLKPM	Sistem Pengurusan Latihan KPM
SRC	School Resource Center
SSTP	Sektor Sumber dan Teknologi Pendidikan
STEM	Science, Technology, Engineering and Mathematics
ToT	Training of Trainer
UiTM	Universiti Teknologi MARA
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
QA	Quality Assurance

VLE	Virtual learning environment
WWW	World Wide Web
YKS	Yuran Khas Sekolah
3M	Reading, Writing, and Counting

CHAPTER 1
INTRODUCTION

1.1 Study Background

In the digital era, information literacy has emerged as a critical competency, essential for navigating an increasingly complex and interconnected world. Digital Information Literacy equips individuals with the skills to access, evaluate, and utilize information effectively within digital environments. The significance of digital information literacy is further highlighted in the context of the United Nations' Sustainable Development Goals (SDGs), especially SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), SDG 10 (Reduced Inequalities), and SDG 11 (Sustainable Cities and Communities) (United Nations. (n.d.). As the digital divide continues to affect communities, fostering collaboration between public libraries and school resource centers is vital to ensuring equitable access to digital resources and educational opportunities.

This study examines how sustainable collaborations between these institutions can be developed to enhance digital information literacy and support the achievement of the SDGs. By exploring these collaborative mechanisms, the research aims to identify best practices that promote long-term educational sustainability and contribute to reducing inequalities, in alignment with SDG 17 (Partnerships for the Goals). Figure 1.1 below illustrates the 17 Sustainable Development Goals, which collectively aim to improve global well-being and the quality of human life by 2030. This study positions digital information literacy as a strategic enabler in achieving these goals, particularly through collaborative efforts between state public libraries and school resource centers.

Each of these SDGs is closely related to the role of libraries. Public libraries and school resource centers serve as agents of lifelong learning by providing reading materials and digital information literacy programs that support non-formal learning. First is SDG 4 (Quality Education), which refers to public libraries and school resource centers serving as agents of lifelong learning through the provision of reading materials and digital information literacy programs that support non-formal learning (Chuenchom, 2022). Second, SDG 9 (Industry, Innovation, and Infrastructure) is supported by public libraries, which function as centres for the provision of a wide range

of information and communication technology infrastructure, including internet access and digital databases, thereby facilitating equitable access to information (Aregbesola, 2024). Furthermore, SDG 10 (Reduced Inequalities), which is related to state public libraries and school resource centers, supports the principle of equal rights in access to information for all categories of library users, regardless of background, with particular emphasis on rural populations (Haryanto, 2024). For example, village libraries operating under state public library systems are in rural areas and provide information access to local communities.

Similarly, rural schools are supported through the provision of school resource centers that facilitate equitable access to educational information. Public libraries support SDG 11 (Sustainable Cities and Communities) by contributing to the development of inclusive, safe, resilient, and sustainable communities through the provision of accessible and secure public spaces and by functioning as community hubs for educational activities, particularly in the area of digital information literacy. SDG-17 focuses on strengthening partnerships with various organizations, including the expansion of services, the sharing of expertise, and the effective use of resources (Chuenchom, 2022), as well as collaboration in the implementation of digital information literacy initiatives.



Figure 1.1 17 Sustainable Development Goals (SDG)

The objective of this research is to establish a framework for sustainable collaborative initiatives between these institutions in Malaysia, specifically aimed at promoting digital information literacy. In an era where digital competencies are increasingly indispensable, partnerships between the state public library and the school resource center are essential. By leveraging the complementary strengths of both

institutions, this study seeks to design digital literacy programs and activities that are adaptable, scalable, and impactful. Ultimately, the proposed framework aims to ensure that library and media teachers are not only proficient in digital literacy themselves but are also empowered to effectively impart these competencies to students, thereby fostering a digitally literate and inclusive school community.

1.1.1 Digital Transformation and The Role of Digital Information Literacy

The American Library Association Digital Literacy Task Force in 2013 defined digital information literacy as the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. The difference between the two components of information literacy and digital information literacy is that information literacy is the general concept of locating, evaluating, and using information. Meanwhile, digital literacy specifically refers to the ability to do those things (information literacy activities) in a digital environment. In light of the present epidemic, digital information literacy has emerged as a key skill and aptitude for employees and professionals.

Before the emergence of digital information literacy, information literacy was the most common topic in librarianship and education. The first information literacy standards were established by the ALA Presidential Committee on Information Literacy in 1989 to define information literacy, design a model, and outline implications (McAdoo, 2013). The commonly used definition of information literacy is by Doyle (1992): -

"...information literacy is the ability to access, evaluate, and use information from a variety of sources. This represents the basic components of group consensus. This concise statement is expanded by a listing of the discrete attributes of an information literate person." (Doyle,1992)

Hence, for this study, digital information literacy is defined as the capacity of an individual to effectively use information and communication technologies to locate, evaluate, create, and communicate information. This competency requires the integration of both cognitive and technical skills to engage with multimedia formats, including images, text, and audio. As noted by Erica (2021), digital and information literacy is essential for ensuring access to high-quality information, supporting successful future career development, and facilitating lifelong learning.

The rapid advancement of digital technologies has revolutionized the way information is created, accessed, evaluated, and utilized. In this evolving digital ecosystem, digital information literacy (DIL) has emerged as a critical competency for individuals, organizations, and educational institutions. The digital transformation of libraries faces challenges, including limited technological infrastructure and budgets, low levels of digital literacy among staff and users, competition from other digital platforms, and a shortage of IT-competent personnel (Delliana et al., 2024). In response to these challenges, Maulida (2025) emphasizes that optimizing digital transformation requires a holistic approach that encompasses infrastructure enhancement, digital literacy training for staff, and the development of user-centered service features.

As information becomes increasingly abundant and complex, digital information literacy serves as a foundational skill enabling users to navigate information resources responsibly and effectively. Within the Malaysian context, state public libraries and school resource centers function as essential information institutions that support lifelong learning, educational development, and equitable access to digital resources (Perbadanan Perpustakaan Awam Selangor, 2021; SK Pendidikan Khas Jalan Batu - Pusat Sumber, 2021; Bukhari, 2024). Strengthening digital information literacy within these institutions is therefore vital for national educational progress and sustainability goals.

State Public libraries, as community-based knowledge hubs, are strategically positioned to promote DIL across diverse user groups (Mengenai Kami – Portal Rasmi Perbadanan Perpustakaan Awam Johor, 2025; PPANPk. (n.d.); Laman Rasmi Pustaka Negeri Sarawak -, n.d.). Similarly, school resource centers play a central role in developing students' information literacy abilities, which are necessary for academic success, future career readiness, and informed citizenship. Collaboration between these two institutions enhances resource sharing, program integration, and community outreach, ultimately fostering a more holistic and sustainable ecosystem for digital information literacy development. However, despite the growing emphasis on digital literacy, collaborative frameworks guiding sustainable digital information literacy initiatives in Malaysia remain limited and underexplored. This study addresses this gap by proposing a Digital Information Literacy (DIL) Index Framework that can support long-term, adaptive, and sustainable partnerships between Malaysian state public libraries and school resource centers.

In Malaysia, the government has launched a digital initiative to support citizens across multiple sectors. According to Berita Harian (2021), the MyDIGITAL program and Malaysia's comprehensive Digital Economy Blueprint are set to be implemented until 2030, aiming to position the country as a regional leader in the digital economy while promoting inclusive, responsible, and sustainable socio-economic development. The plan identifies six strategic thrusts: driving digital transformation in the public sector, enhancing economic competitiveness through digitization, developing digital infrastructure, cultivating a digitally skilled workforce, fostering an inclusive digital community, and establishing a secure and ethical digital environment. The MyDIGITAL initiative further seeks to empower all Malaysians, from Perlis to Sabah, by improving various aspects of daily life. Key measures include enhancing digital literacy, creating high-income employment opportunities, streamlining banking and financial services, providing virtual educational access for children, and extending healthcare services to remote areas (Prime Minister's Office, 2021).

In conclusion, state public libraries and school resource centers have embraced and adapted technology to enhance their services, improving efficiency and functionality, for example, as digital learning hubs. Moreover, it is essential to develop staff competencies to effectively implement digital information literacy and ensure its sustainability.

1.1.2 Institutional Roles in Facilitating Digital Information Literacy

This part discusses the role of organizations in developing digital information literacy, whether in state public libraries or school resource centers. Public libraries and school resource centers are interdependent entities that frequently collaborate in various contexts. The state public libraries rely on students, teachers, and school resource centers to implement programs and activities. In contrast, school resource centers benefit from the advocacy and support of public libraries to manage resources, conduct activities, and provide user service consultations. Public libraries and school resource centers play a crucial role in promoting digital information literacy by providing access to information, developing literacy skills, and fostering the ethical use of information. This helps create a knowledgeable community that can effectively navigate the digital age (Liu et al., 2023; Ghosh et al., 2024; Velip & Misal, 2025). However, the educational landscape has undergone significant changes due to the COVID-19

pandemic. In Malaysia, the implementation of the Malaysian Movement Control Order (MCO) on 18 March 2020 had a profound impact on numerous sectors, particularly the service and education industries (Tang, 2022).

Over the past year (2019–2021), it has become increasingly evident that digital information literacy is crucial, particularly for library and media teachers, in supporting educators throughout the teaching and learning process (Kirin et al., 2021; Mamat et al., 2021; Mokhtar et al.,2021). The COVID-19 pandemic led to the closure of schools worldwide, and the sudden shift to online classes revealed significant challenges, including the lack of digital devices and stable internet access. Furthermore, many teachers were unprepared and inadequately equipped with the necessary technological skills, often relying on self-taught strategies to conduct learning sessions (Mailis 2022; Rosli et al., 2022). Nevertheless, with the support of technology and expertise from state public libraries, coupled with effective collaboration with school resource centers, the development of digital information literacy among school teachers can be successfully achieved. The State public libraries are no exception in this regard, as stated by Otike et al. (2021), that libraries are modifying their functions due to technological advancements, particularly in reaction to the pandemic.

In this context, state public libraries and school resource centers assume a critically important role in addressing the urgent demand for technology use, while simultaneously guiding users in the effective and responsible use and management of digital information. This matter is consistent with the claim by Thompson et al. (2023) that the partnership between the public library and the school resource center helped students and teachers become more aware of available resources and services.

This is also acknowledged by McChesney (2022) that public libraries are recognized as essential institutions in supporting learning recovery and advancement for children impacted by this setback, and supported by Adle et al. (2023) that during the COVID-19 pandemic, public libraries adjusted their services by offering dependable information, instruction in information literacy, and health-related programs. The school resource centers also assisted students and their users by providing access to resources, encouraging healthy practices, and working to reduce inequalities in access to health information.

1.1.3 Barriers and Challenges in Implementing Digital Information Literacy

In the implementation of any initiative, there are inevitably obstacles and challenges that must be addressed. These obstacles and challenges may arise from various factors such as limited resources, time constraints, varying levels of skills, and the degree of support from stakeholders. The following discussion highlights issues related to digital information literacy, issues within state libraries, and issues in school resource centers.

1.1.3.1 State Public Library Issues

One of the primary functions of state public libraries is to provide current, accurate, relevant, and easily accessible information in various formats to support the economic and social development of the state and its citizens. To fulfil this role, state public libraries continually strive to deliver high-quality services to all user groups, including infants and pre-schoolers, primary and secondary school students, higher education students, public and private sector staff, families and communities, as well as individuals with special needs. However, in their efforts to offer optimal library resources and services, state public libraries also encounter several challenges. These include issues arising from the COVID-19 pandemic, rapid advancements in information and communication technologies (ICT), the digital divide, and varying levels of digital information literacy.

The most significant challenge occurred during the COVID-19 pandemic, which lasted from 2020 to 2022, when all services were closed except for 25 essential service sectors (Mohd, 2020), affecting libraries worldwide. During this period, libraries were required to operate entirely in a virtual manner. Various initiatives were implemented to provide the best possible services to users. Acknowledging the situation, libraries adopted multiple approaches to ensure that connections with users and the public remained uninterrupted.

Berita Harian reported that Perez-Salmeron (2018) stated that working in the field of libraries presents significant challenges, as information services continue to evolve with the emergence of modern technology and the digital era. This statement is supported by Nur (2020), who agrees that the rise of the information and communication technology era and knowledge-based economies (k-economy) has

intensified challenges for libraries and information centers worldwide, including in Malaysia. Therefore, according to Norashikin (2018), given these changing circumstances, it is essential to provide future library learning spaces that meet the evolving needs and demands of users, such as Wi-Fi facilities, and that serve as environments for studying, conducting research, engaging in discussions, socializing, relaxing, and more, to address the challenges of the Fourth Industrial Revolution (I.R 4.0).

Thirdly, with the advancement of diverse technologies, a digital divide has also emerged among library users. Some users quickly adapt to and utilize the new technologies provided in the library, while others require more time to embrace them. Wihelm (2004), as cited in Singh and Rajiv (2020), argues that technology itself is not the core issue; rather, it is how it is utilized, whether it empowers, liberates, or restricts individuals. The role of humans is crucial, and merely providing ICT is insufficient. This view is echoed by Hendry (2000), who contends that the digital divide extends beyond access to technology alone. In this regard, it is the responsibility of the state public library to bridge this gap, as Kinney (2010) notes that public libraries were recognized early on as key contributors to ensuring equal access to computers and the Internet.

Lastly, the issue of digital information literacy. In this context, state public libraries need to provide appropriate training for different user groups. The challenge lies in offering adequate training and resources to achieve this goal and sustaining such programs. Library staff should be equipped with methodological skills to serve as effective trainers (Kingori, 2016; Mansour, 2017). The ability to teach requires more than just knowledge of the technology; it involves a range of transferable skills that should be valued as equally important, not secondary (Martzoukou, 2016). By actively building their digital competencies, they strive to keep pace with technological changes, ensuring they can effectively curate, manage, and share digital knowledge (Onunka et al., 2023).

For this purpose, this study is crucial in ensuring that the digital information literacy programs implemented in state public libraries and school resource centers remain sustainable with the establishment of an appropriate framework in the future.

1.1.3.2 School Resource Center Issues

The school resource center serves as a space for students and the school community to engage in intellectual activities and library programs. It functions as a physical and digital learning environment within schools where activities such as reading, inquiry, research, critical thinking, imagination, and creativity are integral to transforming information into knowledge, thereby fostering students' personal, social, and cultural development (Majid, 2020). However, several issues and challenges are also encountered within school resource centers.

Over the past years (2019–2021), the vital importance of digital information literacy has become evident, particularly for library and media teachers, to support educators in the teaching and learning process. The COVID-19 pandemic resulted in school closures worldwide (UNICEF, 2021), and the transition to online classes commenced without adequate preparation, leading to numerous challenges such as a lack of devices, unstable internet access, and the high cost of internet packages (Zulaikha et al., 2021). Many teachers were unprepared (Newton, 2020) and lacked essential technology skills (Winter et al., 2021). Consequently, they often relied on their own abilities to conduct learning sessions. In response to the pandemic, new pedagogical models and online learning tools were developed to help students achieve their learning objectives (Schneider & Council, 2020). However, support from technology and expertise available in state public libraries, combined with effective collaboration with school resource centers, can enhance digital information literacy among school teachers. With regard to the pandemic, school resource centers have become more proactive in supporting teachers in teaching and learning. Wan (2020) listed several actions to be taken when schools are closed for extended periods, including the distribution of devices, increasing access to online classes, expanding student reach through television, and encouraging learning outside the classroom. These efforts align with digital information literacy in creating individuals who are confident in using, managing, creating, quoting, and sharing various sources of digital information effectively.

Nonetheless, Education 4.0 is also a matter of concern. Education 4.0 is closely linked to the Industrial Revolution 4.0 (IR4), which has become familiar to many. According to Dunwill (2016), Education 4.0 is defined as the use of technology in teaching and learning contexts. The teaching process has transformed and is no longer

confined to traditional methods; technology and devices are now widely used by students and teachers. Although Education 4.0 alters teaching and learning patterns, it presents both advantages and disadvantages. Lawrence et al. (2019) found that Education 4.0 provides opportunities for teachers to engage with and utilize new technologies, aligning with the statement by Yunita et al. (2020), who argue that Education 4.0 has transformed teaching methods into more technology-based approaches. Education 4.0 also enhances technological knowledge and usage for both teachers and students and supports classroom development using 21st-century learning technologies. In Malaysia, the Ministry of Education plans to transform teaching and learning patterns with a focus on knowledge, humanity, and industry, incorporating four principal aspects (Lawrence et al., 2019): redesigning learning spaces, incorporating 21st-century pedagogies, applying fluid and organic curricula, responding to innovations and new areas of knowledge, and integrating the latest teaching and learning technologies.

Although Education 4.0 presents many opportunities for teachers and students, it also brings challenges. The rapid introduction of new technologies may lead to resistance to change, as teachers and students, particularly senior educators, often remain in their comfort zones and require time to adapt. While people are digitally connected, they may also become socially disconnected, and technology may limit engagement between teachers and students. Safari and Dueñas (2020) identified three essential skills needed to face Education 4.0: skills to address economic challenges, skills to address social challenges, and skills to address environmental challenges. As the learning ecosystem shifts towards greater technological integration, challenges arise related to mobile networks (Kizilkaya et al., 2021). Emphasis must be placed on data rate and capacity, reliability and latency, edge/cloud computing, security, and privacy.

Furthermore, Huk (2021) described the teaching and learning processes under Education 4.0 as challenging due to the need to address the Internet of Things, cloud computing, big data analytics, autonomous process organization, augmented reality, horizontal and vertical integration, advanced robots, and co-robots. From these statements, it can be concluded that the Education 4.0 teaching and learning process is a complex challenge that requires teachers to navigate and integrate multiple emerging technologies to provide a modern and effective learning experience. To use these technologies effectively, teachers and students must acquire new competencies (Yunita et al., 2020), including:

i) digital literacy, which involves knowledge of new technologies and their classroom applications;
ii) data analysis, the capacity to gather, examine, and interpret information to guide instructional strategies;
iii) content creation, the ability to produce engaging and dynamic digital materials;
iv) collaboration, the capacity to work effectively with peers, administrators, and students in digital environments;
v) adaptability, the ability to modify instructional strategies in response to emerging technologies and evolving circumstances.

According to Dunwill (2016), significant changes are expected in classrooms within the next five to seven years, including changes in classroom layout, the use of virtual and augmented reality, flexible assignments to accommodate various learning styles, and the increased influence of massive open online courses (MOOCs) and other online learning options on secondary education. Similarly, Mallik & Mallik (2019) support this view, highlighting technologies that have transformed the digital classroom, such as eTexts, virtual libraries, online school portals, webcams, and teleconferencing, and mobile apps and augmented reality. They also note changes in teacher and student roles, increased motivation and self-esteem, enhanced technical skills, and greater use of external resources due to technology. Since predicting the future with precision is difficult, Haseeb (2018), as cited in Lawrence (2019), proposed that new educational programs must be designed to remain competitive and meet shifting demands over time.

Additionally, school resource centers face challenges related to limited funding and outdated resources. According to the Financial Circular Letter Number 8 Year 2012: Guidelines for Financial Management of School Assistance Allocations Based on Per Capita and Student Enrolment, funding for school resource centers is derived from *PCG Bukan Mata Pelajaran and Yuran Khas Sekolah*, covering expenses for purchasing reference books, encyclopaedias, and other teaching and learning materials. This funding also includes costs for inventory, consumables, maintenance, educational programs, and capital acquisitions for the school resource center. Allocations range from a minimum of RM2,000.00 plus RM10.00 per student for schools with more than 50 students, up to a maximum of RM13,700.00 plus RM12.00 per student for schools with more than 1,000 students (SSTP Kedah, 2024). From this circular, it can be

concluded that the funding received by school resource centers is insufficient, given the wide range of expenses to be covered.

Another issue is the qualification of library and media teachers. Qualifications are essential because they contribute to competency. Developing competency requires formal learning to ensure individuals become skilled or expert in a specific field. Massing & Schneider (2017) support this, noting that competency-building is grounded in formal education. Thus, greater access to knowledge and its utilization increases the level of formal education and basic competencies that can be achieved. Ahmad (2012) further stated that the country requires highly skilled workers, whose quality is assessed based on technical and employability skills. Consequently, teacher competency is necessary for managing technology-related areas, especially as digital information literacy requires skills to handle new technologies, highlighting the importance of qualifications in developing competency. Many studies on Malaysian school resource centers have shown that they are managed by non-certified librarians, meaning these individuals lack formal library and information science training.

According to Kamal (2012), Malaysian schools do not employ full-time, trained professional librarians; instead, teachers without such qualifications manage the resource centers. Typically, library and media personnel are selected from regular teachers and receive only a 36-hour training course before confirmation of their appointment, while also teaching 6 to 8 periods weekly. These teachers dedicate 18–20 hours weekly to managing the school resource centers in addition to their teaching duties (Husain et al., 2017). As they are not trained librarians, they encounter various constraints that hinder program success, particularly in implementing information literacy initiatives. The IFLA School Library Guideline (2012) emphasizes that school resource centers require qualified school librarians with formal education in librarianship and teaching to fulfil complex roles in instruction, literacy development, resource management, teacher collaboration, and community engagement. This issue cannot be directly resolved by state libraries, as recruitment is determined by the schools themselves. State libraries can, however, contribute by offering relevant expertise to teachers within their scope.

In practice, implementing digital information literacy in school resource centers presents significant challenges. In line with this, Lai (2008), as cited in Hazura et al. (2012), outlines four main obstacles to accessing digital services:

i. Mental access, referring to a lack of basic digital experience due to disinterest in technologies perceived as unattractive;
ii. Material access, referring to inadequate equipment and services such as computer hardware and network connectivity;
iii. Skill access, referring to the lack of digital skills caused by user-unfriendly technology and insufficient education, training, or social support;
iv. Use of access, referring to limited opportunities to use the Internet and ICT, which hinders access to digital services.

Previously, Johari & Siti (2010) found that teachers primarily use computers and ICT resources for personal purposes rather than for teaching and learning. The barriers identified include attitudinal factors, inadequate training, and limited facilities for teachers in the educational process.

The statements above highlight several issues and challenges faced by school resource centers, including the post-COVID-19 school environment, Education 4.0, changes in classroom dynamics, limited funding, outdated library resources, the qualifications of library and media teachers, and digital information literacy.

1.1.3.3 Digital Information Literacy Issues

Digital information literacy issues and challenges would also lead to misinformation and disinformation. The spread of fake news, propaganda, and manipulation increased, and information users are affected because they lack evaluation skills and influence on people's opinions and behaviours (Broda & Strömbäck, 2024). In addition, Kadam & Atre (2020) mentioned that during the recent COVID-19 outbreak, the spread of fake news and misinformation sparked significant concern and created numerous problems within the population. Schuetz et al. (2021) emphasized the importance of fact-checking to ensure that disseminated information is accurate and trustworthy, which is achieved by verifying the credibility of sources, cross-referencing multiple sources to detect inconsistencies, and consulting experts for complex topics. Additionally, analysing the timeline of events helps maintain chronological accuracy, while a contextual examination ensures that information is interpreted within its proper context (Brandtzaeg et al., 2018; Ceron et al., 2021). Thus, incorporating fact-checking

into their daily practices enables the information users to support the larger societal aim of cultivating a well-informed and critical-thinking public (Oladukun et al., 2024).

Education and curriculum gaps are also a challenge in digital information literacy. In some countries, digital information literacy is not integrated into the education system. Consequently, teachers may lack the necessary resources and training to teach digital information literacy effectively. To ensure students can fully benefit from their guidance, teachers must enhance their own digital competencies. (Fernández-Otoya et al., 2024). On top of that, Junaedi et al. (2024) stated that addressing the digital literacy gap requires a clear understanding of its underlying causes, including insufficient education systems, unequal access to technology, socio-economic challenges, and reluctance to adopt new technologies due to fear or lack of awareness. Advancing digital and technological literacy calls for focused educational programs, strategic policy measures, and strong collaboration between the public and private sectors in empowering both individuals and organizations to thrive in today's digital era. This is why integrating digital information literacy into school curricula is essential to prepare students for current and future technological advancements (Thelma et al., 2024).

Another challenge discussed involves language and cultural barriers. As is widely known, digital content is often presented in dominant global languages, such as English, and the terminology used can be complex and difficult to pronounce or understand, especially for non-native speakers or seniors. This can disrupt how digital information literacy is interpreted and applied. Someone may have applied an ICT activity, but due to language barriers, they may not know exactly what they are supposed to do. Abdullah (2021) reported that students with a low level of English proficiency self-reported difficulty practicing digital information literacy. In this case, Amiruddin & Kamba (2025) also stated that the main challenges of learning digital application technology include technical issues such as internet disruptions and malfunctioning devices, as well as a lack of technological knowledge and skills among teachers. In addition, Majid & Hassan (2024) highlighted that low self-efficacy, such as a lack of confidence, fear, and disinterest, also contributes to the reluctance of senior teachers to use technology.

Based on the discussion above, it is concluded that the digital divide is one of the challenges and issues in implementing digital information literacy that may need to

be reduced or overcome to ensure that the delivery and learning system continues smoothly and successfully, and has a positive impact on all parties involved.

1.1.3.4 Sustainable Issues

For instance, Matthews (2020) emphasized that collaboration plays a vital role in organizational sustainability, particularly within the non-profit sector, where non-profit organizations often rely on external partners for resources to support their operations and achieve their goals. For any public organization, sustainability is a fundamental aim, as its activities represent just one part of what sustains the organization as a whole. Both sustainable and sustainability terms are essential to understanding these two crucial concepts. This understanding plays a critical role in helping solve some of the challenges in the world today, such as extreme weather, poverty, climate change, armed conflicts, and inequity across society. Sustainable describes the processes for improving long-term economic well-being and quality of life without compromising future generations' ability to meet their needs. Meanwhile, sustainability is a broad term that describes managing resources without depleting them for future generations. This concept extends beyond environmental sustainability, which concerns the earth's natural resources, to include economic and social sustainability, which relates to meeting people's current economic and social needs without compromising the needs of future generations. Individuals with a comprehensive understanding of these two essential concepts can help support society's current needs and plan for the future. Professionals in the sustainability field can use their knowledge to help organizations integrate the principles of sustainability and sustainable development into their operations. They can also guide government and business leaders in developing sustainability goals, defining sustainability success, and assessing the effects of their decisions. Their actions can make an impact on equity, responsibility, and social justice (Maryville University, 2020).

There are various definitions of sustainability made by various parties, whether individuals or organizations. Ozili (2022) defined sustainability as,

> "*Sustainability is a philosophy, an approach or practice that guides the use of today's resources in an efficient manner to ensure that resources are available and sufficient to meet today's needs and the needs of future generations. Sustainability is also defined as the ability to make responsible decisions in using and allocating resources to economic and non-economic activities in an effort to achieve some desired social, economic, and environmental outcomes." (Ozili, 2022; p.4)*

On the other hand, Mollenkamp (2023) stated that sustainability is used to describe the capacity to sustain or maintain a process over time. Sustainability in commercial and policy contexts aims to keep natural or physical resources from running out so they continue to be applied for a long time to come. European Environment Agency (2023) mentioned that sustainability is hard or difficult to achieve because we consume too much, in an unsustainable manner, and transitioning to sustainability is hard: the challenges come from legislation, governance, companies, technologies, and personal behaviours and mindsets. As highlighted by the European Environment Agency, achieving sustainability is a herculean task due to the many challenges we face. These include our unsustainable consumption habits and the need for transformative changes in legislation, management, companies, technology, and individual behaviour and thinking.

However, libraries can play an important role in promoting sustainability (Che Nasir, 2023) by providing in-library services such as free access to information and resources that can educate and empower citizens to make more informed choices about their usage habits and lifestyles, and Aytac (2017) concludes that libraries are ready to become the heart of worldwide sustainability efforts. By offering a wealth of information on sustainable living, environmental issues, and alternative technologies, libraries can assist organizations as well as individuals in developing a deeper understanding of the relationship between human well-being and the environment. This will encourage and may inspire organizations and individuals to adopt more sustainable behaviours and lifestyles, ultimately contributing to the achievement of a more sustainable future for the organization.

Sustainability is a complex issue that calls for both original thinking and an all-encompassing strategy. To properly address this issue, diverse cooperation is essential. When companies, governments, non-governmental organizations, and communities collaborate, they pool various views, resources, and expertise (Sustainability, 2024). To find out what the challenges associated with the sustainable collaborative initiative are,

the researchers have divided it into three main pillars, namely economy, environment, and society (Kenneth, 2024). Based on these three main pillars, the idea of 'economic sustainability' centers on protecting both renewable and non-renewable natural resources that serve as physical inputs for economic activity. The idea of 'environmental sustainability' focuses more on soil and atmosphere, two life-support systems that are essential for economic activity and human existence. Meanwhile, social sustainability is about how the economic system affects people personally and includes initiatives to end hunger and poverty and combat inequality (Mollenkamp, 2023).

1.1.3.5 Economy

Economic sustainability describes the ability of an economy to grow, and important nowadays as many initiatives require financing and a strong economic rationale (Browne, 2022). According to The Welding Institute (2024), a business needs to be profitable and generate enough money to last into the future in order to be considered economically viable. Finding a balance is the difficult part of this kind of sustainability. Instead of pursuing profit at all costs, businesses ought to endeavour to produce profit in line with other aspects of sustainability.

1.1.3.6 Environment

Environmental sustainability symbolizes important things like natural resources and biodiversity to support life and the Earth (Browne, 2022). The entire global ecosystem, which includes oceans, freshwater systems, land, and atmosphere, is involved in environmental sustainability. Nonetheless, the concepts of environmental sustainability are equally applicable to ecosystems of all sizes, including modest home gardens (The University of Maine,2018). The Welding Institute (2024) stated that environmental sustainability focused on cutting down on inefficient supply chain procedures, non-biodegradable packaging, water use, and carbon footprints. These procedures are frequently beneficial monetarily and environmentally, as well as being cost-effective. Due to the serious environmental imbalances, HEC Paris (n.d) highlights that, due to the environmental degradation caused by excessive human consumption and industrial production, communities of civil society, activists, governments, scholars, and practitioners worldwide are urged to support sustainability

1.1.3.7 Social Sustainability

Social sustainability is important in social structure, well-being, and harmony that can affect poverty, wars, and injustices (Browne, 2022). Its consist of a) implementation, such as ensuring programs fit the local context, b) instability, such as conflict between nations, and c) governance, such as the political will to transform development programs into sustainable long-term practices. As noted by Gibson (2023) stated that someone who has worked on a long project or in a vast bureaucracy understands how exhausting and frustrating it can be to carry out any cooperation, and cooperating with people to achieve a common goal is difficult. Moreover, the European Environment Agency (2023) stressed that legislation, government, businesses, technology, and individual attitudes and behaviours are the sources of the challenges. Moldan & Dahl (2007) stated that sustainability is the capacity of any system or process to maintain itself indefinitely.

In addition to the three main challenges in maintaining sustainability, Javanmardi et al. (2023), have made an analysis based on Grey Systems Theory that sustainability challenges are also driven by four causes namely, the first is challenges caused by the imbalance of human knowledge which includes challenges caused by the imbalance of human knowledge, challenges caused by the dynamicity of knowledge, paradigms, and values, challenge of comprehensive modelling of the problems. The second is challenges to the identification/definition of values, preferences, and desirables, which is about the complexity of reaching a universal consensus on sustainability values and value conflicts and their origins. The third is challenges to risk perception on the extent to which we can improve resilience and risk management. Fourth, challenges to decision-making and taking action, which lead to challenges in the formulation of solutions/policies

To overcome the challenges, Kenneth (2024) suggests collaborative efforts, whether international cooperation or public-private partnership, policy and regulations to create strong governance and supportive community engagement, technological advancement, and lastly education and awareness in terms of information dissemination and capacity building of skills of individuals to build a sustainable future for all.

1.1.4 Collaborative Strategies for Strengthening Digital Information Literacy Competencies

Several digitally oriented initiatives have been implemented in collaboration with the school resource center, including information literacy programs that focus on the use of online databases, methods of online information retrieval, types of online resources, and related competencies. These activities were conducted at the request of the school resource centre and are aligned with the public library's efforts to extend its services to schools by providing students with appropriate exposure to digital resources. In addition, library services have increasingly shifted towards digitalization for public use. A successful example is the *Perpustakaan Bestari* of the Perlis State Public Library, which has provided tablets and interactive televisions to enable users and visitors to access reading materials. A total of 4,700 e-books have been made available to readers.

Currently in Malaysia, public state libraries are promoting the use of u-library, also known as u-Pustaka. The U-Library database, which is a synergy of collaboration between KPKK through SKMM, with the support of the National Library of Malaysia (NLM), has 11 consortium members throughout Malaysia, namely INTAN, *Perpustakaan Awam Selangor, Perpustakaan Awam Sabah, Perpustakaan Awam Negeri Kedah, and Perpustakaan Awam Negeri Perlis*. U-Pustaka has offered e-resources such as e-books, e-journals, e-brochures, and animated oral histories for its members. 12 reference databases and eight light reading databases are ready to be accessed, for example, BLIS, LawNet, and Proquest eBook Central. Audio books are also available to be accessed by the members. U-Pustaka also offers U-Pustaka inter-lending services within the consortium members. Sinar Harian reported that the U-Pustaka portal recorded 3.17 million page views of consumption, and the figure is seen to have increased to 28.9 per cent or 4.091 million page views of consumption last year. Meanwhile, the view page for the usage of eNewspaper is 13,980, e-magazine is 3,624, while eBook is 2,629 in the collection. Other than promoting u-Pustaka, each state library has its own digital initiatives to support the services, especially during this pandemic. Selangor State Library has come out with Bookfly2u, Penang State Library with Portal eBook@PPAPP, and Sarawak State Library introduces PANDei (People Accessible, Network for Digital Empowerment Inclusivity) for the community about digital information literacy.

In Malaysia, digital libraries have also been established to enhance access to information and learning resources. Currently, three fully operational digital libraries exist: two in Penang, managed and maintained by the Penang State Government and the Penang State Library, and a recently opened facility in Kedah under the Kedah State Library. These libraries are equipped with high-speed internet, private rooms for group discussions, a virtual reality classroom, and e-book collections. Furthermore, in Perlis, the State Secretary has announced plans to establish a free and accessible digital library in the near future.

These types of collaborative efforts are considered potentially beneficial to local school resource centers if a formal arrangement, standard, or procedure can be established between the two entities. Accordingly, this study seeks to explore these opportunities. Specifically, the primary aim is to examine the extent to which state public libraries contribute to the development of school resource centers in the area of digital information literacy, the collaborative programs conducted with state librarians, taking into account the capabilities and expertise of library and media teachers, and the standards or modules implemented. In this context, Creech (2018) suggested that school libraries should actively seek to form partnerships with public libraries.

Moreover, as recommended by the International Federation of Library Associations and Institutions (IFLA, 2015), connections among school libraries, public libraries, and academic libraries should be strengthened to enhance access to resources and services while promoting their shared responsibility for supporting lifelong learning among all community members.

Efforts need to be made to ensure that this objective is achieved, and public libraries can, to some extent, contribute to upgrading the quality of school resource centres through their skills and expertise. As recommended by IFLA (2015), a plan should be in place for the development of the three essential features for the success of a school library: a qualified school librarian, a collection that supports the school curriculum, and an explicit plan for the ongoing growth and development of the library's skills and expertise. It is anticipated that additional engaging activities will be implemented in the future, as this initiative has demonstrated both success and a positive impact on schoolchildren and the broader community.

1.2 Problem Statement

Collaborative efforts between state public libraries and school resource centers in Malaysia remain fragmented, ad hoc, and largely unsustainable. Although both institutions share a common mandate to promote digital information literacy, existing initiatives are typically short-term, weakly coordinated, and lack structured integration. This absence of sustained and systematic collaboration highlights a critical gap in how digital information literacy efforts are organized and maintained across institutions.

Current literature identifies several contributing challenges, including limited resource sharing, insufficient staff competencies, inconsistent institutional readiness, and weak policy alignment. However, these studies predominantly describe operational issues without advancing a systematic or scalable approach to collaboration. As a result, the underlying structural gap, namely, the absence of a coordinated and sustainable collaboration model, remains insufficiently addressed.

Furthermore, research on school resource centers in Malaysia has largely concentrated on library usage, reading promotion, and general information literacy, with minimal emphasis on digital information literacy or cross-institutional collaboration. This limited focus constrains the development of integrated strategies, reinforcing the gap in knowledge on how digital information literacy collaboration can be effectively structured between institutions.

Most critically, there is no comprehensive, context-specific framework to guide sustainable digital information literacy collaboration between state public libraries and school resource centers in Malaysia. Existing digital literacy frameworks are often too generic or developed for different contexts and therefore fail to account for the unique institutional, structural, and policy dynamics of these sectors. This absence constitutes a clear theoretical and practical gap in the field.

Without an evidence-based, structured framework, collaborative initiatives remain dependent on informal, inconsistent practices, limiting their scalability, coherence, and long-term sustainability. Consequently, disparities in digital infrastructure, staff capacity, and access to resources persist, further underscoring the need for a systematic solution to address this gap. Therefore, this study addresses the identified gap by proposing a Digital Information Literacy (DIL) Index Framework to support structured, coordinated, and sustainable collaboration between state public libraries and school resource centers in Malaysia.

1.3 Purpose of the Study

The purpose of this study is to develop and validate a comprehensive Digital Information Literacy (DIL) Index Framework that facilitates sustainable collaboration between Malaysia's state public libraries and school resource centers. By investigating the current digital information literacy practices and challenges faced by both entities, the study aims to identify key factors that influence successful collaboration and integration of digital literacy initiatives. The proposed digital information literacy index framework will serve as a strategic tool to enhance digital literacy competencies, foster resource-sharing, and ensure the long-term sustainability of digital education efforts within Malaysia's educational landscape. This study further seeks to align its findings with national educational goals and Sustainable Development Goal 4 (SDG 4), promoting inclusive and equitable quality education for all, SDG 9 (focus on Industry, Innovation and Infrastructure), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities) as well as SDG 17 (Partnership for the Goals).

Given the evolving educational landscape, it is essential to explore how public libraries can effectively support these centers in developing robust digital literacy initiatives. This research will focus on investigating collaborative efforts between state public libraries and school resource centers to identify and implement best practices for sustainable digital information literacy programs and activities. By understanding the dynamics of these collaborations, the study seeks to develop strategies that can help overcome current obstacles and improve digital literacy outcomes.

A key objective of this study is to establish a Digital Information Literacy (DIL) Index framework for sustainable collaboration between state public libraries and school resource centers in Malaysia. These frameworks aim to enhance the digital literacy skills of library and media teachers, thereby equipping them with the necessary competencies to effectively teach and support students in the digital age. The research will evaluate various collaborative models to determine which approaches are most effective in creating adaptable, scalable, and impactful digital literacy programs. This focus on sustainability ensures that the initiatives can continue to evolve and address emerging digital literacy needs over time. Therefore, the study seeks to contribute to broader educational goals by fostering partnerships that leverage the strengths of both public libraries and school resource centers. By developing a model of collaboration that supports the ongoing development of digital literacy, the research aims to ensure

that library and media teachers are not only proficient in digital skills but are also capable of transferring these skills effectively to students. This approach addresses the current challenges faced by school resource centers and supports Malaysia's educational objectives in the context of the digital age.

1.4 Research Objectives

The objectives of this study are:

a) RO1: To analyze existing collaborative Digital Information Literacy (DIL) initiatives in Malaysia State Public Libraries.
b) RO2: To investigate existing collaborative Digital Information Literacy (DIL) initiatives in Malaysia public school resource center.
c) RO3: To explore Digital Information Literacy (DIL) implementation factors towards sustainable collaborative initiatives between State Public Library and School Resource Center in Malaysia.
d) RO4: To recognize collaborative dynamic factors supporting sustainable Digital Information Literacy (DIL) initiatives between the State Public Library and School Resource Center in Malaysia.

1.5 Research Question

The research questions of this study are:

i) RQ1: What are the current Digital Information Literacy (DIL) efforts in Malaysian state public libraries?
ii) RQ2: What are the current Digital Information Literacy (DIL) initiatives in Malaysia Public School Resource Centers?
iii) RQ3: How Digital Information Literacy (DIL) implementation factors strengthen sustainable collaborative initiatives between State Public Library and the School Resource Center in Malaysia?
iv) RQ4: Does collaborative dynamic factors support Digital Information Literacy (DIL) sustainable initiatives between the State Public Library and School Resource Center in Malaysia?

1.6 Research Map

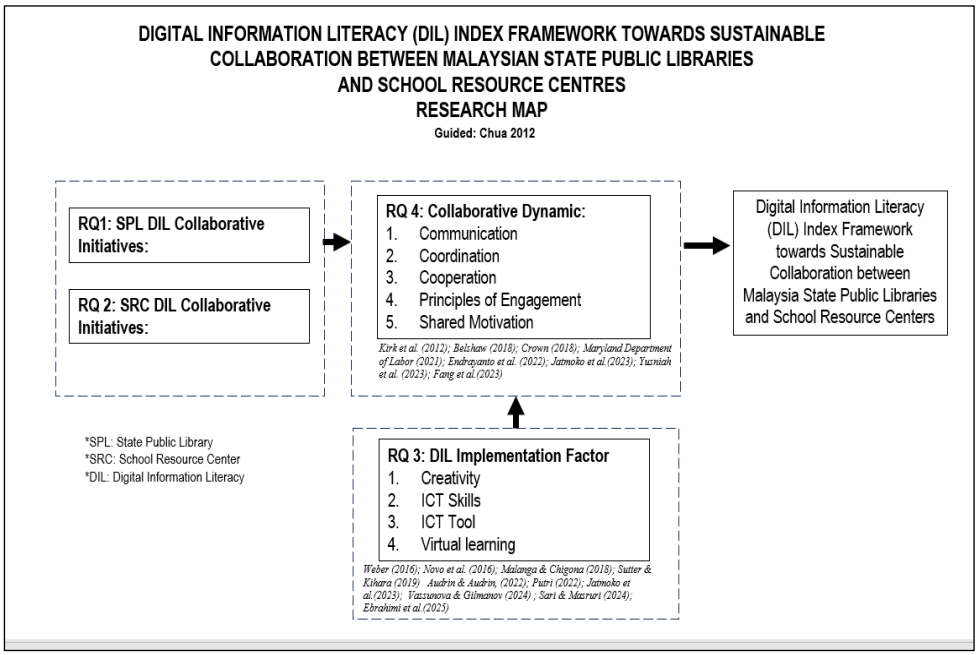

Figure 1.2 Research Map of the Digital Information Literacy Index Framework Towards Sustainable Collaboration Between Malaysian State Public Libraries and School Resource Centers

Figure 1.2 above is the research map of the Digital Information Literacy (DIL) Index Framework for Sustainable Collaboration between Malaysian State Public Libraries and School Resource Centers, guided by Chua (2012). The map encompasses several key elements that shape an effective and sustainable collaborative approach to digital information literacy within these institutions. It provides the foundation for the researcher's development of a proposed framework that identifies the factors contributing to the success of long-term collaborative initiatives aimed at promoting digital information literacy. The elements incorporated in this research map are derived from the reviewed literature. This framework aims to guide the development of a sustainable collaboration model for Digital Information Literacy between Malaysian State Public Libraries and School Resource Centers. It is based on key research questions (RQs) that explore collaborative initiatives, implementation factors, and the dynamics of collaboration, leading to a comprehensive DIL Index Framework.

The researcher chose Chua (2012) because it provides guidance on designing and conducting research. Chua's framework aligns with research objectives, methodology, and data analysis, ensuring that each stage of the study is coherent and rigorous. It remains relevant as it is conceptual rather than time-dependent. The selection of the index (factors) included in this research framework, namely

communication, collaboration, cooperation, the principle of engagement, shared motivation, creativity, ICT Skills, ICT Tools, and virtual learning, is based on a review of the literature, which indicates that these factors are aligned with the objectives of the study. This index has been directly mapped to the research questions of the study. It can be observed that creativity, ICT Skills, ICT Tools, and virtual learning correspond to Research Question 3 (RQ 3), while communication, collaboration, cooperation, the principle of engagement, and shared motivation correspond to Research Question 4 (RQ 4). Moreover, the SPL and SRC collaborative initiatives represent Research Question 1 (RQ1) and Research Question 2 (RQ2).

The selected index serves as a core construct that influences the study outcomes. The alignment of the chosen index with the research questions ensures conceptual clarity and reinforces the methodological rigor of the study. Table 1.1 below shows the components of the research map.

Table 1.1
Components of Research Map

COMPONENTS OF RESEARCH MAP	DESCRIPTION
RQ 1 **SPL Collaborative Initiatives**	This question focuses on identifying the collaborative initiatives by State Public Libraries in promoting Digital Information Literacy, such as programs, strategies, and activities.
RQ 2 **SRC Collaborative Initiatives**	This question examines the collaborative initiatives by the school resource center and the partnership with the state public library.
RQ 3 **DIL Implementation Factor**	This question identifies the critical factors, which are creativity, ICT skills, ICT tools, and virtual learning, that influence the successful implementation of digital information literacy
RQ 4 **Collaborative Dynamic**	This question explores the mechanism that supports and maintains collaboration, which consists of communication, coordination, cooperation, the principle of engagement, and shared motivation.

A more detailed discussion about this research map is provided in Chapter 2: Literature Review. In brief, the first is creativity. Weber (2016) emphasizes the importance of creativity in the library, while Putri (2022), as well as Sari & Masruri (2024), mentioned that creativity is needed in library programs, whether to encourage reading habits or upgrade collections. Second, ICT tools and ICT skills, as stated by Sutter & Kihara (2019), are the factors influencing the implementation of digital literacy projects in schools. This is supported by Vassunova & Gilmanov (2024) that teachers encounter difficulties in developing proficiency and using digital tools and resources

effectively in their instructional practices. Virtual Learning as Jatmoko et al., (2023) indicate that online learning influences the students' digital literacy practices, as previously stated the same by Novo et al. (2016).

For collaborative dynamics, as for communication, Audrin & Audrin (2022) highlight the importance of communication in the educational setting. Organizational success is driven by collective teamwork, where shared strengths support the vision, strategy, optimal performance, and the well-being of all members (Lasmi et al., 2022). This statement is supported by Yusniah et al. (2023) that the collaboration aims to strengthen institutional partnerships in education, research, community service, and related areas. In terms of cooperation, Jatmoko et al. (2023) also suggest that effective planning of learning centered on students' digital skills requires collaboration among teachers, school leaders, and policymakers. It is also essential in establishing a trustworthy and sustainable collaborative relationship (Fang et al., 2023). Lastly, Kirk et al. (2012) stated that collaborative dynamics are about three interactive components (principled engagement, shared motivation, and capacity for joint action).

This research map operates by first identifying collaborative initiatives from both parties, namely the State Public Libraries and School Resource Centers, and subsequently examining their interactions. The success of these collaborative dynamics is supported by the digital information literacy implementation factors, which provide the practical tools necessary for executing the initiatives. In turn, these elements contribute to the development of a Digital Information Literacy Index Framework aimed at sustaining collaboration between the state public library and the school resource center.

1.7 Scope of the Study

This study focuses on collaborative digital information literacy initiatives between Malaysian state public libraries and primary school resource centers. It aims to examine existing collaborative programs, explore factors influencing sustainable implementation, and develop a Digital Information Literacy (DIL) Index Framework to guide structured and long-term partnerships.

The research involves 14 state public libraries and 13 officers from the Educational Resources and Technology Sector (SSTP), providing insights into institutional experiences, challenges, and collaborative dynamics. The study is conducted within the

Malaysian context, specifically focusing on public libraries and primary school resource centers that actively engage in digital information literacy initiatives. Key variables include collaboration practices, sustainability mechanisms, institutional readiness, and implementation factors that support effective digital information literacy programs.

The scope of the study does not extend to evaluating individual student digital literacy skills or programs outside the selected institutions. A qualitative research design is employed, utilizing online interviews to collect detailed data from library officers and SSTP personnel, ensuring a comprehensive understanding of sustainable collaborative digital information literacy practices in both the state public library and the school resource center in Malaysia.

1.8 Significance of the Study

This section aims to delineate areas for further research and propose potential policy changes or interventions informed by the study's findings. The study's significance identified herein encompasses effects on teachers, schools, state public libraries, and relevant authorities, as elaborated below. Understanding the implications of a study is crucial, as it enables the researcher to underscore the significance of their findings and their practical applications. Furthermore, these implications assist readers in comprehending the study's relevance and contributions to the broader field of research. By articulating these implications, the study not only fosters a deeper understanding of the results but also provides a foundation for subsequent inquiries and practical enhancements in educational and library contexts.

1.8.1 Significance for the State Public Libraries

State public library staff need to be equipped with digital literacy knowledge before teaching students. This study can prove that there is indeed a need for digital information literacy knowledge because respondents suggest teaching. With several suggestions outlined in this study, it is confident that this can be realized and benefit library and media teachers in applying digital information literacy in the school community, to:

a. Provide trained instructors to help library and media teachers convey information in the classroom

b. Provide hardware and information technology resources to assist schools in disseminating digital information literacy.
c. Provide appropriate programs and activities for teachers and students as well as students.
d. Provide appropriate digital information literacy learning modules to teachers and students in schools.

First and foremost, public libraries need to employ trained instructors who can assist library and media teachers in effectively delivering information in the classroom. This collaboration will ensure that students receive consistent and high-quality instruction in digital information literacy. Secondly, public libraries should provide essential hardware and information technology resources to support schools in their efforts to disseminate digital information literacy. Such resources are vital for bridging the digital divide and ensuring that all students have access to the necessary tools to thrive in the digital age.

Thirdly, state public libraries ought to develop and implement targeted programs and activities for both teachers and students. These initiatives can include workshops, seminars, and various training sessions designed to keep educators and learners abreast of the latest trends and technologies in digital information literacy. Finally, public libraries should offer tailored digital information literacy learning modules that cater to the diverse needs of different age groups and skill levels. These modules should be designed to complement and enhance classroom instruction effectively. By undertaking these measures, public libraries can significantly contribute to the promotion of digital information literacy and facilitate student success in the 21st century.

This study serves as a valuable resource for state public libraries in their efforts to research and enhance digital information literacy initiatives in collaboration with school resource centers. The framework outlined and discussed in Chapter 6 offers a strategic opportunity for state public libraries to identify and adopt suitable approaches for promoting and integrating DIL among library and school personnel. This presents a unique opportunity for state public libraries to extend their services and foster cooperative relationships with school resource centers in the realm of digital information literacy.

In addition to the support provided by the Education Resources and Technology Sector (SSTP), which is responsible for managing and organizing school resource centers, state public libraries play a critical role in this collaboration, provided that it

aligns with existing government policies. By leveraging the findings of this study, state public libraries can effectively contribute to the advancement of digital information literacy, ultimately benefiting both library staff and students in their educational pursuits.

1.8.2 Significance for the Educational Institution (School)

With a deeper understanding of the foundation for practical enhancements in educational and library contexts, library and media teachers are required to be directly involved in the use of the school resource center, and make the involvement of teachers one factor used to determine student achievement at the end of the year. There must be a variety of modules or activities in accordance with the subject so that the equipment in the library is relevant and can attract students to the library. This study can provide information, especially the new framework developed to help the school in the implementation of digital information literacy with the state public libraries or other agencies.

The involvement of teachers in the use of school resource centers is crucial for students' academic achievement. Teachers can play a vital role in guiding students to relevant resources and providing support for students' learning. Therefore, the involvement of teachers should be considered as one of the factors used to determine student achievement at the end of the year. In addition, it is important to have a variety of modules or activities available in the library that are aligned with the different subjects taught in the school. This ensures that the library's equipment remains relevant and attracts students to use the library as a resource for their studies. Ultimately, a well-equipped and well-utilized school resource center can contribute significantly to students' academic success and overall learning experience.

Through this study, selected effective approaches may be implemented through the proposed framework. Schools constitute an optimal environment for the development of digital information literacy among their members. Furthermore, cooperation between schools and state public libraries or other relevant agencies may be established as part of a coordinated effort to promote and institutionalize digital information literacy within schools.

1.8.3 Significance for Library and Media Teachers

Library and media teachers must be equipped with adequate digital literacy knowledge prior to delivering instruction to students. The findings of this study demonstrate a clear need for digital information literacy competencies, as reflected in respondents' recommendations for teaching-related applications. With the several suggestions proposed in this study, it is anticipated that these initiatives can be effectively implemented and subsequently benefit library and media teachers in integrating digital information literacy within the school community, specifically for:

(a) It requires collaboration from other class teachers to diversify information search methods so that the goals and objectives of digital information literacy are achieved. Working together, teachers would create diverse perspectives, approaches, and teaching styles in digital information literacy that influence students' learning experiences.

(b) There is a need to prepare in classroom-based learning reference sources in addition to printed material and digital sources of information.

(c) To provide students with a variety of hands-on activities on digital information literacy in the school resource center. This study is evidence of the need for activities on a digital information literacy program among students.

Digital information literacy is a crucial skill that students need to develop in today's digital age. To achieve this, it is important for teachers to have a solid understanding of digital information literacy themselves before teaching their students. Collaboration among teachers from different subject areas can also help diversify information search methods and achieve the goals and objectives of digital information literacy.

Meanwhile, classroom-based learning resources, in addition to printed and digital materials, serve to provide students with diverse sources for learning. Strategies that enhance the student learning experience include the use of audiovisual materials, educational visits to institutions offering hands-on opportunities in digital information literacy, and the engagement of experts in the field to share practical experiences. These approaches enrich the content and information presented in textbooks, thereby adding significant value to students' learning.

Library and media teachers are an important element in the success of digital information literacy in schools, with the help of a complete ICT infrastructure and support from school administrators. This study can be a testament to the importance of library and media teachers in the implementation of digital information literacy in schools, ICT needs, and also the support of administrators who can contribute to the success of digital information literacy.

Finally, providing students with hands-on activities on digital information literacy in school resource centers can help to reinforce their learning and ensure that they are prepared. In addition, Fallon (2020) stated that teacher education programs should do more to help students understand the kinds of skills necessary to operate safely, ethically, and productively in a variety of increasingly digitally mediated environments. This training or activity must also be continuous so that it can remain consistent, which can increase the level of efficiency and productivity, and improve the development of skills through involvement on a regular basis. In addition, continuous involvement in such programs provides an opportunity to receive and learn from past experiences and re-formulate strategies based on feedback and evaluation of the program. Consistency also shows the level of seriousness of the organization in disseminating digital information literacy, whether in schools or in libraries.

1.8.4 Significant for the Policy Makers or Authorities

Policymakers and relevant authorities must prioritize the development of a comprehensive curriculum for library and media teachers to implement digital information literacy within school resource centers effectively. This research underscores the critical role that a well-structured curriculum plays in supporting library and media teachers throughout the teaching and learning process. Additionally, it advocates for the creation of fully equipped libraries that integrate advanced technology to facilitate digital information literacy across all schools.

By emphasizing the need for enhanced facilities, this research aims to inspire policymakers and authorities to invest in resources that bolster the national education system. Ensuring that both students and teachers have access to the necessary tools and materials will foster the development of digital information literacy, which is essential for their academic and professional advancement. Such investments are likely to yield

significant positive outcomes, enhancing the overall quality of education and equipping learners with the skills required to thrive in a digital landscape.

Policymakers and authorities are strongly encouraged to enhance the educational landscape by establishing well-equipped libraries that serve both students and teachers. This initiative is vital for improving the quality of library utilization and, consequently, elevating the educational experience for all learners. By fostering a conducive learning environment, these libraries will play a crucial role in supporting the academic and professional development of both teachers and students.

Furthermore, it is essential for policymakers and authorities to conduct survey studies aimed at evaluating the effectiveness of digital information literacy programs among educators and school students. This strategic approach will enable the collection of valuable feedback, identifying areas for improvement, and ensuring that the program remains responsive to the evolving needs of teachers and students. By actively engaging with stakeholders through these surveys, policymakers can make informed decisions that enhance the relevance and impact of digital information literacy initiatives within the educational system. Secondly, the Department of Education should provide a library for students and teachers to improve the quality of library use and the quality of pupils' education. This will help ensure that students receive consistent and effective instruction in digital information literacy.

Finally, the authorities should undertake a systematic survey study to assess the effectiveness of the digital information literacy program implemented among teachers and school students. Such an evaluation would enable the identification of areas requiring improvement and ensure that the program is achieving its intended objectives. By implementing these measures, the authorities can further promote digital information literacy and enhance the overall quality of education for students.

1.9 Limitation

An understanding of the limitations of a study is crucial, as it informs the interpretation and generalization of its findings by providing researchers and potential readers with a clearer understanding of the constraints inherent in the research. The scope of this study is to examine and analyze the collaborative platform between public libraries and school resource centers in Malaysia in the context of digital information literacy.

The limitations of this study arise from several factors, including time constraints, sample size, data availability, and resource limitations. The COVID-19 pandemic has significantly affected the data collection process. The disruption caused by the pandemic made it challenging to gather data within the planned timeframe. Specifically, researchers were restricted from conducting face-to-face data collection sessions at premises under the Ministry of Education Malaysia due to social distancing regulations. Consequently, online data collection was encouraged, with the understanding that participation by officers would be voluntary and not mandatory.

Additionally, as a part-time researcher, balancing research responsibilities with professional obligations as a government officer posed further challenges. Both roles demand substantial time and attention, making it difficult to allocate sufficient resources to each. Researchers are required to participate in departmental programs and fulfil tasks assigned by the head of the department while simultaneously ensuring that the study is completed within the established timeframe. Financial constraints also limited the study, as it was entirely self-funded without sponsorship from any external party. Researchers were responsible for covering all associated costs, including tuition fees, data collection expenses, and publication fees.

The study is also limited to a specific group involved with state public libraries. Academic literature on the topic is scarce, even though the issue is widely discussed in mass media and other non-academic sources. This scarcity restricted the ability to obtain extensive information for the literature review. The respondents of this study include library officers and Education Resource and Technology Sector (SSTP) officers. Data from the State Education Departments and the State Education Resource and Technology Sectors are also utilized, as these agencies are responsible for management, human resources, annual allocation, and training programs.

Data and information from state public libraries are critical in supporting school resource centers in digital literacy initiatives. The mission of public libraries includes providing advisory services and infrastructure for information and knowledge resources accessible to all segments of society, thereby advancing knowledge. Librarians at the State Public Libraries are well-positioned to support data collection, as they regularly interact with schools and resource center teachers in implementing activities and programs at the school resource centers.

1.10 Operational Definition

The following list details all the operational definitions employed in this study.

1.10.1 Digital Information Literacy

Digital information literacy is the capability to recognize the necessity for, to gain access to, and to assess electronic information. The digitally literate can confidently utilize, administer, create, cite, and distribute sources of digital information in an efficient manner (Hegarty et al., 2010). Also, Sparks et al. (2016) stated that digital information literacy is generally described as the capacity to find, comprehend, assess, and apply knowledge in a range of digital technology settings, while Ashikuzzaman (2021) defined digital information literacy as the ability to navigate, evaluate, and utilize digital information in a technologically driven world effectively and critically. Essentially, this study examines digital information literacy practices in state public libraries and school resource centers.

1.10.2 Index

The index in this study refers to the indicators (items) set in the proposed framework, which is used to evaluate and identify the roles and responsibilities of state public libraries and school resource centers in implementing digital information literacy collaboration to ensure the sustainability of the program. The index functions as a composite measurement tool that integrates multiple dimensions, such as skills and collaboration mechanisms, into a coherent framework.

1.10.3 Sustainable

Sustainable defined by the United Nations Brundtland Commission (1987) as meeting the needs of the present without compromising the ability of future generations to meet their own needs. According to Oliveira et al. (2018), the sociologist John Elkington was a pioneer in the dissemination of sustainability, which was in focus when he created important concepts such as the concept of the Triple Bottom, where he presents the three aspects of sustainability - Planet (health of the environmental systems,

People (personal capital) and income (economic output). For this study, it impacts SDG 4, SDG 9, SDG 10, SDG 11, and SDG 17 as previously discussed in the study background above.

1.10.4 Collaboration

Collaboration, as defined by Parkinson (2006), is a mutually beneficial and well-defined relationship entered into by two or more organizations to achieve common goals. The relationship includes a commitment to mutual relationships and goals; a jointly developed structure and shared responsibility; mutual authority and accountability for success; and sharing of resources and rewards. According to Parkinson, the partnership spectrum consists of three elements, which are i) cooperation; ii) collaboration; and iii) Within the scope of this study, the collaboration spectrum focuses on the developed structure and mutual understanding towards collaborative engagement between state public libraries and school resource centers.

1.10.5 Initiatives

An initiative may be defined as a planned action or deliberate effort undertaken to achieve a specific objective. Initiatives constitute an essential component of strategic planning and may be implemented by individuals, groups, or organizations to address identified problems or to enhance existing actions, programs, or processes. Such initiatives may include, for example, the introduction of new products, improvements in service delivery, the implementation of cost-reduction measures, or the launch of marketing campaigns. The successful execution of initiatives requires careful planning, appropriate allocation of resources, and effective implementation (Analysistabs, 2023). This study examines the initiatives implemented by state public libraries and school resource centers.

1.10.6 State Public Library (SPL)

In Malaysia, public libraries are established in each state, with their management and librarianship administered by the respective state governments under the supervision of the National Library of Malaysia (NLM). State public libraries actively

implement reading and literacy programs not only for library users but also for a wide range of stakeholders, including state governments, government agencies, schools, and institutions of higher education. According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) (UNECSO, 2022), public libraries are described as "a living force that provides education, information, and recreation." For this study, state public libraries are regarded as organizations that serve local communities, including school resource centers. Accordingly, this study involves 14 state public libraries across Malaysia.

1.10.7 School Resource Center (SRC)

A school resource center constitutes both a physical and digital learning environment that supports reading, inquiry, research, critical thinking, imagination, and creativity, thereby facilitating students' progression from information to knowledge as well as their personal, social, and cultural development. The International Federation of Library Associations and Institutions (IFLA) has provided a formal definition of a school library; however, it is also referred to by various terms, including school media center, library resource center, and center for documentation and information. In the Malaysian context, the term school resource center has been officially adopted since 1 May 1983, following a directive by the Ministry of Education mandating its use as a standardized designation in place of school library (Yushiana, 2011). For the purposes of this study, the school resource center is regarded as the primary implementer of policies and guidelines issued by the State Education Department through the Educational Resources and Technology Sector (SSTP).

1.10.8 Educational Resources and Technology Sector (SSTP)

For this study, a total of 13 Educational Resources and Technology Sector (SSTP) in Malaysia have been involved, and their officers have been appointed as respondents for the study. In the Ministry of Education Malaysia, it is known as *Bahagian Sumber dan Teknologi Pendidikan*. In the states, it is known as *Sektor Sumber dan Teknologi Pendidikan* (SSTP), which works under the State Department of Education. The Educational Resources and Technology (SSTP) functions in assisting the school resource center, including planning, managing, and monitoring learning

platforms and programs to support digital learning, planning, managing, coordinating, and implementing information and digital literacy programs, school resource center development programs, and reading culture.

1.10.9 State Public Library Officer

In this study, the term officers refer to staff members involved in the implementation of digital information literacy initiatives within libraries or schools. These individuals are directly engaged throughout all stages of the process, including proposal preparation, program implementation, and subsequent reporting and evaluation. The officers comprise librarians, assistant librarians, and librarian assistants drawn from 14 state public libraries across Malaysia.

1.10.10 Educational Resources and Technology (SSTP) Officer

In this study, officers from 13 Educational Resources and Technology (SSTP) refer to the staff members responsible for executing digital information literacy initiatives in the school resource center. This employee is also an intermediary in the implementation of the digital information literacy program between the state public libraries and school resource centers.

1.11 Organization of The Chapter

The thesis is systematically organized into seven comprehensive chapters, each serving a distinct purpose in developing and presenting the study. Chapter One provides an extensive introduction to the research. It outlines the background and context of the study, clearly articulates the research problem, and explains the overall purpose of the investigation. In addition, this chapter specifies the research objectives and guiding questions, defines the scope and limitations of the study, and highlights the significance and potential contributions of the research within its academic and practical fields.

Chapter Two offers a thorough and critical review of the relevant literature. It establishes the theoretical and conceptual framework that underpins the study, situates the research within existing scholarly work, and examines key debates and perspectives. Furthermore, this chapter identifies gaps, inconsistencies, and unresolved issues in the

current body of knowledge, thereby providing a strong justification for the necessity and relevance of the present research.

Chapter Three focuses on the research design and methodology employed in the study. It provides a detailed explanation of the qualitative approach adopted, including the rationale for its selection. The chapter also describes the data collection procedures, such as interviews, and elaborates on the techniques and processes used for data analysis to ensure rigor, reliability, and validity of the study.

Chapter Four presents the empirical findings of the study, specifically focusing on digital information literacy programs implemented in Malaysian public libraries and school resource centers, and the implementation and dynamic factors that influence the collaboration. It systematically reports the data collected, highlighting key patterns, themes, and observations related to the implementation of these programs.

Chapter Five extends the cross-case analysis by examining collaborative digital information literacy initiatives, the implementation factors, and the dynamic factors. Drawing on data obtained from interviews with library officers and personnel from the Educational Resources and Technology Sector (SSTP). Chapter Six provides an in-depth discussion on the development and application of the Digital Information Literacy (DIL) Index Framework. It critically analyzes how this framework supports and enhances sustainable collaboration between Malaysian state public libraries and school resource centers, offering insights into its practical implications and potential for broader adoption.

Finally, Chapter Seven concludes the thesis by synthesizing and summarizing the key findings of the study. It presents well-founded recommendations for policy, practice, and further research, discusses the broader implications of the findings, and suggests possible directions for future studies to build upon and extend the current research.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Chapter 2 presents a comprehensive and systematic review of the literature to establish a strong conceptual and theoretical foundation for this study, with particular emphasis on digital information literacy and the sustainable collaboration between Malaysia's state public libraries and school resource centers. This chapter goes beyond a descriptive summary by critically examining key theories, empirical findings, and diverse scholarly perspectives that inform the study. In doing so, it highlights how digital transformation has reshaped information practices within library and educational contexts, especially in developing collaborative ecosystems that support lifelong learning and digital competency. An in-depth literature review is widely recognized as a cornerstone of rigorous academic research. As noted by Snyder (2019), such a review is essential across disciplines to justify the research problem, refine research objectives, and provide a solid basis for formulating research questions and hypotheses. In line with this, the present chapter situates the study within the broader academic discourse, enabling a clearer understanding of how digital information literacy has evolved and how collaborative frameworks between libraries and educational institutions have been conceptualized and implemented. It also identifies critical gaps in the existing body of knowledge, particularly in the Malaysian context, where studies on sustained collaboration between public libraries and school resource centers remain limited.

Furthermore, this chapter establishes the theoretical foundation guiding the investigation by integrating relevant models and frameworks related to digital literacy, knowledge sharing, and institutional collaboration. It also examines contextual factors influencing collaboration, such as policy environments, technological infrastructure, and professional competencies of librarians and educators. By doing so, the chapter provides a nuanced understanding of the challenges and opportunities in fostering sustainable partnerships aimed at enhancing digital information literacy.

Rowe (2014) emphasizes that a rigorous literature review not only synthesizes prior studies but also critically evaluates them to uncover underlying assumptions,

methodological limitations, and potential biases. It should also point toward areas requiring further exploration. Guided by this perspective, the chapter systematically analyzes existing research to identify inconsistencies and underexplored themes, thereby justifying the need for the present study and outlining its potential contributions. This chapter aims to contribute to the growing body of knowledge on the digital culture of libraries and librarianship in Malaysia. It underscores the importance of strategic and sustainable collaboration in enhancing digital information literacy among users, particularly students. To ensure clarity and coherence, the chapter is organized into eight subchapters, each addressing specific aspects of the topic, including core concepts of digital information literacy, relevant theoretical models, collaborative practices, and related constructs. Together, these sections provide a comprehensive and integrated overview that supports the overall research framework of the study.

2.2 Early History of the Library

The historical development of libraries demonstrates the long-standing human pursuit of knowledge preservation, access, and dissemination, principles that closely align with today's concept of digital information literacy. The Great Library of Alexandria, established during the reign of Ptolemy II Philadelphus (285–246 BC), is often regarded as one of the earliest symbols of organised knowledge systems. It housed hundreds of thousands of scrolls from renowned scholars such as Aristotle and Plato and aimed to bridge the knowledge gap between the elite and the general population (Ahmad Fezal, 2022). Although its destruction remains debated, its legacy reflects early efforts to centralise and share information for societal benefit (Haughton, 2011). Many historical contributions recorded in the library, including advancements in astronomy and medicine, further highlight its role as a foundational knowledge institution (Shahrom & Mohammad Fadzli, 2016).

Similarly, the Islamic Golden Age witnessed the establishment of *Bait al-Hikmah* (House of Wisdom) in Baghdad, which functioned as a major centre for translation, research, and knowledge preservation. It facilitated the systematic organisation, reproduction, and dissemination of scholarly works, particularly in science, astronomy, and medicine (Ikram et al., 2024). This reflects early practices of knowledge curation and intellectual accessibility, which are key elements of modern

digital information literacy, particularly in enabling users to access, evaluate, and utilise information effectively.

The evolution of libraries continued with institutions such as the Library of Congress and the British Library, which introduced advanced classification systems and large-scale information management practices. The Library of Congress Classification (LCC) system marked a significant milestone in organising knowledge for efficient retrieval, serving diverse user groups including researchers and policymakers (Billington, 2024; LOC, 2024). Similarly, the British Library, with its extensive global collections, including rare Malay manuscripts, demonstrates the importance of preserving cultural heritage while ensuring accessibility for academic and research purposes.

In the context of digital information literacy, these historical developments illustrate a continuous progression from physical knowledge preservation to structured information systems that support access, evaluation, and dissemination. Today, digital information literacy extends these foundational principles into the digital environment, where individuals must critically navigate vast and complex information ecosystems using digital tools and technologies. Thus, modern libraries and information centres can be seen as direct descendants of these historical institutions, now evolving into digital knowledge hubs that support lifelong learning and informed decision-making in the digital age.

2.3 Digital Information Literacy Landscape

Globally, libraries and school resource centers play a pivotal role in advancing the United Nations Sustainable Development Goals (SDGs) by providing access to information, fostering learning, and supporting community development (Nasir, 2023). Specifically, libraries preserve and make accessible human knowledge and cultural heritage, while school resource centers provide learning materials that support educational programs for students, the school, and staff. Consequently, several SDGs are particularly relevant to the functions of these institutions, including SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), and SDG 17 (Partnerships for the Goals).

Firstly, regarding SDG 4: Quality Education, libraries and school resource centers serve as foundational spaces for learning across all levels of education. For example, initiatives documented on the Library Maps of the World website show that 29 countries contributed 42 stories illustrating libraries' role in promoting literacy, providing safe learning spaces, and supporting research. The United Nations (UN) emphasizes that libraries are foundational to schools, universities, and colleges, providing safe spaces for learning, supporting literacy initiatives, and enabling researchers to reuse data and produce new knowledge. In Malaysia, the Reading Seeds program by Pustaka Negeri Sarawak, launched in 2016, exemplifies this role. The program targets parents and children from prenatal stages to age three, providing kits that include guidebooks, storybooks, flashcards, and online resources, supplemented by workshops to train parents in using these materials. Furthermore, the program demonstrates inter-agency collaboration involving the State Health Department, Ministry of Women, Early Childhood and Community Wellbeing Development, Ministry of Public Health, Housing and Local Government Sarawak, and Me Books Asia, highlighting how libraries contribute to early childhood education and lifelong learning. This program shows Malaysia's recognition of early literacy as foundational to lifelong learning, and collaboration with health, education, and community agencies can maximize outreach and effectiveness, aside from limited funding, as well as unequal access in remote areas and a shortage of trained staff.

Secondly, SDG 9: Industry, Innovation, and Infrastructure is linked to libraries' capacity to provide access to digital resources and expertise. According to IFLA, public and academic libraries often serve as the primary or only sources of free public Internet access. Globally, initiatives such as coding programs for Romanian children illustrate how libraries can address digital literacy gaps and prepare citizens for future employment in digital societies. This illustrates the importance of coding skills for future participation in digital societies and employment. In Malaysia, similar initiatives could enhance public libraries' role in developing digital competencies among students and communities, particularly in rural areas where digital access is limited. Co-operation with universities, Non-Governmental Organizations (NGOs), and technology companies to serve as hubs for digital skill development.

Thirdly, SDG 10: Reduced Inequalities highlights libraries as inclusive spaces that promote equitable access to information. Evidence from Africa and the Philippines shows that library programs for marginalized children, such as "Kids on the Tab" and

the Book Cart initiative, significantly improve learning outcomes, confidence, and social skills. In the Malaysian context, libraries and school resource centers can similarly provide access to educational materials and digital tools for underprivileged communities, helping to bridge socio-economic and educational gaps. This way may overcome challenges such as disparities between urban and rural areas, awareness of library services, and infrastructure gaps. Within this, state libraries can empower

Fourthly, SDG 11: Sustainable Cities and Communities underscores libraries' role in cultural preservation and digital inclusion. According to the UN (2023), local communities benefit from cultural access, which supports inclusive and sustainable urban development. For example, the Helsingborg Digital Center in Sweden addresses digital exclusion among senior citizens by providing training, equipment, and outreach services. As a result, many seniors have become more independent in using online services and technology. In Malaysia, state public libraries could replicate similar strategies to support both digital information literacy and community engagement, ensuring access to resources for all age groups.

Finally, SDG 17: Partnerships for the Goals emphasizes the importance of collaboration. Globally, libraries participate in multi-stakeholder partnerships, such as the Toronto Public Library's support for Syrian refugees and the Czech Public Library's collaboration with primary schools. In Malaysia, such partnerships could strengthen the connection between public libraries and school resource centers, fostering knowledge-sharing, joint programs, and coordinated services to advance national education and sustainability agendas.

Based on the above discussion, the state public libraries and the school resource centers are recognized as important institutions in promoting sustainability across multiple dimensions. Their contributions are evidenced through engagement with the United Nations SDGs by providing access to knowledge, promoting digital literacy and skills, and fostering inclusive communities that begin in schools and are strengthened through collaboration with state public libraries. The role of these institutions in bridging the digital divide, supporting education, and preserving cultural heritage is essential to building a more sustainable and equitable society.

2.3.1 Literacy

Previously, literacy was defined as the state or quality of being literate; the ability to read and write (Hillerich, 1976). In this modern era, according to UNESCO (2026), literacy is defined as "a continuum of learning and proficiency in reading, writing, and using numbers throughout life and is part of a larger set of skills, which include digital skills, media literacy, education for sustainable development, and global citizenship, as well as job-specific skills. Literacy skills themselves are expanding and evolving as people engage more and more with information and learning through digital technology." This new definition reflects a significant conceptual shift, in which literacy is no longer limited to traditional print-based abilities such as writing and reading, but is increasingly shaped by the involvement of digital technologies and information systems. In other words, literacy is dynamic and evolving. Literacy develops in response to changes in the way people access, interpret, and produce knowledge.

Traditionally, literacy has been understood in terms of foundational skills such as reading literacy (Uzun & Çelik, 2020), which is the ability to understand and use written language forms that are needed by society and valued by individuals, and writing literacy, which is proficiency in written language. The principle of literacy is that everyone has the right to learn and gain knowledge, and everyone has abilities and potential that need to be honed. This is important for knowing and understanding the world, as well as improving the standard of living (Kapur, 2019; Muhaimi Suhaili, 2023; UNECSO, 2026). This foundational literacy still plays an important role; however, contemporary educational discourse increasingly sees it as a foundation for building more complex forms of literacy. The fundamental principle of literacy as a universal right asserts that every individual has the potential to learn and expand knowledge, something that is essential for improving the quality of life and actively participating in society.

In response to rapid technological advancement, the concept of literacy has expanded into multiple interconnected forms. Kapur (2019) identifies several emerging literacies, including digital, media, visual, cultural, emotional, and moral literacy, among others. Similarly, Stordy (2015), Swertz and Fessler (2010), and Uzun and Çelik (2020) highlight the increasingly multidimensional nature of literacy in the digital age. These developments indicate that literacy is no longer a singular competency but a

layered set of skills that enable individuals to navigate complex information environments.

Within this evolving framework, digital information literacy is a set of essential skills that combine traditional literacy with digital skills, information management, and critical thinking. Unlike basic digital skills, digital information literacy emphasizes the ability to find, evaluate, ethically use, and generate information in a digital context. As literacy now encompasses a wide range of digital forms and media, digital information literacy has emerged as a core educational goal for the 21st century (Khamdamov, 2024; Lemke, 2002; Nurhasanah et al., 2025; Spengler, 2015). This evolution reflects a broader trend in literacy development, moving away from basic reading and writing skills toward more sophisticated, flexible, and analytical approaches to learning, with digital information literacy playing a key role in this development.

2.3.2 The Concept of Information Literacy

To understand digital information literacy, it is necessary to first examine the concept of information literacy. Information literacy is commonly defined as the ability to think critically and make informed judgments about information. The American Library Association (ALA, 1989), as cited in Anunobi & (2014), defines information literacy as a set of abilities that enable individuals to recognize when information is needed and to locate, evaluate, and use information effectively. Digital literacy, in contrast, refers to the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills (ALA, 2013). Before the emergence of digital information literacy, information literacy was a central focus in librarianship and education. The concept was formally introduced by the ALA Presidential Committee on Information Literacy, which defined information literacy, developed models, and examined its implications (McAdoo, 2013). A widely cited definition of information literacy is provided by Doyle (1992):

> *"Information literacy is the ability to access, evaluate, and use information from a variety of sources. This represents the basic components of group consensus. This concise statement is expanded by a listing of the discrete attributes of an information literate person (Doyle, 1992).*

Information literacy is widely recognised as a crucial skill that enables individuals to develop informed perspectives and participate actively in society (CILIP, 2018). Since its emergence in 1989, it has gained global recognition as a fundamental competency within the information society (Arua et al., 2018). Expanding on this, Arua et al. (2018) emphasise that information literacy is most effective when embedded within curricula through problem-based, inquiry-based, and resource-based approaches that align instructional strategies with disciplinary learning outcomes. This perspective highlights a shift from viewing information literacy as a standalone skill to understanding it as an integrated component of teaching and learning. However, while this approach underscores the importance of curriculum integration, it places significant responsibility on institutional collaboration, particularly involving librarians and other stakeholders, which may present practical implementation challenges. Furthermore, with ongoing technological advancements, the concept has evolved into digital information literacy, reflecting the increasing complexity of navigating digital environments. Accordingly, this section introduces key models and theories in information retrieval to further contextualise the development of information literacy.

2.3.2.1 Kuhlthau's (1991) Information Search Process (ISP) Model

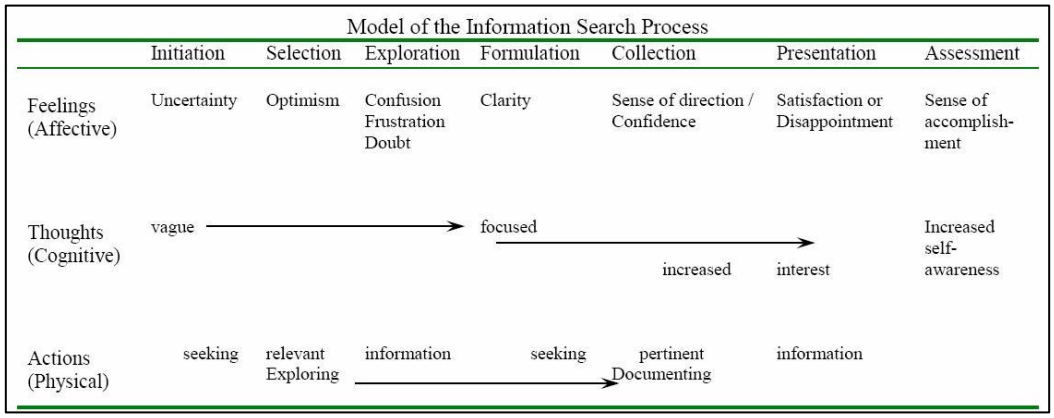

Figure 2.1 Kuhlthau Model (1991)

One of the most influential models in information behaviour is Kuhlthau's (1991) Information Search Process (ISP) model, which outlines six stages of information seeking, ranging from initiation to presentation. The model is particularly significant for its emphasis on the emotional dimensions of information seeking, highlighting how feelings such as uncertainty, confusion, and confidence evolve throughout the process. For instance, the exploration stage is identified as the most

challenging, as individuals often encounter inconsistent information that leads to doubt. This focus on affective experience distinguishes Kuhlthau's model from more linear or purely cognitive approaches to information retrieval.

However, while the model provides valuable insights into learners' experiences, it has been critiqued for its structured progression, which may not fully reflect the non-linear, iterative nature of information seeking in digital environments. Nevertheless, the model remains highly relevant, particularly in understanding how students navigate online information and in supporting both their cognitive and emotional development during the search process.

2.3.2.2 Leckie et al. (1996) General Model of Information Seeking of Professionals

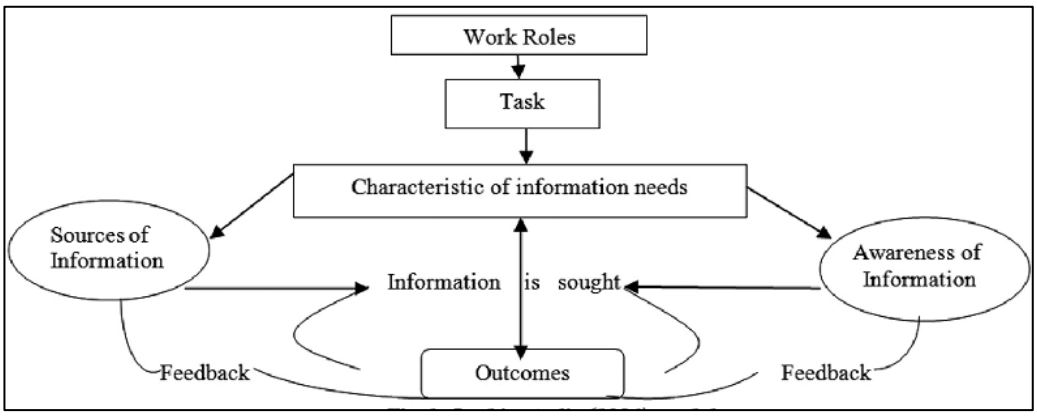

Figure 2.2 Leckie et al. (1996) General Model of the Information Seeking of Professionals

Secondly, Leckie et al. (1996) proposed the General Model of Information Seeking of Professionals, which emphasises how professional roles and job-related responsibilities shape information-seeking behaviour. The model highlights the close relationship between professional tasks and information needs, suggesting that information practices are deeply embedded within workplace activities. This perspective is particularly useful in understanding how professionals such as academics, healthcare practitioners, and librarians engage with information in context. In contrast to models that focus on individual cognitive or emotional processes, such as Kuhlthau's (1991) Information Search Process model, Leckie et al.'s framework adopts a more task-oriented and role-based approach. However, while the model effectively captures the influence of professional context, it has been criticised for placing less emphasis on the iterative and dynamic nature of information seeking, particularly in rapidly evolving

digital environments. Nevertheless, the model remains relevant for examining digital information literacy in professional settings, especially in fields such as librarianship, where digital tools are integral to daily work practices.

2.3.2.3 Marchionini's (1995) Information Seeking in Electronic Environments

Thirdly, Marchionini's (1995) Information Seeking in Electronic Environments model focuses on information-seeking behaviour within digital contexts, conceptualising the process as a problem-solving activity. Based on observations of students' search behaviour, Marchionini highlights the iterative and trial-and-error nature of online searching, where users continuously refine queries and evaluate results. This model is particularly valuable in emphasising the cognitive strategies involved in navigating web-based environments, especially the importance of query formulation and critical evaluation. In comparison to Kuhlthau's (1991) Information Search Process model, which foregrounds emotional experiences, and Leckie et al.'s (1996) role-based framework, Marchionini's model adopts a more systems-oriented and procedural perspective. However, despite its relevance to digital environments, the model may be overly complex for novice users, particularly children, as it assumes a relatively high level of information literacy and technical competence. Nevertheless, it remains highly applicable to advanced users, as it closely reflects real-world online search behaviours and underscores the critical thinking skills required for effective digital information literacy.

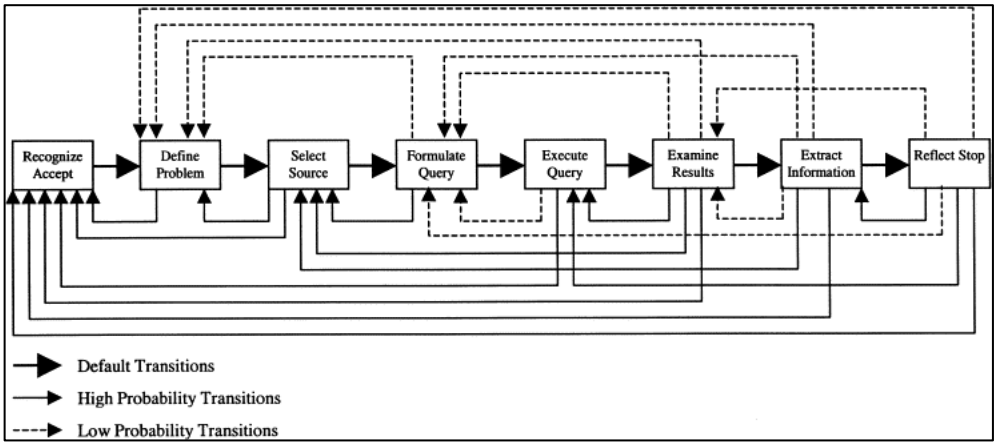

Figure 2.3 Marchionini (1995) Information Seeking in Electronic Environments

2.3.2.4 Ellis (1989) Model of Information Seeking Behaviour

Ellis (1989) identifies a set of core information-seeking behaviours, including starting, chaining, browsing, differentiating, monitoring, and extracting, later extended to verifying and ending. These categories highlight the non-linear and iterative nature of information seeking, particularly among academic researchers. However, while Ellis' model is grounded in empirical observation, it primarily focuses on behavioural actions and does not account for cognitive or emotional factors. In contrast, Kuhlthau's Information Search Process model emphasizes the role of uncertainty and affective experiences, while Wilson's model incorporates contextual and environmental influences. Furthermore, Ellis' framework was developed prior to the rise of digital information environments, limiting its applicability in understanding contemporary search behaviours such as algorithm-driven discovery. Despite these limitations, Ellis' model remains valuable as a foundational framework for analysing structured research practices.

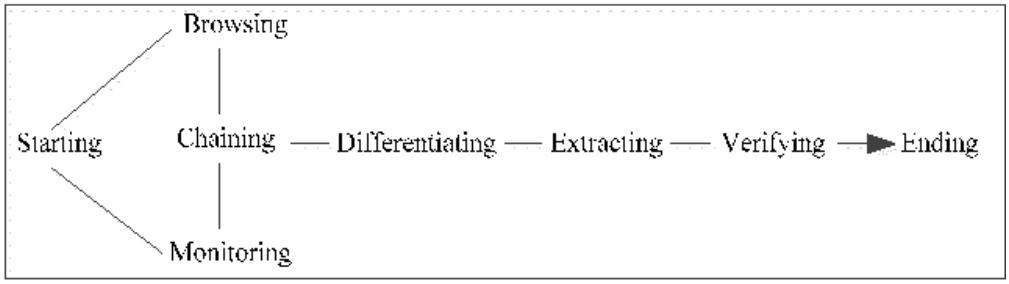

Figure 2.4 Ellis (1989) Model of Information Seeking Behaviour

Ellis (1989) provides a foundational behavioural framework for understanding information-seeking activities. However, it is limited in scope when compared to later models. Kuhlthau (1991) introduces cognitive and emotional dimensions, addressing the experiential aspects of searching. Leckie et al. (1996) further extend the discussion by situating information behaviour within professional roles and task-based contexts. Meanwhile, Marchionini (1995) reflects the shift toward digital environments by conceptualizing information seeking as an interactive, system-oriented process. Together, these models demonstrate that information behaviour is multifaceted, encompassing behavioural actions, cognitive and affective states, and contextual as well as technological influences.

2.3.2.5 Wilson's 1996 Model of Information Behaviour

Thomas D. Wilson (1991; 1996) proposes that information-seeking behaviour arises from a perceived information need, which leads individuals to seek information through formal or informal sources. The outcome of this process may result in either success or failure, influencing whether the need is fully or partially satisfied. Importantly, Wilson emphasizes that information seeking is not an isolated activity but may involve interaction with others, including information exchange and sharing.

In his revised 1996 model, Wilson introduces "information processing and use" as a crucial feedback mechanism, highlighting that the use of information ultimately determines whether the original need is satisfied. Furthermore, the model incorporates several activating mechanisms, such as stress/coping, risk/reward, social learning theory, and self-efficacy, which explain why individuals choose to engage (or not engage) in information seeking. These psychological factors extend the model beyond observable behaviour, positioning information seeking within a broader interdisciplinary framework.

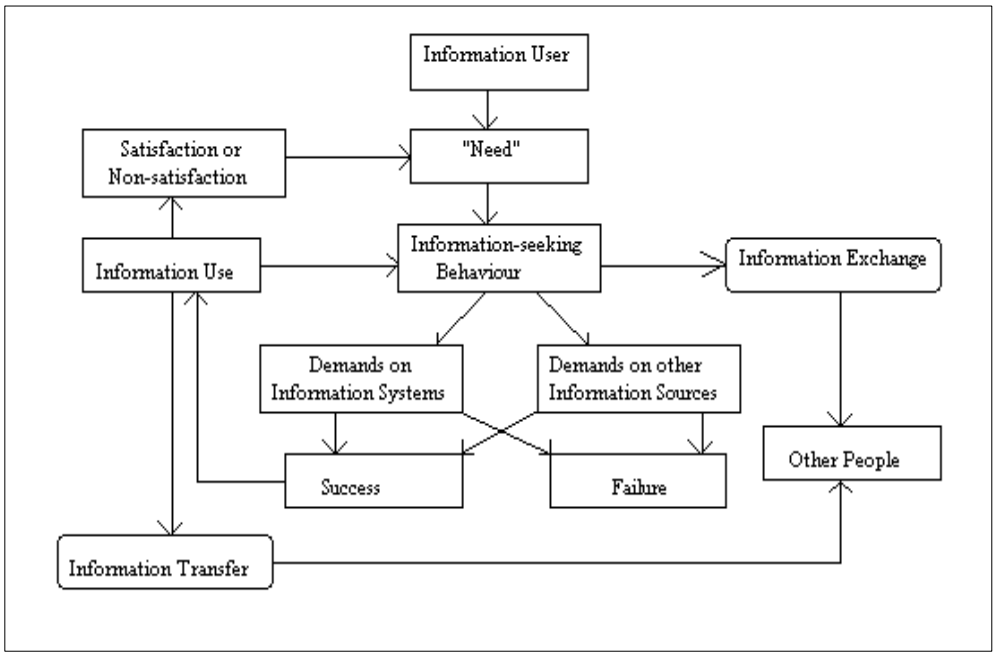

Figure 2.5 Wilson (1996) Model

Compared to David Ellis's behavioural model, which focuses primarily on observable search activities, Wilson's framework provides a more comprehensive explanation by incorporating motivational and contextual factors. Similarly, while

Carol Kuhlthau emphasizes cognitive and emotional stages of the search process, Wilson offers a broader systems-oriented perspective that includes environmental and psychological influences. However, despite its conceptual depth, Wilson's model has been critiqued for being highly abstract and less explicit in describing the specific actions users take during information seeking, an area that Ellis and Gary Marchionini address more clearly.

In a nutshell, these models demonstrate that information seeking is a multifaceted process encompassing emotional, cognitive, and contextual dimensions. While Kuhlthau's (1991) model emphasises the affective experiences of users, Leckie et al. (1996) highlight the influence of professional roles and task-based contexts, and Marchionini (1995) focuses on the cognitive and procedural aspects of searching within digital environments. Ellis provides a foundational behavioural perspective by identifying key activities involved in information seeking, while Wilson expands this view by incorporating motivational, psychological, and contextual factors. This suggests that no single model fully captures the complexity of information behaviour; rather, each offers a complementary perspective depending on the user group and context. However, the applicability of these models varies, as some may be less suitable for novice users or rapidly evolving digital environments. Nevertheless, their combined use provides a comprehensive theoretical foundation for understanding information retrieval and problem-solving processes, particularly in analysing the development of digital information literacy within contemporary library settings.

In the following section, the discussion will shift to the central focus of this study, namely digital information literacy.

2.3.3 Definition and Concept of Digital Information Literacy

Digital information literacy refers to the ability to locate, evaluate, use, and create information using digital technologies. Specifically, it encompasses the skills and competencies needed to navigate the digital landscape effectively, critically, and ethically. According to Hegarty et al. (2010), digital information literacy is the capability to discern the necessity for, access, and assess electronic information. They describe digitally literate individuals as those who can adeptly employ, oversee, generate, reference, and proficiently share digital information sources. In addition, Hague & Payton (2010) extend this view by emphasising broader dimensions such as

collaboration, e-safety, creativity, and critical thinking. Together, these perspectives suggest that DIL is not merely a technical skill set but a multidimensional construct that integrates cognitive, social, and ethical competencies.

It should further emphasize effective information-seeking, selection, and proficient communication in digital contexts. In this regard, the key elements of digital information literacy include:

i. Accessing Information: The ability to efficiently find and retrieve information from various digital sources.
ii. Creating Information: Generating new content using digital tools, often involving multimedia and digital platforms.
iii. Using Information: Applying the information in appropriate contexts, including research, decision-making, and problem-solving.
iv. Evaluating Information: Critically assessing the credibility, relevance, accuracy, and bias of the information.
v. Ethical and Legal Understanding: Recognizing and adhering to ethical standards and legal requirements in the use and creation of digital information.

These components highlight the increasing complexity of digital engagement, where users are required not only to consume information but also to critically assess and produce it within appropriate contexts. However, while these frameworks provide a comprehensive outline of required competencies, they often assume a level of access to digital tools and skills that may not be equally distributed across different user groups, pointing to potential gaps in implementation.

International experiences illustrate the value of promoting digital literacy at the societal level. For instance, Norway has launched the Digidel 2017 initiative, which aims to reduce the number of citizens who are weak or non-users of the internet and digital tools. Furthermore, Gundersen & Rogler (2016) highlighted that the public libraries promote and spread education and information, where the sources of information and knowledge nowadays are not paper-based but digital, and help the community to make use of it. Similarly, Finland also takes action to improve the public library employees' digital skills (Anu & Päivi, 2019). In addition, the aim of the digital initiatives of Finnish public libraries is for library employees to have reached the digital skills requirements, to create local service networks and position libraries as digital

support providers and collaborative spaces for businesses, the public sector, and voluntary organizations (Anu & Päivi, 2019). These examples highlight the evolving role of libraries as active agents in digital inclusion and literacy development.

Nevertheless, while such initiatives provide valuable models, their direct applicability may be influenced by contextual factors such as infrastructure, policy support, and user readiness. Consequently, Malaysian state public libraries can draw inspiration from these international initiatives. Although these programs are primarily designed for national library development, the underlying concepts and strategies can be adapted to foster collaboration between public libraries and school resource centers.

2.3.3.1 Key Components of Digital Information Literacy

Digital information literacy encompasses the ability to locate, evaluate, use, and create information through digital technologies, requiring individuals to navigate digital environments effectively, critically, and ethically. In this case, Riel et al. (2012) classify digital information literacies into four domains: tools and interfaces, information and data, sharing and creation, and historical and cultural context. This framework highlights that proficiency in the digital realm extends beyond technical skills to include cognitive, ethical, and collaborative competencies. While comprehensive, the model primarily addresses individual capabilities and may underemphasise contextual factors such as organizational support or access disparities, which can significantly affect digital literacy outcomes. Integrating this perspective with other models of digital information literacy underscores the need for both skill development and supportive environments to cultivate fully competent digital users.

Proficiency in digital information literacy requires the integration of technical, cognitive, ethical, and collaborative competencies, each of which contributes to effective and responsible engagement with digital environments. Technical skills involve the ability to use digital tools and platforms, such as search engines, databases, and content creation software, effectively (Pearson & Young, 2002, as cited in Riel et al., 2012). Then, Israel & Nsibirwa (2018) further highlight that proficiency across dimensions such as tool literacy, critical literacy, and emerging technology literacy enhances the effective use of electronic information resources. Cognitive skills, encompassing critical thinking and problem-solving, enable individuals to evaluate, synthesise, and apply digital information in informed ways. Drawing on Piaget's formal

operations stage, higher-order cognitive abilities allow users to identify relationships, make decisions, and assess the credibility of digital content (Piaget, 1977, as cited in Basari & Siew, 2022; Nurkhuzaimah & Che Soh, 2022).

Ethical and legal awareness underpins responsible engagement with digital environments, including understanding privacy, copyright, and intellectual property considerations. As Amaris (2022) notes, the accessibility of ICT amplifies the need for careful and ethical use, while Luić & Lepoglavec (2019), as cited in Muhaymin et al. (2023), argue that digital ethics support behaviors that benefit both individuals and the broader community. This includes critically evaluating information for credibility, relevance, and currency, and adhering to professional and social responsibilities (Aziz et al., 2023; Muhaymin et al., 2023). Communication and collaboration further extend DIL by enabling individuals to interact and work collectively via digital platforms, fostering knowledge sharing, problem-solving, and alignment with 21st-century competencies such as critical thinking, creativity, communication, and collaboration (Engliana & Ekarina, 2024; Marta, 2020; Rosnaeni, 2021; Wahyuni, 2022).

While these components are conceptually distinct, they are highly interdependent in practice. For example, effective collaboration relies not only on communication skills but also on technical proficiency and ethical awareness, while cognitive skills enhance both information evaluation and collaborative problem-solving. Moreover, although these frameworks provide a comprehensive understanding of digital information literacy, they often assume equitable access to technology and foundational skills, which may not be consistent across different populations or contexts. Consequently, developing digital information literacy requires not only individual skill-building but also supportive infrastructure, guidance, and educational strategies that integrate technical, cognitive, ethical, and social dimensions.

2.3.3.2 Importance of Digital Information Literacy

Digital information literacy is increasingly essential in today's complex digital landscape, where information overload and misinformation pose significant challenges. Forbes & Ferris (2024) highlight that the proliferation of digital data makes distinguishing reliable from false information difficult, with potential psychological and social consequences. By equipping individuals with skills to critically assess sources and identify misinformation (Dan et al., 2021; Dimitrova, 2022; Kang, 2022), digital

information literacy mitigates these risks and enhances the effective navigation of digital environments. Furthermore, it supports the management of information overload by fostering strategies to filter, organise, and prioritise information efficiently (Arnold et al., 2023; Koltay, 2011). Similarly, Mbandje et al. (2023) also argue that digital competence, which is defined as the ability to use digital tools and resources efficiently, promotes active engagement rather than passive consumption, reinforcing the value of digital information literacy in contemporary digital life.

Beyond immediate information management, digital information literacy underpins lifelong learning by enabling individuals to continuously acquire, evaluate, and apply knowledge. Teachers with high digital literacy, for instance, are more inclined toward ongoing professional development and openness to new perspectives (Demir et al., 2022; Kesici, 2022). Advanced digital skills are therefore crucial not only for higher education participation but also for maintaining adaptability in professional and personal learning contexts (Jeffrey, 2011; Muhammad et al., 2024). This highlights the broader societal importance of digital information literacy as a foundation for continuous knowledge acquisition and critical engagement.

Finally, digital information literacy promotes critical analysis and ethical engagement with digital information, supporting informed decision-making and reducing vulnerability to bias or inaccuracy. Research indicates that individuals with high information literacy demonstrate more responsible behaviours online (Gündüzalp, 2021; Mishra & Maharana, 2007). Ethical considerations are integral, encompassing copyright, intellectual property, and responsible information use (Aziz et al., 2023; MyIPO, n.d.). In Malaysia, for example, copyright law safeguards the rights of authors and creators, emphasizing the necessity of ethical digital practice. Thus, digital information literacy equips users not only with cognitive and technical skills but also with the ethical awareness required to navigate, evaluate, and utilise information responsibly, bridging technical proficiency with social responsibility.

2.3.3.3 Digital Information Literary Challenges and Barriers

Digital information literacy comes with challenges and barriers. The development of information communication technology has various challenges regardless of religion, culture or race in a society (Radhiah, n,d). Harian Metro reported that among the main challenges in realizing Society 5.0 is the digital divide, which

refers to the difference in access and use of technology between the capable and vice versa. According to the Malaysian Communications and Multimedia Commission (MCMC), around 30 percent of rural residents still do not have access to stable internet (Ahmad, 2024).

The term digital divide has been commonly discussed since the 1990s (Djik, 2006). Kende (2015) wrote digital divide is that it separates the Internet 'haves' from the 'have-nots'; dividing those who are online from those who would like to get online, but are prevented based on the availability or affordability of access. Kende (2015) outlines the various factors contributing to disparities in Internet access. It begins by highlighting the importance of availability, emphasizing the presence of accessible Internet connection points in each area as the initial step toward Internet access. The discussion then delves into the aspect of affordability, prompting consideration of the cost of access in comparison to other essential goods and its proportion to individuals' income. It also emphasizes the significance of upload and download speeds in meeting local Internet users' needs, thus underlining the quality of service as a crucial factor in Internet access disparities. Furthermore, it also stresses the relevance of Internet access, encompassing the community's proficiency in utilizing technology, local interest and understanding of Internet access, availability of relevant content and mobile apps in the local language, and their alignment with the community's needs.

Moreover, the discussion broadens by addressing additional divides contributing to digital inequality. These include security concerns, interconnectivity, digital literacy, and access to equipment. By incorporating these factors, the document provides a comprehensive overview of the multifaceted nature of Internet access disparities, acknowledging that the issue extends beyond mere availability and affordability. Instead, it encompasses various technological and socio-economic aspects, ultimately emphasizing the complexity of the digital divide and the necessity for a holistic approach in addressing these disparities. Overall, the discussion serves as a foundational framework for understanding the nuanced elements contributing to unequal access to the Internet, paving the way for informed strategies and interventions to bridge the gap and promote digital inclusivity.

Djik (2012) has developed four successive kinds of access i) motivation, 2) physical and material access, 3) digital skills, and 4) usage. The excerpt discusses the motivations and barriers related to obtaining computer and internet access, specifically focusing on the digital divide. It highlights that before physical access, there is a desire

to have a computer and be connected to the internet, but many individuals facing the digital divide experience motivational problems. The text points out that there are both "have-nots" and "want-nots" in terms of digital technology, and that acceptance problems related to new technology are primarily driven by motivation. It also notes that as technology diffuses in society, the motivation to obtain a computer and internet access increases rapidly. It also delves into reasons for refusal, as identified in German and American surveys around the turn of the century, including lack of need or significant usage opportunities, lack of time or interest, rejection of the medium (internet and computer games), lack of money, and lack of skills. It sheds light on the motivational aspects and barriers related to computer and internet access, particularly focusing on the digital divide. It highlights that motivation plays a significant role in obtaining access, and as technology diffuses in society, the desire to obtain access increases. It provides insights into the dynamics of motivation and barriers related to computer and internet access, offering a glimpse into the evolving landscape of the digital divide and the factors influencing individuals' decisions regarding technology adoption. It underscores the importance of understanding and addressing motivational challenges and barriers to access, especially in the context of technological diffusion and societal connectivity.

Second is the concept that physical access encompasses more than just the core hardware of devices like computers and smartphones. It also includes peripheral equipment, materials such as paper and ink, software, and subscriptions. These additional expenses for digital media are increasing as hardware costs decrease and the number of devices purchased rises. While the physical access gap is closing, income inequalities still play a significant role in determining material access.

The third one is digital skills. It is important to have motivation and physical access to computers to use them effectively. However, learning how to manage hardware and software can be a challenge for some people due to a lack of skills. This issue is often referred to as 'computer literacy', 'information literacy', or 'multimedia literacy', and is related to concepts such as 'computer skills' and 'information capital'. Digital skills, as introduced by Steyaert (2000) and Dijk (2002), can be thought of as a series of different types of skills. The most basic of these are 'instrumental skills' (Steyaert) or 'operational skills' (Dijk), which are the abilities to work with hardware and software. The four types of internet skills, as proposed by Deursen (2010) are

operational internet skills, formal internet skills, information internet skills, and strategic internet skills.

The last successive kind of access is of source; while having the motivation, physical access, and skills to use digital media are necessary, they are not sufficient conditions for actual usage. Other factors can influence whether someone will use digital media. Usage is a dependent factor and can be measured in at least four ways, including the amount of time and frequency of use, the number and diversity of usage applications, whether broadband or narrowband is used, and the level of active or creative use. It is possible that usage time could be the first usage factor to equalize among users. This is because usage time can be influenced by factors such as convenience and availability, which are often similar among users. For example, if two people have similar access to digital media and use it for similar purposes, they may end up using it for a similar amount of time. However, it is important to keep in mind that other usage factors, such as the number and diversity of usage applications or the level of active or creative use, may not necessarily equalize at the same rate as usage time.

Critically, these challenges illustrate that achieving equitable digital literacy requires more than infrastructure provision. Interventions must address the motivational, educational, and socio-economic dimensions of digital information literacy, ensuring that users not only have access to digital tools but also the competence, confidence, and incentive to use them effectively. Without such a holistic approach, digital literacy initiatives risk reinforcing existing inequalities, limiting the potential of digital information literacy to foster informed, ethical, and active participation in digital environments.

Digital information literacy plays a crucial role in mitigating the spread of misinformation, ensuring cybersecurity, and promoting responsible digital engagement. By fostering critical evaluation skills, digital information literacy enables users to discern reliable information from fake news, reducing the social and psychological impacts of misinformation (Ahmad, 2024). In parallel, the growing reliance on digital technologies has intensified cybersecurity challenges, including data breaches, cyber-attacks, and threats to personal and organizational information (Irwin, 2022; Kamarulzaman et al., 2022). Developing an information safety culture, supported by robust technical measures, such as firewalls, antivirus software, access controls, and

staff training, complements digital information literacy by promoting secure and responsible use of digital tools.

Beyond technical and critical competencies, digital information literacy also encompasses ethical and legal awareness in digital spaces. Social media misuse, including the spread of false information, hate speech, harassment, and disclosure of confidential information, underscores the need for digital users to understand legal frameworks such as the Malaysian Copyright Act 1987 and MCMC regulations (Ariffin, 2022). Research further highlights that excessive or problematic use of social media can negatively impact cognitive functioning and academic performance while also providing opportunities for emotional support and community building (Griffiths et al., 2018). This dual potential reinforces the importance of digital literacy education that balances technical, cognitive, ethical, and social competencies, enabling individuals to use digital platforms effectively, safely, and responsibly.

Analytically, these findings suggest that digital information literacy should be approached holistically, integrating cybersecurity, critical evaluation of information, ethical behaviour, and responsible social media engagement. While many existing initiatives focus on technical or cognitive skills, less attention is given to fostering ethical awareness and resilience against digital risks. Thus, comprehensive digital literacy programs are needed to equip individuals with the skills, knowledge, and judgment required to navigate complex digital environments safely and ethically.

Laws are regulations of behaviour within a society, formulated and implemented by a governing body. They are intended to uphold law and order, settle conflicts, safeguard individual liberties, and advance the general welfare. Laws cover a wide range of topics, including business operations, civil litigation, criminal activity, and societal norms. In Malaysia, several acts can be used to punish offenders when the internet is used as a medium for communication. Pitchan & Omar (2019) highlighted that these include: (i) *Akta Komunikasi dan Multimedia 1998*, (ii) *Akta Perlindungan Data Peribadi 2010*, (iii) *Akta Perlindungan Pengguna 1999 (Pindaan) 2010*, (iv) *Akta Perdagangan Elektronik 2006*, and (v) *Akta Jenayah Komputer 1997*. Information about these acts was obtained from reliable websites.

i) *Akta Komunikasi dan Multimedia 1998 (Suruhanjaya Komunikasi dan Multimedia Malaysia, 2024)*

An act to provide for and regulate the communications and multimedia industry, geared towards the merger and matters incidental thereto. Section (211) prohibits the sharing of offensive content. (1) No content application service provider, or any other person using the content application service, may provide content that is indecent, obscene, false, threatening, or offensive in nature with the intent to harass, abuse, threaten, or harass any person. While 233. Improper use of network facilities or network services, etc. (1) someone who—

(a) by using any network facility or network service or application services consciously (i) create, create or request; and (ii) the commencement of the transfer, any comments, requests, suggestions, or other obscene, indecent communications, false, threatening, or offensive nature with intent to offend, harass, threaten, or harass others; or

(b) initiate a communication using any of the application services, whether continuously, repeatedly or otherwise, and within that communication may or may not occur, with or without disclosing his identity and with intent to harass, harass, threaten or harass any person at any number or electronic address, commits an offence and may upon conviction may a fine not exceeding fifty thousand ringgit or imprisonment for a term not exceeding one year or both and shall also be liable to a further fine of one thousand ringgit for each the day of the offense continued after the conviction.

ii) Akta Perlindungan Data Peribadi 2010 (Pesuruhjaya Perlindungan Data Peribadi, 2024)

This Act applies to any person processing, and any person who has control over or authorizes processing, any personal data in connection with a commercial transaction. The processing of personal data by a data User shall comply with the principles. The following personal Data protection measures, namely—

(a) General principles - A data user may not in the case of personal data other than sensitive personal data, process personal data about a data subject unless the data subject has given his consent to the processing of the personal data; or in the case of sensitive personal data, process sensitive personal data about a data subject except in accordance with the provisions of Section 40.

(b) Notice and option principles - A user of the data shall, by written notice inform a data subject of the data to be used as soon as possible and a notice

under this subsection shall be in the national and English languages, and the individual shall be given a clear and accessible way to make his choice, if necessary, in the national and English languages.

(c) Disclosure principles - Meaning, no personal data may, without the consent of the data subject, be disclosed

(d) The principle of safety - A data user shall, when processing personal data, take practical measures to protect such personal data from any loss, misuse, modification, unauthorised or accidental access or disclosure, alteration or destruction.

(e) Storage principle - Personal Data processed for any purpose cannot be stored for longer than necessary to fulfil this purpose. It is the duty of a data user to take all reasonable steps to ensure that all personal data is destroyed or permanently deleted if the personal data is no longer required for the purposes for which the personal data is to be processed.

(f) The principles of data integrity- A data user shall take reasonable steps to ensure that the personal data is accurate, complete, not misleading, and up-to-date with regard to the purposes, including any directly related purposes, for which the personal data is collected and further processed.

(g) Access principle - A data subject shall be given access to his / her personal data held by a user of the data and may correct the personal data if the personal data is not accurate, incomplete, misleading, or not up-to-date, unless compliance with such requests for access or rectification are refused to be granted under this act.

iii) Akta Perlindungan Pengguna 1999 (Pindaan) 2010 (Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna, 2024)

This act protects the rights of consumers in the process of buying and selling goods, services, contracts, and other items, including businesses online, and protects users in terms of obtaining information, especially through advertisements posted or broadcast over the internet.

iv) Akta Perdagangan Elektronik 2006 (Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna, 2012)

An act to provide for the legal recognition of electronic messages in commercial transactions, the use of such electronic messages to meet the requirements of the law, and to enable and facilitate commercial transactions using electronic means and other matters relating thereto.

v) Akta Jenayah Komputer 1997

A person commits an offense if he causes a computer to perform any function with the intention of gaining access to any program or data stored in any computer; the access he intended to obtain was without power; and he knew, while he was causing the computer to perform that function, that it would happen.

In addition to the five acts discussed above, the Copyright Act also needs to be emphasized. The Copyright Act is responsible for providing legal protection to the owner of the work and the owner of the copyright from any misuse of their work by unauthorized individuals, including the misuse and dissemination of their work without permission. Referring to the Copyright Act 1987 Act 332, works that are eligible for copyright under Section 7 are literary works, musical works, artistic works, films, sound recordings, and broadcasts. These works are protected regardless of the quality or purpose for which they were produced. Each of the above works has a period of copyright as stated under this act, that is, the period of copyright on works of literature, music or art is in existence during the life of the creator and shall continue to exist until the expiration of fifty years after his death.

The second is that the duration of the copyright on a sound recording is to continue to exist until the expiration of a period of fifty years, counting from the beginning of the calendar year following the year the recording was first published or, if the sound recording was not published, from the beginning of the calendar year following the year of designation. Further, the duration of the copyright on the broadcast and the duration of the copyright on the film shall continue to exist until the expiration of the fifty years counted from the beginning of the calendar year following the year in which the broadcast was first made.

According to Section 36 of this Act, a violation of the Copyright Act occurs when a person does not have a copyright license. There are 11 offenses under this act whereby an individual may be fined not less than RM2,000.00 and not more than twenty RM20,000.00 for each infringing copy, or imprisoned for a term not exceeding five

years or both, and for any subsequent offense, fined not less than RM4,000.00 and not more than RM40,000.00 for each infringing copy or imprisoned for a term not exceeding ten years or both. Offenses under this Act include making a sale of any infringing copy, distributing infringing copy, and making, importing, or selling any technology or device for the purpose of circumventing technology protection measures.

Understanding these regulations is a key component of digital information literacy, particularly in promoting ethical use of digital content and responsible sharing. Users with strong digital literacy skills are better equipped to recognize copyright restrictions, avoid infringement, and navigate legal obligations when creating or disseminating digital information. Moreover, integrating copyright knowledge into digital literacy education ensures that individuals not only develop technical and evaluative competencies but also cultivate ethical and legal awareness, reinforcing responsible digital behavior in academic, professional, and social contexts.

The application of digital information literacy in schools and state public libraries can be guided by legal frameworks and cybersecurity principles. Legal provisions, such as the Copyright Act 1987 and related regulations, provide a foundation for teaching students and library users how to use digital resources ethically and responsibly (Pitchan & Omar, 2019). Integrating cybersecurity awareness into digital literacy programs is equally essential, as widespread use of gadgets and internet access among children increases exposure to potential digital risks. Structured campaigns and educational initiatives can systematically introduce students to best practices in online safety, including data protection, secure use of digital tools, and adherence to legal requirements. Critically, such integration ensures that DIL education goes beyond technical skills to foster responsible, informed, and secure digital behaviors, preparing students and library users to navigate digital environments safely and ethically.

2.4 Definition and Concept of Sustainable Collaboration

Sustainable collaboration involves emphasizing the long-term, enduring nature of partnerships that are designed to persist and thrive over time, balancing economic, social, and environmental goals. It refers to partnerships or cooperative efforts between different entities that are designed to achieve shared goals in a manner that is environmentally, socially, and economically sustainable. These collaborations prioritize

long-term impact, resilience, and adaptability, ensuring that the benefits and resources are sustained over time without depleting or harming the involved parties or the environment.

2.4.1 Concept of Collaborative Initiative

Collaborative initiatives involve structured efforts where multiple entities, such as organizations, institutions, or individuals, work together to achieve shared objectives, pooling resources, expertise, and efforts to address complex challenges (Ksapa, 2024). Since their emergence in the 1980s, collaborative initiatives have been recognized as effective strategies for enhancing organizational performance and achieving mutual benefits (Freitas et al., 2018). Key characteristics include a shared vision, mutual benefit, resource sharing, joint decision-making, and collective responsibility. In the context of digital information literacy, collaboration between state public libraries and school resource centers offers significant potential. By sharing expertise, digital resources, and instructional strategies, these institutions can create integrated DIL programs that are more comprehensive and sustainable than isolated efforts. Critically, such collaboration not only improves resource efficiency but also fosters consistent digital literacy education across educational and community settings, ensuring that students and library users develop the necessary skills, ethical awareness, and responsible digital behaviors.

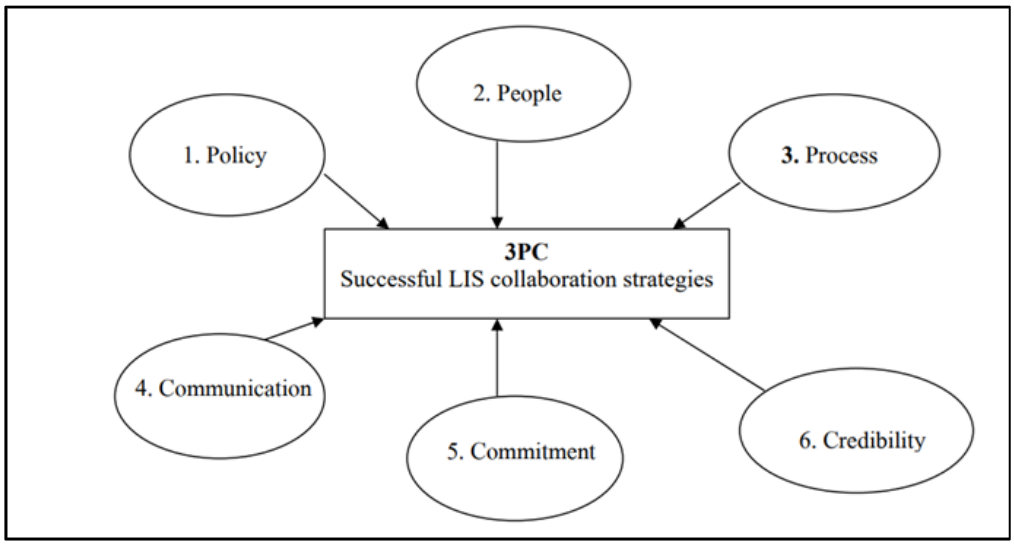

Figure 2.6 3PC Successful LIS Collaboration Strategies (Sacchanand, 2012)

The first critical element of collaborative initiatives is a shared vision and goals, which refer to the collective agreement among participants on a common purpose or set of objectives. A shared vision aligns individual efforts, fosters commitment, and positions each participant as "indispensable" to the achievement of the overarching goal (Rabuzzi, n.d., as cited in Montiel-Overall, 2005). In the context of library and information services, collaborative initiatives underpinned by a shared vision can enhance research, teaching, and learning outcomes, improve service quality, and optimize the pooling of human and material resources (Sacchanand, 2012). For instance, 3PC Successful LIS Collaboration Strategies illustrate how shared goals can help break down barriers and create opportunities for productive cooperation in library and information science, highlighting the practical application of this concept in professional settings. Critically, establishing a shared vision ensures that collaborative efforts in implementing digital information literacy programs in schools and public libraries are coherent, sustainable, and focused on achieving measurable educational and community outcomes.

The second key characteristic of collaborative initiatives is the sharing of resources and responsibilities. This involves pooling knowledge, skills, funding, and infrastructure, and distributing responsibilities among participants to achieve collective objectives. Sharing resources enables organizations to complement each other's strengths, reduce individual burdens, and improve efficiency in planning and service delivery (Partridge et al., 2021). For example, public libraries and universities often collaborate to map existing services, identify gaps, and develop joint resources, particularly to support students in regional, rural, or remote areas. In the context of digital information literacy, such collaborative resource sharing between state public libraries and school resource centers can enhance access to digital tools, instructional materials, and skilled personnel, ensuring more equitable and comprehensive digital information literacy programs. Notably, this approach not only strengthens institutional capacity but also promotes sustainable and mutually beneficial outcomes by leveraging combined expertise, technology, and infrastructure to meet community and educational needs.

A third key characteristic of collaborative initiatives is mutual benefit, which ensures that all participating entities gain value from the partnership. Sustainable collaborations rely on reciprocal advantages, encompassing tangible resources, shared expertise, and enhanced organizational capacities (Charles, 2017; Chen & Xue, 2010).

In the context of digital information literacy, both state public libraries and school resource centers contribute their respective strengths, such as instructional expertise, digital resources, and infrastructure, while simultaneously benefiting from access to complementary assets and shared knowledge. Such mutually beneficial arrangements not only enhance program outcomes but also provide a competitive and strategic advantage by leveraging combined resources and networks (Bruning et al., 2006).

The fourth characteristic, joint decision-making, refers to collectively reaching decisions through consensus or participative processes. Research indicates that joint decision-making fosters psychological safety, enhances creativity, and strengthens collaboration outcomes (Kundi & Subhan, 2023). Applied to digital information literacy initiatives, joint decision-making ensures that both state public libraries and school resource centers are actively involved in planning, implementing, and evaluating programs. This inclusive approach builds trust among staff, teachers, and the wider community and supports sustainable and adaptive practices by aligning initiatives with the needs and priorities of all stakeholders.

Evaluatively, relationship building emerges as a central factor in sustaining collaborative efforts. Continuous engagement, open communication, and mutual accountability contribute to long-term collaboration and program viability (Matthews, 2020). For digital information literacy, this means that sustained partnerships between libraries and schools can create lasting educational impact, foster digital competencies, and ensure equitable access to digital resources across communities.

2.4.2 Types of Collaborative Initiatives

Collaborative initiatives are structured efforts in which multiple organizations leverage their strengths, resources, and expertise to address shared challenges. Such initiatives enable institutions to reduce individual burdens and achieve objectives more effectively through mechanisms such as shared vision and goals, mutual benefit, joint decision-making, and relationship building. These collaborations can take various forms, including inter-organizational, community-based, and cross-sector collaboration, each with unique characteristics and applications.

Inter-organizational collaboration refers to partnerships between distinct organizations aimed at achieving common objectives while maintaining organizational autonomy. Effective inter-organizational collaboration depends on multiple factors,

including external environmental conditions, organizational characteristics, individual competencies, relational dynamics, and supporting instruments or frameworks (Kożuch & Katarzyna, 2016). Team members from different organizations bring diverse expectations, routines, and perspectives shaped by their respective organizational contexts, which can both enrich and challenge the collaboration (Dolfsma et al., 2022).

In other hands, Longoria (2005) emphasizes several key considerations for successful inter-organizational collaboration: dialogue to clarify assumptions and meanings, adequate allocation of resources, accountability in program delivery, data-driven decision-making, and knowledge sharing. Despite its recognized importance, the structural foundations of inter-organizational collaboration remain underexplored. Ganeshu et al. (2024) argue that existing research insufficiently addresses the identification of organizational structures and characteristics that facilitate effective collaboration, even though these structures are critical in determining the degree and success of cooperative initiatives. Critically, understanding these factors is essential for designing collaborative frameworks that are adaptable, sustainable, and capable of supporting initiatives such as digital information literacy programs across state public libraries and school resource centers.

Community-based collaboration emphasizes fostering a sense of community, shared purpose, and positive organizational culture among participants (Together Team, 2023). This type of collaboration typically involves engaging stakeholders who are invested in the well-being and satisfaction of community members. Key considerations for establishing effective community-based collaborations include defining the focus of the initiative, such as addressing local issues like child welfare, literacy, or social challenges, clarifying desired outcomes, conducting community assessments to understand cultural norms and habits, and carefully selecting committee members who can contribute resources and influence (Sangalang, 1999). Although some of these studies were conducted decades ago, their principles remain relevant today, providing a framework for implementing structured, participatory collaborations that address local needs effectively.

Cross-functional collaboration occurs when teams from different departments, disciplines, or areas of expertise work together to achieve shared organizational goals. This approach leverages diverse skill sets and perspectives, facilitating more effective problem-solving, knowledge sharing, and innovation (Woolley, 2023; Samija, 2023). Cross-functional collaboration can: 1) enhance customer experience, 2) foster

organizational alignment to ensure teams work toward common objectives, and 3) gain a competitive advantage through accelerated innovation. This collaboration can lead to improved employee engagement, greater business agility, enhanced insights and management skills, and the elimination of stereotypes and diversity issues (Cascade Team, 2023). By bringing together diverse expertise, organizations can address complex challenges more efficiently while fostering professional growth and collaboration skills among participants.

Hence, these types of collaborative initiatives, which are inter-organizational, community-based, and cross-functional, provide complementary approaches for achieving shared objectives. Before engaging in collaboration, organizations should assess which type aligns best with their goals, available resources, and intended outcomes. For state public libraries and school resource centers, inter-organizational collaboration may be particularly relevant, as it allows two distinct organizations to pool resources, share knowledge, and jointly implement digital information literacy initiatives to maximize community impact.

2.4.3 Importance and Benefit of Collaborative Initiative

Notably, Yarooms (2024) highlighted that collaboration teams composed of members from diverse backgrounds and skill sets bring a wide range of perspectives to the table. This diversity fosters creative problem-solving and often generates innovative solutions that may not emerge in individual work. Consequently, collaborative initiatives enable participants to address complex, multifaceted challenges by leveraging varied expertise, experiences, and resources. The importance and benefits of such collaborative initiatives can be summarized as follows:

(a) Collaborative initiative empowers innovation and creativity. Through collaboration, it fosters innovation by bringing together different ideas, skills, and approaches, leading to creative solutions. Participating in meaningful communication through digital tools while possessing the essential skills and knowledge to effectively navigate online environments (Belshaw, 2014)

(b) Resource optimization, especially in pooling that allows participants to achieve more than they could individually, maximizing efficiency and impact. Schuh et al. (2014) mentioned that Resource pooling involves the

allocation of essential information, equipment, and human resources to achieve collaborative objectives. This process includes assigning tasks and determining the duration for which resources will be dedicated to various activities.

(c) Collaborative initiative addresses the capacity building of joining members. Collaborative initiatives could build the capacity of all involved, as participants learn from one another and strengthen their abilities to address future challenges. Laurence (2024) outlines that capacity building boosts organizational efficiency, increases organizational effectiveness, and drives for a broader social system change.

Further, Laurence (2024) emphasized that collaboration involves creating, producing, or achieving outcomes together; consequently, collaborative initiatives provide tangible benefits to all participants working toward shared goals. In the context of this study, such collaboration is particularly significant for enhancing digital information literacy, as it enables state public libraries and school resource centers to jointly utilize digital resources more effectively, share expertise, and implement strategies that strengthen the digital competencies of both staff and users.

2.4.4 Challenges and Barriers to Collaborative Initiative

As mentioned by Sangalang (1999), developing and sustaining community collaborations is a continuous and intricate process. It is important to recognize that these collaborations will face obstacles and challenges as time goes on. All challenges and barriers need to be identified and managed effectively to ensure that the collaboration functions smoothly, promoting mutual success. Below are the challenges and barriers that can be associated with implementing collaborative initiatives.

The first challenge and barrier in collaborative initiatives relates to trust and power dynamics. Denise et al. (2018) highlight that cooperation, collaboration, and mutual respect among partners are grounded in the trust established between them. A lack of trust can hinder the development of collaborative relationships, whereas mature and evolving partnerships increasingly rely on trust as a critical factor for success. Similarly, Baddache (2023) emphasizes that trust is fundamental in collaborative initiatives, requiring partners to engage in open and transparent communication, share

relevant information, and maintain confidentiality when necessary. Effective trust-building also involves implementing clear rules, equitable decision-making processes, and conflict-resolution mechanisms, all of which help mitigate the challenges posed by power imbalances.

Another significant challenge in collaborative initiatives is resource disparities. Oliwia (2024) notes that limited resources, conflicting demands, and logistical constraints can undermine the effectiveness of collaborative partnerships. For example, insufficient financial resources may impede the planned collaborative processes. Addressing these disparities is therefore crucial for achieving successful outcomes. Similarly, Akbar et al. (2022) highlight that differences in resources can both facilitate and inhibit collaboration, depending on how they are managed.

Sustainability is another critical challenge that requires careful attention. Given the substantial investments of time, effort, and resources, collaborative initiatives risk losing impact if they are not maintained over the long term. For instance, Baddache (2023) emphasizes that effective collaborations prioritize long-term sustainability over short-term gains. This requires partners to assess the initiative's durability, scalability, potential risks, and challenges and to implement strategies that ensure continuity beyond the initial stages. Similarly, Sangalang (1999) argues that planning for sustained collaboration must begin at the outset, while Wasonga et al. (2011), as cited in Charles & Bbuye (2014) underscore the importance of allocating sufficient funding and resources to both initiate and maintain collaborative activities. Therefore, this study not only identifies the challenges inherent in implementing collaborative initiatives but also proposes a framework designed to promote their long-term sustainability and effectiveness.

Communication and coordination, along with trust, resources, and sustainability, are among the key challenges in building effective collaborative initiatives. Maintaining clear, consistent communication and coordinating activities among diverse participants can be difficult. Birt (2024) identifies fourteen challenges in teamwork, highlighting the lack of clarity as a primary concern. Each collaborative member must understand the objectives and goals; otherwise, misunderstandings can lead to inefficiencies, duplication of efforts, or delays. Similarly, Abdul Hassan (2015) notes that poor communication can result in confusion, misinterpretation of messages, or bias toward certain individuals or cultural groups. Samija (2023) further emphasizes

that variations in terminology, priorities, and communication styles among team members can create misunderstandings during collaboration.

Trust and power dynamics also significantly impact collaborative effectiveness. Denise et al. (2018) assert that cooperation, mutual respect, and open communication stem from trust between partners, which is crucial for sustaining collaborative relationships. Baddache (2023) adds that trust-building measures, such as clear rules, equitable decision-making processes, and conflict-resolution mechanisms, are essential for successful collaboration. Resource disparities present another major challenge. Limited financial, human, or material resources, as highlighted by Oliwia (2024), can hinder the implementation of collaborative initiatives. Akbar et al. (2022) note that differences in resources can both facilitate and inhibit collaboration, depending on how they are managed.

Finally, sustainability is a critical consideration. Collaborative initiatives require significant investment in time, effort, and resources, and their impact may diminish without long-term planning. Within this context, Baddache (2023) emphasizes the importance of prioritizing long-term sustainability over short-term gains. Furthermore, Sangalang (1999) argues that planning for sustained collaboration must begin at the outset, whereas Wasonga et al. (2011, as cited in Charles & Bbuye, 2014) highlight the need for adequate funding and resource allocation to support ongoing collaborative activities.

Collectively, these challenges- trust and power dynamics, resource disparities, sustainability, and communication and coordination must be proactively identified and addressed. Effective management of these barriers is essential to ensure that collaborative initiatives achieve their intended goals and produce lasting, positive outcomes.

2.4.5 Collaboration Models and Governance

This section introduces the concept of collaborative efforts across different scopes and models in relation to supporting the aims and objectives of this study, specifically to investigate best practices in implementing collaborative digital literacy programmes and activities between state public libraries and school resource centres. In general, collaborative effort models refer to various structures and approaches designed to enhance cooperation, teamwork, and joint problem-solving among individuals or

groups. Notably, several models of cooperation are commonly recognised. In this regard, each cooperation model offers distinct benefits and challenges; therefore, the selection of an appropriate model depends on the context, goals, and nature of the specific cooperative effort.

According to Parkinson (2006), collaboration is defined as a mutually beneficial and well-defined relationship entered into by two or more organisations to achieve shared goals. In this definition, the relationship entails a commitment to mutual objectives, a jointly developed structure with shared responsibility, mutual authority and accountability for success, as well as the sharing of resources and rewards. Furthermore, Parkinson conceptualised the partnership spectrum as consisting of three elements: (i) cooperation, (ii) collaboration, and (iii) integration.

Regarding cooperative efforts, these arrangements are typically informal and short-term, with minimal structural requirements. Under such arrangements, each partner retains its own decision-making authority, organisational identity, autonomy, and responsibility for its respective actions. Consequently, the level of risk involved is low, as information is shared strictly on a need-to-know basis and resources are not jointly utilised. In addition, participating groups may continue to operate independently and are not required to coordinate decision-making processes. By contrast, formal cooperative efforts are characterised by long-term partnerships of moderate intensity, in which specific roles and responsibilities are allocated to each agency. In these contexts, partners are accountable to one another, and some degree of autonomy and decision-making authority is relinquished. As a result, a higher level of risk is involved due to the pooling of resources; therefore, decision-making processes must be coordinated, with agreements reached through consensus.

2.4.5.1 The Integrative Framework for Collaborative Governance

The concept of collaborative engagement, originally explored in management and nationhood studies, has evolved into a framework for understanding multi-stakeholder decision-making. Emerson et al. (2012) offer a widely cited definition of collaborative governance, describing it as the structured processes and decision-making mechanisms that engage participants across public agencies, levels of government, and the private and civic sectors to achieve public purposes unattainable by any single actor. While this definition provides a comprehensive conceptual foundation, it also highlights

the challenges inherent in coordinating diverse stakeholders with varying priorities and capacities.

Emerson et al. (2012) identify leadership, consequential incentives, interdependence, and uncertainty as key drivers that shape the direction and effectiveness of a collaborative governance regime. The notion of a "regime" emphasizes that cross-boundary collaboration is not merely episodic but constitutes the prevailing pattern of organizational behaviour, which has implications for the sustainability and institutionalization of collaborative efforts.

Furthermore, the dynamics of collaborative governance, principled engagement, shared motivation, and capacity for joint action had served as both indicators and determinants of its success. Critically, while these components provide a structured approach to evaluating collaborative initiatives, empirical studies suggest that the practical implementation of such frameworks often encounters challenges related to power asymmetries, resource disparities, and communication barriers (Denise et al., 2018; Baddache, 2023). Nevertheless, when effectively operationalized, collaborative governance enhances adaptability, resilience, and the capacity to achieve collective outcomes that individual organizations could not accomplish alone, making it particularly relevant for initiatives such as partnerships between state public libraries and school resource centers.

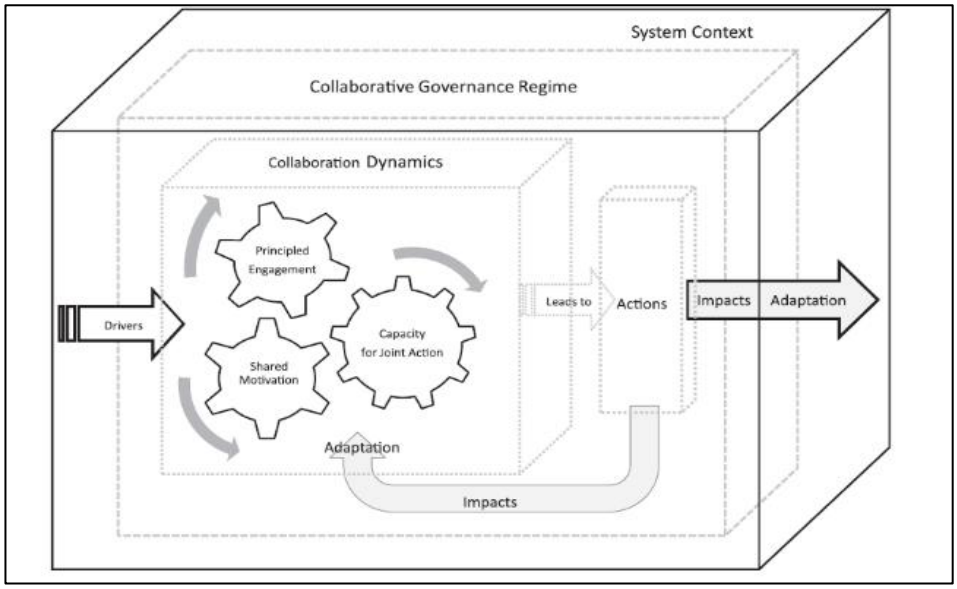

Figure 2.7 The Integrative Framework for Collaborative Governance (Emerson et al., 2012)

2.4.5.2 Collaborative Approach Framework

This framework emphasises the pivotal role of school principals and teachers in school resource centres in establishing effective partnerships to support teaching and learning. By adopting a collaborative approach, library and media teachers, classroom teachers, and principals can work collectively, aligning their roles to enhance the quality of educational resources and information services. Such collaboration reflects the principles of shared vision, joint decision-making, and mutual benefit, which are central to successful collaborative initiatives (Emerson et al., 2012; Sacchanand, 2012). Importantly, this approach is directly applicable to the present study, as it examines collaborative initiatives between state public libraries and school resource centres. Moreover, Creech (2018) highlights that school libraries should actively seek partnerships with public libraries to expand access to resources, share expertise, and improve service delivery. Figure 2.6 provides a visual representation of the Collaborative Approach framework, illustrating the interconnected roles and responsibilities that underpin effective collaboration.

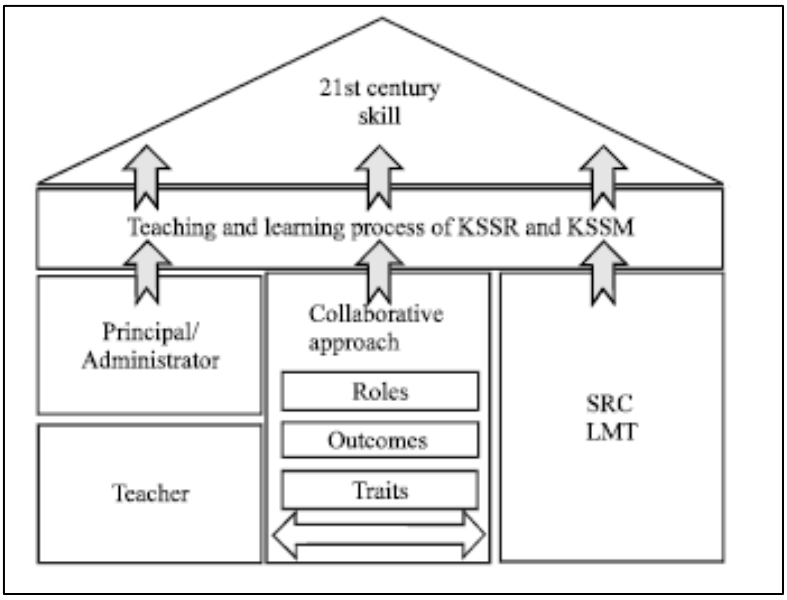

Figure 2.8 Collaborative Approach framework (Hashim et al., 2017).

The Collaborative Approach framework is particularly relevant to developing digital information literacy in public libraries and school resource centres, as it emphasises structured partnerships among school administrators, library and media teachers, and library staff. Critically, collaboration not only aligns roles and

responsibilities but also fosters a systemic approach to teaching, applying, and reinforcing digital information literacy skills, enabling students to locate, evaluate, and use digital information responsibly (Emerson et al., 2012; Creech, 2018). Empirical evidence suggests that such collaborative models enhance resource sharing, reduce redundancy, and create opportunities for professional learning among educators, thereby strengthening the implementation of digital information literacy initiatives (Partridge et al., 2021; Laurence, 2024).

However, the literature also highlights potential barriers to effective collaboration, including trust asymmetries, resource disparities, and communication challenges, which may limit the framework's effectiveness if not proactively addressed (Denise, 2018; Baddache, 2023). By integrating both the benefits and challenges, the Collaborative Approach framework provides a nuanced lens for understanding how strategic partnerships can transform school resource centres into hubs for digital information literacy, supporting students in navigating digital content efficiently while promoting ethical, critical, and collaborative engagement with information.

2.4.5.3 Collaboration Moves Productivity to the Next Level

The framework for collaborative practice delineates three principal dimensions: communication, coordination, and cooperation, each comprising specific collaborative practices intended to foster effective collaboration (Schuh et al., 2014). While the framework does not claim to be exhaustive, it provides a structured approach to understanding how organizations can enhance joint efforts. Communication is critical for information sharing and sense-making, ensuring that all stakeholders maintain a common understanding of goals, processes, and expectations. In parallel, coordination addresses interdependencies between tasks, aligning resources and activities to improve efficiency and reduce redundancies. Cooperation, meanwhile, emphasizes joint effort toward shared objectives, promoting engagement across functions and strengthening interpersonal and inter-organizational relationships.

Critically, applying this framework to digital information literacy initiatives highlights its relevance, as effective communication ensures accurate information dissemination, coordination aligns the roles of school resource centres and state public libraries, and cooperation supports the joint development and implementation of digital literacy programs. However, empirical studies suggest that while these dimensions

provide a useful structure, their practical implementation often encounters challenges such as power asymmetries, resource disparities, and communication barriers (Denise et al., 2018; Baddache, 2023), underscoring the need for deliberate strategies to mitigate these obstacles.

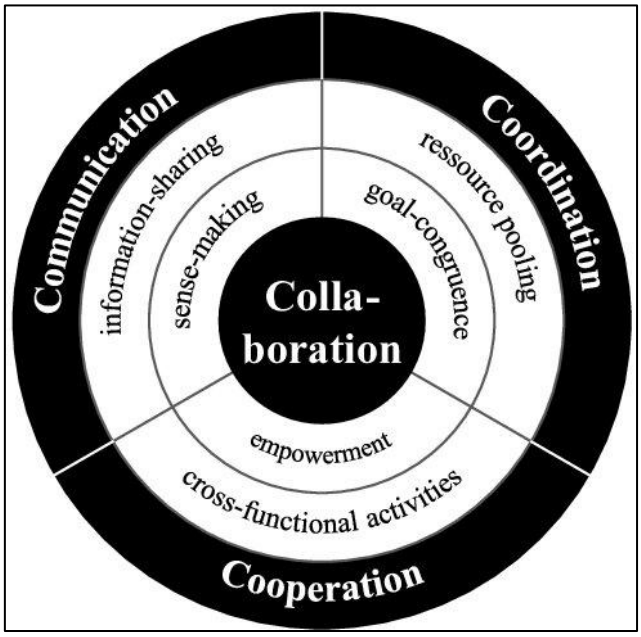

Figure 2.9 Framework for Collaborative Practice (Schuh et al., 2014)

2.4.5.4 Three Imperatives of Collaboration

This model underscores that successful collaboration depends on the genuine commitment of every team member to integrate instructional approaches while ensuring alignment with their disciplinary expertise. Central to this commitment is the establishment of a shared understanding and common purpose from the outset, which serves as the foundation for coordinated action and mutual accountability. While the literature on collaboration and communities of practice often assumes these aspects, empirical studies highlight that they must be explicitly cultivated. For instance, team members in practice consistently emphasise that a conscious effort to articulate the purpose of collaboration and a willingness to actively engage are essential for building trust, fostering psychological safety, and achieving productive outcomes (Emerson, 2012; Kundi & Subhan, 2023). Without such intentional development, collaborative efforts risk misalignment, disengagement, or superficial participation, which can undermine both the effectiveness and sustainability of initiatives.

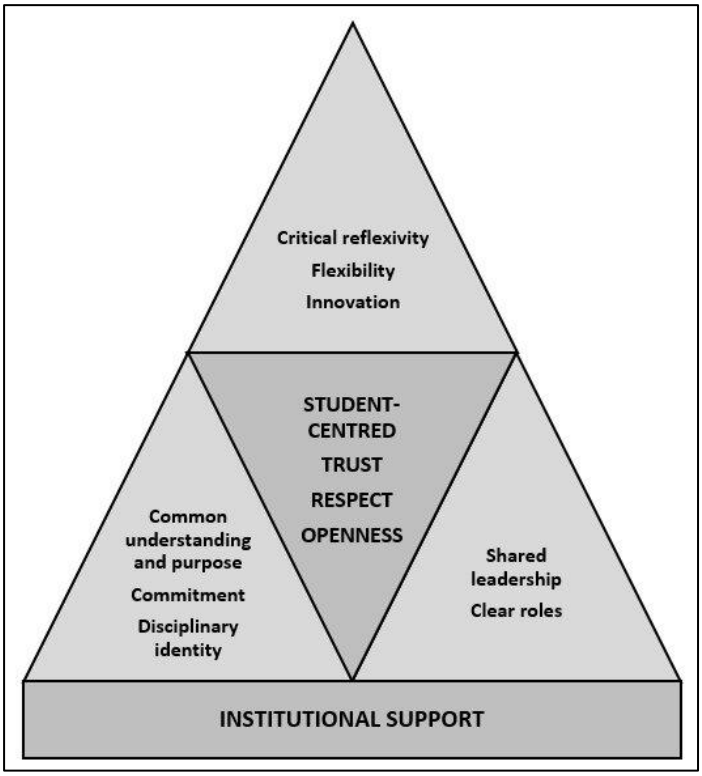

Figure 2.10 Three Imperatives of Collaboration (Khan & Dieu, 2017).

Therefore, these three imperatives: commitment, shared understanding, and purposeful engagement, are not merely theoretical ideals but practical necessities for the successful implementation of collaborative frameworks, including those aimed at enhancing digital information literacy in school resource centres and state public libraries.

2.4.5.5 Theory-Based Pedagogical Model

In educational contexts, collaborative engagement is frequently operationalised through inquiry-based and collaborative approaches. Thus, Häkkinen (2016) proposes a theory-based pedagogical model that supports twenty-first-century teaching and learning by structuring learning tasks, activities, resources, and implementation levels to foster effective collaboration. Specifically, task types include ill-structured, complex, and challenging learning tasks that are inquiry-based, problem-based, case-based, and collaborative, thereby encouraging learners to develop higher-order thinking and collective problem-solving skills. Activities within this framework are designed to promote active engagement, peer interaction, and reflective practice, aligning with

constructivist principles of learning. Resources encompass technology, instructional materials, peer collaboration, and teacher support, highlighting the interplay between human and digital resources in enabling collaborative learning. Finally, the levels of implementation guide educators in adapting these components to suit various educational contexts, ensuring that collaboration is meaningful, scalable, and aligned with learning objectives.

Critically, while Häkkinen's framework offers a structured approach to pedagogical design, its practical implementation requires careful alignment with institutional goals, teacher expertise, and available resources. Empirical studies suggest that without intentional scaffolding, even well-designed collaborative tasks may fail to achieve their intended learning outcomes (Laurence, 2024; Kundi & Subhan, 2023). Therefore, applying this pedagogical model in contexts such as school resource centres and state public libraries necessitates integrating both digital tools and collaborative strategies to cultivate digital information literacy, ensuring that students not only access information but also evaluate, synthesise, and apply it effectively in collaborative settings.

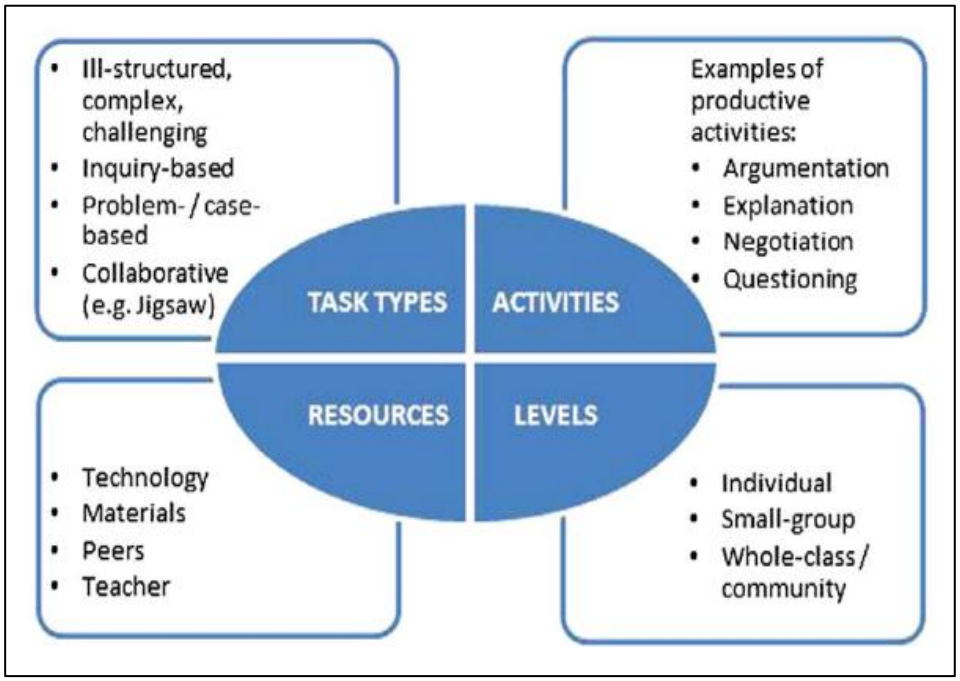

Figure 2.11 Theory-based Pedagogical Model (Häkkinen et al. 2016)

2.4.5.6 Model of Collaborative Governance

The Model of Collaborative Governance, developed by Ansell & Gash (2012), emphasises the role of facilitative leadership in sustaining collaborative efforts. Leaders function as stewards, mediators, and catalysts, supporting process integrity, conflict resolution, and opportunity identification. While the model provides a practical framework for guiding collaboration between public libraries and school resource centres, empirical research suggests that success also depends on addressing power asymmetries, resource disparities, and communication barriers (Denise et al., 2018; Baddache, 2023).

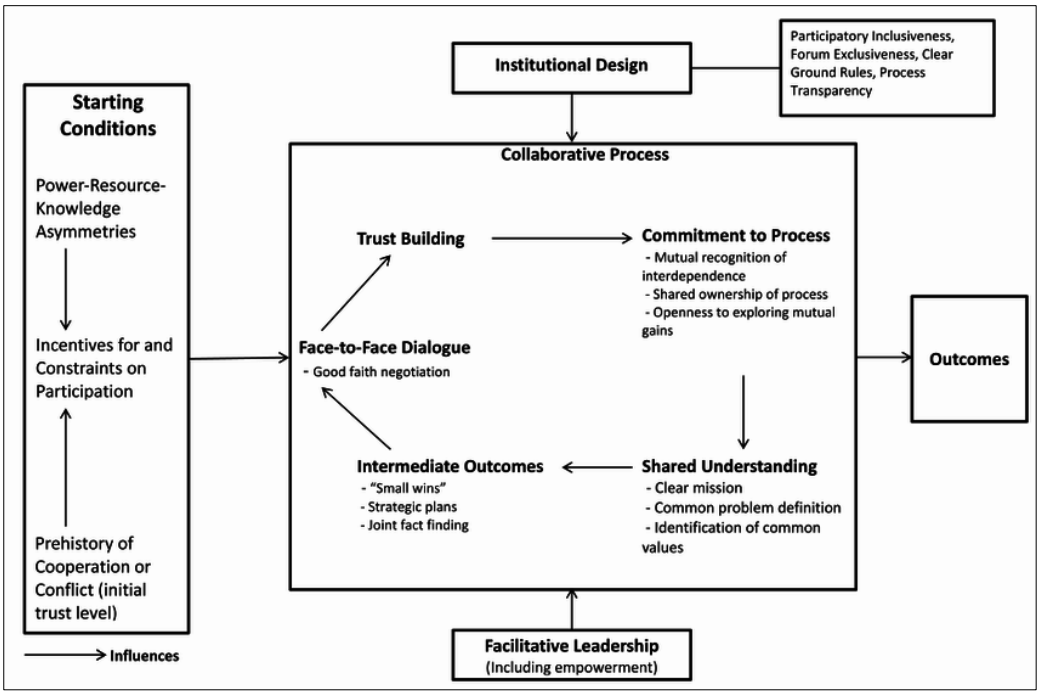

Figure 2.12 Model of Collaborative Governance. Source: Ansell and Gash (2008), p. 550

In the context of digital information literacy, collaborative leaders must not only coordinate programs but also ensure equitable access to resources, effective knowledge sharing, and alignment of goals among stakeholders. Thus, applying the Model of Collaborative Governance in this setting requires both leadership facilitation and careful management of practical challenges to achieve sustainable and impactful collaboration.

2.4.5.7 Multi-Level Principle-Guided Governance Framework for Public Policy and Services

The Multi-Level Principle-Guided Governance Framework provides a structured approach for generating public value by integrating collaborative intelligence with technology-enabled platforms. This framework emphasizes that collaboration should be the central governance objective, supported by digital tools that facilitate coordination and knowledge sharing. Its first principle underscores the use of public values, such as equity and transparency, to guide digital governance, ensuring that artificial intelligence (AI) systems and other technologies serve the public interest. The second principal advocates for sociotechnical system modelling, which integrates social interactions with technological infrastructure and recognizes feedback loops in decision-making processes. The third principle focuses on designing collaborative structures that leverage the complementary strengths of humans and AI, enhancing social connections and embedding public values within governance processes.

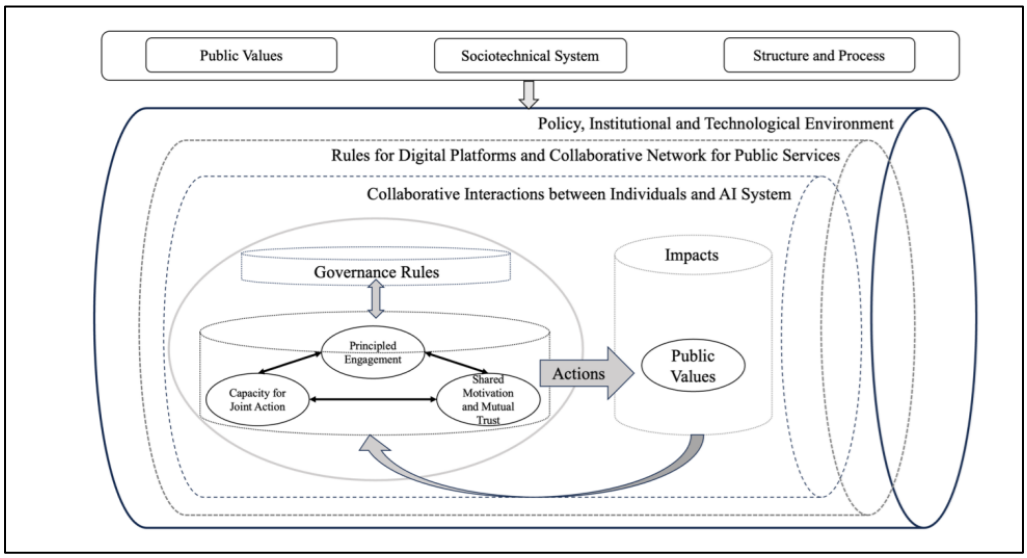

Figure 2.13 A Multi-Level Principle-Guided Governance Framework for Public Policy and Services (Yu-Che Chen et al, 2024)

The framework operates primarily at the meso-level, emphasizing engagement, shared motivation, and capacity for joint action, all of which are essential for advancing governance design aimed at public value creation. Importantly, this framework is directly applicable to collaboration between state public libraries and school resource centres. By aligning governance principles with collaborative practices, the framework

ensures that joint initiatives are well-coordinated, equitable, and sustainable, while promoting transparent decision-making and effective use of digital tools.

Critically, while this framework offers a comprehensive guide for principle-driven governance, empirical studies suggest that practical implementation can encounter challenges such as unequal access to technology, differences in institutional capacity, and varying levels of digital literacy among stakeholders (Baddache, 2023; Denise et al., 2018). Therefore, its successful application in the context of public libraries and school resource centres requires not only adherence to governance principles but also active measures to address power asymmetries, resource disparities, and communication barriers, ensuring that collaborative efforts translate into meaningful improvements in digital information literacy.

2.4.6 Evaluation of Collaborative Approach Frameworks

The frameworks reviewed encompass a wide range of applications, including project collaboration, public–private partnerships, twenty-first-century pedagogical practices, Industry 4.0 systems, and information literacy development in rural communities. While these models vary in focus, they collectively emphasise key elements of collaboration such as shared leadership, mutual trust, institutional support, and the integration of technological and human systems to enhance efficiency and learning outcomes. However, the breadth of these frameworks also highlights a lack of specificity when applied to educational-library contexts, particularly in relation to digital information literacy.

A comparative evaluation of these frameworks reveals that each prioritises different dimensions depending on its context. For instance, Industry 4.0 models emphasise technological efficiency and cyber-physical systems, whereas educational frameworks focus on student motivation, learning processes, and instructional collaboration. Similarly, information literacy models designed for rural communities highlight social development, lifelong learning, and equitable access, which are highly relevant to the present study. In contrast, governance-heavy frameworks, while valuable for policy-level analysis, may be less directly applicable to the operational collaboration between state public libraries and school resource centres.

Based on this evaluation, the most relevant frameworks for this study are those that emphasise instructional collaboration and information literacy development,

particularly partnerships between library and media teachers and classroom teachers, as well as models addressing information literacy in underserved communities. These frameworks align closely with the study's focus on enhancing DIL through collaborative initiatives. Nevertheless, the literature reveals a gap in integrating these perspectives into a unified model that combines collaboration, governance, and digital literacy within the Malaysian context, indicating a need for further conceptual development.

Furthermore, the success of collaborative initiatives is consistently influenced by common constraints identified across multiple frameworks. These include the "three limitations" of time, trust, and turf, as well as the need for a shared vision, commitment to power-sharing, and accountability mechanisms. Critically, while many models acknowledge these factors, they often assume their presence rather than providing practical strategies for their development. This limitation underscores the importance of designing context-specific frameworks that explicitly address these challenges to ensure effective and sustainable collaboration. Table 2.1 shows the evaluation of the collaborative approach framework.

Table 2.1
Evaluation of Collaborative Approach Framework

CONCEPTUAL MODEL	FOCUS	DIMENSIONS	RELEVANCE
Ansell and Gash (2008)	Highlights steps in a collaborative process and key aspects of collaboration, including trust building, face-to-face dialogue, commitment to process, shared understanding, and facilitative leadership	Starting conditions, institutional design, leadership, and collaborative process in collaborative governance.	Support sustainable collaboration among public agencies and, educational institutions
Emerseon et al. (2012)	Smart city projects, collaboration, and public-private partnerships (PPPs)	To illustrate how core organizations lead multi-party cooperation in current smart city projects, there are two types of mechanisms for adjusting to urban development driven by technological innovations: static	Encourages shared responsibility and coordination across government, especially libraries and educational institutions.

CONCEPTUAL MODEL	FOCUS	DIMENSIONS	RELEVANCE
		factors and dynamic mechanisms.	
Päivi et al. (2016)	Pedagogical framework for the twenty-first-century learning practices in teacher education	Strategic learning skills, collaborative problem-solving skills, and the skills to use information and communication technologies	Aligned with Malaysia 21st century Education Agenda, support collaboration through teamwork and shared practices.
Husain et al. (2017)	Partnership between the Library and Media Teachers, and the school teachers to fulfill the teaching and learning process	Understanding the roles between the Library and Media Teachers, school teachers, and principals	Encourage sustainable partnership in the educational system
Schuh et al. (2014)	How collaboration improves organisational performance	Coordination, communication, cooperation	The model supports the idea that Digital Information Literacy is strengthened through effective collaboration.
Ibrahim & Ab. Rashid (2018)	Model of information literacy for rural societies to assist them in education, human development, economic development, social development, and lifelong learning	Identify need, locate and access information, evaluate information, organize information, apply ethics, and disseminate information.	Support and relevance to Malaysian libraries, and inclusive, encourage collaboration among national, state, and school.
Khan, & Dieu., (2017)	The importance of building a robust team culture built upon shared leadership, mutual trust, and commitment, grounded by strong institutional support, to give any collaboration integrity and sustainability.	1. Critically reflexity innovation, 2. Student-centered – trust, respect, openness, 3. Shared leadership, clear roles Common understanding and purpose, commitment, and disciplinary identity	Applicable to Malaysian educational institutions, support long-term institutional collaboration
Yu-Che Chen et al. (2024)	The governance framework establishes a structure for generating public value. This suggested framework relies on a fresh	The emphasis is on meso-level governance, which is driven by the principles of active involvement, mutual motivation, and the ability to collaborate in order to improve	Promotes sustainable collaboration in public institutions, such as libraries and schools

CONCEPTUAL MODEL	FOCUS	DIMENSIONS	RELEVANCE
	understanding of collaborative intelligence, which prioritizes collaboration as the primary governance goal and sees technology-enabled platforms as crucial for collaboration.	governance structures for the creation of public value.	

2.5 Digital Information Literacy in the Malaysian Context

This section presents digital information literacy in Malaysia, namely in state public libraries and school resource centers in developing digital information literacy skills in education settings. Both institutions support access to information, promote critical thinking, and help bridge the digital divide. However, challenges such as misinformation and evolving technologies require careful consideration and must be addressed effectively within the context of teaching and learning. In this regard, Nurul Hazlina (2024) found that age and gender played a limited role in shaping participants' digital literacy and online behaviour, as these factors did not significantly affect their ability to seek, access, or evaluate online information.

2.5.1 State Public Library

Much has been discussed in Chapter One and earlier sections of this chapter regarding the state public library collaborative initiative. This section focuses on a review of past studies related to collaboration initiatives in state public libraries. Reviewing previous studies is essential for gaining insights into the implementation, implications, and impacts of such initiatives. Furthermore, prior research provides a conceptual framework for establishing the significance of the present study and serves as a benchmark for comparing its findings with those of earlier investigations (Creswell, 2009).

The literature indicates a significant shift in the role of public libraries from traditional information repositories to community and civic centres, driven by

technological advancements and evolving user needs (Soska & Navarro, 2020). This transformation has positioned libraries as key facilitators of collaboration, particularly in supporting educational and digital initiatives. For instance, in Malaysia, the Perlis State Public Library has actively promoted partnerships with schools, institutions, and government agencies through outreach and digital communication platforms (Perpustakaan Awam Negeri Perlis, 2022). While such initiatives demonstrate institutional commitment, the literature provides limited evaluation of their effectiveness in enhancing digital information literacy outcomes, indicating a gap in empirical assessment.

Internationally, collaborative practices have been more extensively documented. Yarrow et al. (2008) highlight programming and electronic resource sharing among libraries, museums, and archives in the United States, illustrating how inter-institutional collaboration can enhance user access to diverse resources and expertise. These initiatives suggest that collaboration can significantly improve service delivery and user engagement. However, their applicability to the Malaysian context may be constrained by differences in infrastructure, funding, and digital readiness.

Locally, collaborative efforts such as the Corporate Social Responsibility (CSR) programme organised by the Perak State Public Library (PPANPk) demonstrate practical engagement with multiple stakeholders, including educational institutions and local authorities (Unit Korporat, PPANPk, 2024). These initiatives aim to strengthen partnerships and attract broader user groups, particularly younger audiences. Nevertheless, similar to other Malaysian examples, such programmes tend to emphasise participation and outreach, with less focus on measuring long-term impacts on users' digital competencies or information literacy skills.

Furthermore, existing studies suggest that public libraries are increasingly involved in promoting reading and literacy initiatives aligned with broader development goals. Adam et al. (2022) note that multiple institutions, including the National Library of Malaysia and state public libraries, contribute to reading promotion activities in support of Sustainable Development Goal 4 (Quality Education). While these initiatives indicate progress toward educational development, they often prioritise traditional literacy outcomes, with comparatively limited emphasis on digital information literacy, which is increasingly critical in contemporary information environments.

In a nutshell, the literature demonstrates that state public libraries are actively engaging in collaborative initiatives at both local and international levels. However, a

key limitation is the lack of integrated frameworks that explicitly link collaboration with the development of digital information literacy, particularly in the Malaysian context. This gap highlights the need for further research to examine how collaborative initiatives between state public libraries and school resource centres can be systematically designed and evaluated to enhance digital information literacy outcomes.

2.5.2 School Resources Center

The school resource centre collaborative initiative is informed by prior studies that provide insights into the design, implementation, and effectiveness of collaborative practices. Such studies are essential for guiding framework development, enabling comparison, and identifying factors that influence successful collaboration. Existing literature highlights that teacher collaboration is shaped by both enabling and constraining factors. For example, Loes de Jong et al. (2022) found that collaboration is facilitated by group dynamics and structured processes, while personal limitations and group-related challenges may hinder its effectiveness. This suggests that successful collaboration within school resource centres requires not only institutional support but also active management of interpersonal and organisational dynamics.

Despite attempts to advocate for digital information literacy, there remains a gap in understanding how it should be developed and implemented in educational settings. While grasping digital information literacy competencies is essential for ongoing learning, it continues to be challenging to instruct. In the Malaysian context, national digital education initiatives further reinforce the importance of collaboration in supporting digital learning environments (Salsuhaida et al., 2023). The introduction of Digital, Educational Learning Initiative Malaysia (DELIMa) in 2020 by the Ministry of Education (Abdullah et al., 2022) provides a centralized platform for online teaching and learning, enabling teachers, students, and schools to interact and share resources more effectively. Similarly, the MyDigital Blueprint (Economic Planning Unit, 2021) emphasises the development of digital competencies through strategic initiatives such as integrating digital skills into primary and secondary education and reskilling the current workforce. These policies reflect a broader national commitment to strengthening digital capabilities, which aligns with the objectives of digital information literacy.

Mohammad Fazli Baharuddin et al. (2022) found that Malaysian teachers generally perceive themselves as having a high level of digital literacy, particularly in terms of accessing, evaluating, and utilising digital information resources. The study further suggests that such competencies can be strengthened through effective policy formulation and structured planning, especially in enhancing teachers' ability to assess the quality of digital information and apply appropriate search strategies. This implies that digital literacy is not solely an individual skill, but is also shaped by institutional support and systematic capacity-building initiatives.

In contrast, Siti Syuhada et al. (2022) emphasise the central role of technology self-efficacy as a stronger predictor of digital technology use compared to perceived digital competence. This finding indicates that teachers' confidence in using technology significantly influences their engagement with digital tools, suggesting that psychological and behavioural factors may be as important as technical skills in shaping digital literacy practices. The study also highlights the interrelationship between personal innovativeness, technology self-efficacy, and digital competence, while acknowledging that variations in instructional context, subject area, and technology exposure may influence teachers' perceptions and practices.

Extending this discussion to school resource centers, Shamila Mohamed Shuhidan et al. (2021) argue that collaboration between teachers and library media teachers plays a crucial role in guiding students towards ethical and responsible information use in the digital environment. This collaboration not only supports students' academic development but also contributes to the cultivation of responsible digital citizenship. Collectively, these studies suggest that digital information literacy in Malaysia is a multidimensional construct influenced by individual capabilities, institutional support, and collaborative practices. However, they also reveal a critical gap: while teachers may report high levels of digital literacy, actual effectiveness in fostering critical information evaluation and ethical digital behaviour among students remains dependent on sustained support from structured frameworks such as School Resource Centers and broader educational policies.

However, while these initiatives establish a strong policy and technological foundation, the literature reveals a gap in understanding how collaboration within school resource centres contributes directly to the development of digital information literacy. In particular, there is limited empirical evidence on how platforms such as DELIMa are integrated into collaborative practices between teachers, librarians, and

external stakeholders. This indicates that the success of such initiatives depends not only on the availability of digital tools and policies but also on the effectiveness of collaborative engagement at the institutional level.

2.5.3 Role of the National Library of Malaysia

The NLM's extensive mandate, encapsulated in its 17 functions, positions it as both a policy advisor and an operational authority. While this centralization allows for standardization and strategic direction, it also raises critical concerns regarding flexibility and responsiveness. In a diverse national context, a highly centralized system may not adequately address local information needs or disparities in access. This becomes particularly significant when examined through the lens of digital information literacy, which requires not only access to information but also the skills to critically evaluate, interpret, and use digital content effectively (PNM, 2024).

The NLM's initiatives, such as electronic resource services, u-Pustaka, and information and media literacy programs (PNM, 2024)., demonstrate a shift toward supporting digital information literacy competencies. These efforts align with global trends that position libraries as facilitators of digital knowledge rather than mere repositories of physical materials. However, a critical issue lies in the assumption that access to digital platforms inherently leads to literacy. In reality, digital information literacy requires structured education, continuous skill development, and contextual adaptation. Without targeted interventions, particularly for marginalized or rural populations, digital services may remain underutilized or inequitably accessed, thereby reinforcing the digital divide.

While the NLM plays a crucial role in shaping the country's information landscape, its effectiveness in advancing Digital Information Literacy depends on the extent to which it addresses issues of access, equity, and adaptability. Going forward, a more decentralized and inclusive approach, combined with targeted investment in digital skills development, will enhance its capacity to equip citizens with the competencies needed to navigate the increasingly complex digital information ecosystem.

Therefore, this study seeks to bridge this gap by examining how collaborative initiatives between the school resource centres, in conjunction with the state public

libraries, can enhance digital information literacy. By integrating insights from teacher collaboration studies and national digital strategies, the research aims to develop a more comprehensive framework that links collaboration, digital platforms, and literacy outcomes.

2.6 Digital Information Literacy in the Global Context

This section discusses digital information literacy globally, including perspectives, best practices, and complexities and emerging realities in implementing digital information literacy.

2.6.1 International perspectives on Digital Information Literacy

From a global perspective, digital information literacy emerges as a multidimensional construct that requires systemic coordination among formal education, public institutions, and community-based platforms. Evidence from Africa demonstrates that the integration of ICT into school curricula is not merely a technical endeavour but a pedagogical transformation, where targeted digital skills training for educators and sustained professional development are critical enablers (Mann & Tock, 2025). This is reinforced by Mbozo'o (2025), who argues that without comprehensive national strategies encompassing infrastructure, teacher capacity, and contextually grounded curriculum design, digital information literacy initiatives risk becoming fragmented and ineffective.

However, a critical synthesis of global practices suggests that formal schooling alone is insufficient to fully realize digital information literacy competencies. The case of Bangladesh illustrates how school libraries function as inclusive educational hubs, particularly for marginalized learners, by fostering information literacy through accessible and community-oriented approaches (Md. Nasiruddin, 2016). Similarly, the provision of technological infrastructure, such as computer laboratories and practical training modules, enhances the operationalization of digital information literacy by translating abstract competencies into applied skills (Agustino et al., 2025). Yet, as McCrary (2025) observes, digital information literacy instruction within schools often remains underprioritized, indicating a disconnect between policy aspirations and institutional practice.

This gap is increasingly addressed through the expanded role of libraries as complementary educational agents. Vrana (2020) highlights that public libraries mitigate the limitations of formal education systems by offering continuous learning opportunities and access to diverse information resources, particularly for workforce development and lifelong learning. This perspective is further strengthened by Szymkowiak (2026), whose analysis of educational partnerships in Germany demonstrates that collaboration between schools and public libraries enhances reading promotion, media literacy, and digital competencies, while also contributing to educational equity. In the context of India, Labyagol (2025) underscores the transformative role of public libraries in bridging the digital divide by providing access to technology, digital skills training, and promoting responsible digital citizenship, including awareness of online privacy, cybersecurity, and ethical technology use.

Taken together, these studies reveal that effective digital information literacy development at the global level depends on an integrated ecosystem that combines policy coherence, institutional commitment, and cross-sector collaboration. Critically, the synthesis highlights that while schools remain central to digital information literacy implementation, the underutilization of libraries and community-based resources represents a missed opportunity. Therefore, a more holistic and partnership-driven model, linking formal education with public and school libraries, offers a more sustainable and equitable pathway for advancing digital information in diverse socio-economic contexts.

2.6.2 Current Practices in School Resource Centres in International Contexts

Internationally, school resource centres and libraries have increasingly integrated digital information literacy into their practices, reflecting a global shift toward digitally capable learning environments. In South Korea, digital media literacy has been systematically embedded within the education system, supported by approximately 50 media education institutions nationwide (Song, 2023). These centres function through multi-sector collaboration involving government agencies, private enterprises, educational institutions, and broadcasting organizations, thereby creating a comprehensive ecosystem for media education. Their programs extend beyond theoretical understanding to include hands-on media production, enabling both students and teachers to develop practical digital competencies. Importantly, South Korea's

strategy emphasizes not only infrastructure development, such as online platforms and convergence education models, but also nationwide capacity building in content creation and critical media engagement. The inclusion of topics such as critical media reading, digital citizenship, and media ethics reflects a holistic approach to digital information literacy that integrates technical, cognitive, and ethical dimensions.

Similarly, in South Africa, structured interventions such as the Digital Information Literacy Program (DILP) demonstrate a targeted effort to enhance students' digital competencies (Sieberhagen & Cloete, 2012). This indicates a recognition that digital information literacy does not develop organically through access alone but requires intentional program design and pedagogical support. In Hong Kong, innovative practices further illustrate the applied dimension of digital information literacy, where students engage with digital tools such as eBook creation platforms, Makerspaces, and STEM collections integrated with QR code-enabled multimedia resources (Chan, 2019). These approaches highlight the importance of experiential and technology-enhanced learning environments in fostering digital skills. At the early education level, technology-based activities proposed by Brightwheel (2024) emphasize foundational digital literacy through interactive and creative tasks, suggesting that digital information literacy development should begin from a young age to support cognitive, social, and motor skill development.

In comparison, while Malaysia has made progress in promoting digital information literacy within school resource centres, particularly through guidelines and initiatives led by the NLM, there remain gaps in systematic implementation and curriculum integration. Unlike South Korea's comprehensive and infrastructure-driven model, Malaysia's approach appears less coordinated, particularly in terms of nationwide capacity building and technological standardization. This suggests a need for stronger alignment between policy and practice, especially in curriculum development for library and media teachers.

The role of teachers is central to this process. As highlighted by Carlson (2019), clarity in teachers' roles and responsibilities is essential when implementing new curricula, particularly those involving digital competencies. This is further supported by Alsubaie (2016), who emphasizes that teachers' knowledge, skills, and experience are fundamental to successful curriculum implementation. Without adequately trained educators, even well-designed digital information literacy initiatives may fail to achieve their intended outcomes. Therefore, professional development, continuous training, and

capacity building among teachers are critical components in strengthening digital information literacy integration within Malaysia's school resource centres.

In conclusion, a comparative analysis reveals that effective digital information literacy implementation requires not only access to digital tools but also structured programs, strong institutional collaboration, and well-prepared teachers. While Malaysia has established foundational frameworks, greater emphasis on coordinated policy execution, teacher empowerment, and experiential learning approaches is necessary to match the more advanced and holistic models observed in countries such as South Korea.

2.6.3 Complexities and Emerging Realities

Across the literature, digital information literacy in the global context is consistently framed through a set of interconnected challenges that reflect both technological and societal transformations. Panda & Kaur (2024) establish that information literacy in the digital era extends far beyond technical skills, incorporating critical evaluation, ethical use of information, and responsible digital citizenship. However, this expanded scope also introduces complexity, as individuals must simultaneously manage vast amounts of information while applying higher-order thinking skills. Building on this, Tanjung et al. (2024) identify structural and global barriers such as limited awareness of digital ethics, unequal access to technology, gaps in user proficiency, and weak regulatory frameworks, which hinder the development of these competencies across different regions.

These challenges are further deepened by systemic inequalities highlighted by Chaparro & Newell (2018), particularly restricted access to libraries and the Internet, as well as broader educational disparities. Such conditions reinforce the global digital divide, limiting opportunities for individuals to develop and practice information literacy skills. At the same time, the widespread normalization of misinformation on social media platforms complicates users' ability to engage critically with digital content, making literacy not just a skill but a necessity for informed participation in society.

Yu et al. (2024) and Angelova & Hristova (2025) emphasize that the ability to distinguish credible information from misinformation has become one of the most pressing global challenges. This difficulty is intensified by uneven levels of digital

literacy and the rapid expansion of AI-driven content. While artificial intelligence enhances access to information, it also raises serious concerns about accuracy, bias, and trust, requiring users to develop more advanced evaluative and analytical skills. This highlights a shift in digital information literacy, from basic access and usage to critical engagement with increasingly complex information ecosystems.

From an educational perspective, Wang (2025) underscores that the digitalization of education is inevitable, but its success depends heavily on teacher preparedness. The lack of adequate digital literacy among educators represents a significant barrier, as teachers play a central role in cultivating these competencies in learners. Strategies such as tiered training models, integrated resources, and collaborative material development are therefore essential, aligning with Putri et al. (2025), who advocate for embedding digital literacy into curricula and supporting it through continuous professional development initiatives.

Importantly, Evurulobi et al. (2024) argue that addressing these challenges requires inclusive, context-sensitive, and sustainable approaches, recognizing that digital information literacy is not a one-size-fits-all concept. Global solutions must account for local realities while promoting equitable access and participation. Koltay (2011) further reinforces the importance of critical thinking and information filtering skills as foundational tools for managing information overload in digital environments.

The global landscape of digital information literacy is shaped by overlapping challenges, which are persistent inequalities in access and skills, the rapid spread of misinformation, ethical and regulatory gaps, the disruptive influence of artificial intelligence, and limitations within educational systems. These issues collectively demonstrate that digital information literacy is not merely a technical competence, but a dynamic, critical, and context-dependent capability essential for navigating the complexities of the modern digital world.

2.7 Sustainability in Collaborative Digital Literacy Initiatives

This section examines sustainability collaboration by reviewing its definitions, key elements, challenges, and impacts as discussed in prior studies. Such a review is essential for informing the development of a robust framework, as it enables comparison across studies and identifies factors that contribute to long-term collaborative success.

The literature consistently emphasises that sustainable collaboration extends beyond short-term outcomes, focusing instead on long-term value creation, continuous improvement, and adaptability. Central to this concept are shared goals and sustained commitment, which ensure that collaborative efforts remain aligned over time. Baddache (2023) highlights that effective partnerships prioritise durability and scalability, requiring partners to anticipate risks, address challenges, and develop strategies that support continuity beyond initial implementation phases. Similarly, Collison (2023) proposes a structured approach to sustainability through four key actions: establishing a clear direction, developing a strategic plan, implementing that strategy, and continuously refining it through stakeholder engagement and feedback.

While these perspectives provide complementary insights, they differ in emphasis. Baddache (2023) focuses on long-term resilience and risk management, whereas Collison (2023) highlights process-oriented strategies and stakeholder engagement. Together, they suggest that sustainable collaboration requires both strategic planning and adaptive management, reinforcing the idea that sustainability is not a fixed outcome but an ongoing process. However, much of the literature tends to assume that organisations possess the necessary resources and capacities to sustain collaboration, with limited discussion on how constraints—such as funding limitations, institutional differences, or varying levels of digital readiness—may affect long-term success.

At the global level, sustainability collaboration is strongly aligned with Sustainable Development Goal 17 (SDG 17), which emphasises strengthening partnerships across public, private, and civil society sectors to support sustainable development. This highlights the importance of leveraging shared resources, knowledge, and expertise to achieve collective goals. In the context of this study, SDG 17 is particularly relevant, as it underscores the role of inter-organisational collaboration between state public libraries and school resource centres in promoting digital inclusion and educational development.

Critically, despite the growing emphasis on sustainability in collaborative initiatives, there remains a gap in integrating sustainability principles with digital information literacy development, particularly within educational and library settings. Existing studies tend to focus either on collaboration sustainability or on literacy outcomes, with limited research examining how sustained partnerships can directly enhance digital competencies. Therefore, this study seeks to address this gap by

exploring how sustainable collaborative initiatives can be designed to support the long-term development of digital information literacy.

Collaborative initiatives are widely recognised as essential mechanisms for addressing complex institutional challenges by leveraging shared resources, expertise, and capabilities. These initiatives can take multiple forms, including inter-organizational collaboration, which involves partnerships across institutions (Pisano & Verganti, 2008), community-based collaboration, which fosters a sense of belonging and shared purpose (Together Team, 2023), and cross-functional collaboration, where diverse teams work together to achieve common goals. While these forms differ in structure and context, they collectively emphasise the importance of knowledge sharing, coordination, and innovation, which contribute to improved organisational performance, enhanced user experiences, and greater adaptability (Woolley, 2023; Cascade Team, 2023).

Empirical studies on sustainability collaboration further demonstrate how such initiatives operate in practice. For instance, Journeault & Vallières (2021) identify five key stakeholder roles, trainer, analyst, coordinator, specialist, and financial provider, in supporting sustainability adoption within SMEs. This highlights the importance of role differentiation and stakeholder complementarity in overcoming implementation barriers. Similarly, Leminen et al. (2021), through a multiple-case study, emphasize the significance of contextual factors and stakeholder relationships in driving collaborative innovation for sustainability, particularly in complex urban environments. These findings suggest that successful collaboration is not only dependent on participant roles but also on the interaction between stakeholders and their operating environments.

In addition, Lazano et al. (2021) propose an "organizational sustainability collaboration" framework that integrates factors, benefits, and challenges associated with collaboration. This framework provides a more holistic perspective by linking collaboration processes with outcomes, enabling organizations to maximize benefits while mitigating constraints. However, despite these contributions, existing studies tend to focus primarily on organizational sustainability and innovation outcomes, with limited attention given to digital information literacy as a collaborative outcome. Furthermore, many frameworks assume the presence of supportive conditions, such as sufficient resources and stakeholder readiness, without fully addressing the practical challenges of sustaining collaboration in resource-constrained environments.

Taken together, these studies demonstrate that effective sustainability collaboration requires a combination of clearly defined roles, strong stakeholder relationships, and structured frameworks that balance benefits and challenges. Nevertheless, there remains a significant gap in integrating these elements into a unified model that explicitly supports the development of digital information literacy (DIL) within educational and library contexts. Therefore, this study builds upon these insights to develop a DIL Index Framework for Sustainable Collaboration between Malaysian State Public Libraries and School Resource Centres, addressing the need for a context-specific and outcome-oriented approach to collaborative sustainability.

2.7.1 The Program Sustainability Framework

This section discusses the sustainability framework, with particular emphasis on the long-term continuity and viability of the programme. Within the context of this study, the sustainability framework is conceptualised as a structured approach to ensuring that initiatives are not only effectively implemented but also maintained and adapted over time. It serves as a guiding mechanism for aligning resources, stakeholder engagement, and institutional support.

2.7.1.1 Public Health Program Capacity for Sustainability

The question of what factors ensure the long-term effectiveness and sustainability of public health programs has gained increasing attention among researchers, evaluators, funders, and community stakeholders. In response, Schell et al. (2013) developed a nine-domain framework to assess and guide program sustainability, aiming to establish a shared understanding among practitioners, funders, and researchers across diverse public health contexts. The framework was derived through a developmental study combining a comprehensive literature review, expert panel input, and concept-mapping exercises, ensuring that its domains reflect both empirical evidence and practitioner experiences

This nine-domain framework for public health program sustainability provides valuable insights that can enhance the implementation and long-term effectiveness of digital information literacy initiatives. While originally designed to evaluate the durability of public health programs, its emphasis on organizational capacity, strategic

planning, stakeholder engagement, and adaptability resonates strongly with the challenges of sustaining digital information literacy programs in schools, libraries, and community settings. Just as public health programs require institutional support and ongoing evaluation to remain effective, digital information literacy initiatives depend on sustained investment in infrastructure, trained personnel, curriculum integration, and responsive teaching strategies.

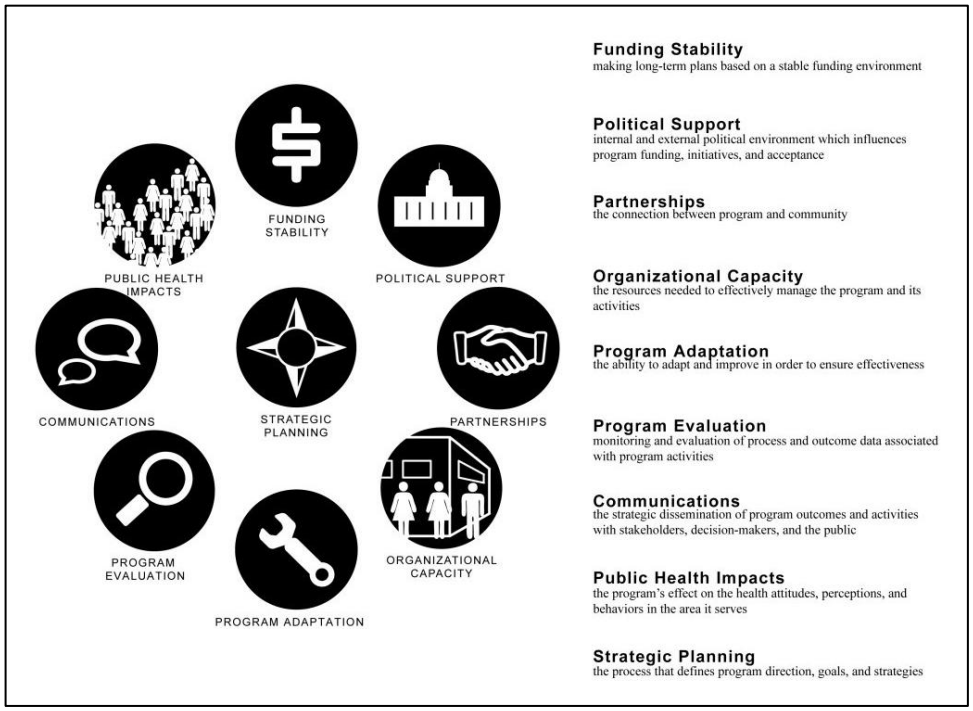

Figure 2.14 Public Health Program Capacity for Sustainability

2.7.1.2 Fundamental Pillars of Sustainable Telemedicine Framework

This framework is structured around several core pillars (Rizos et al., 2025). These include environmental (E), social (S), governance (G), and economic (E) dimensions, alongside digital transformation and innovation (DTI). In addition, the framework must incorporate a robust legal structure (L), mechanisms for quality assurance (QA), and careful consideration of ethical principles (EC). Together, these elements form the foundational components necessary to ensure effective and sustainable telemedicine governance. This framework emphasises the key considerations that shape the sustainability of the telemedicine initiative.

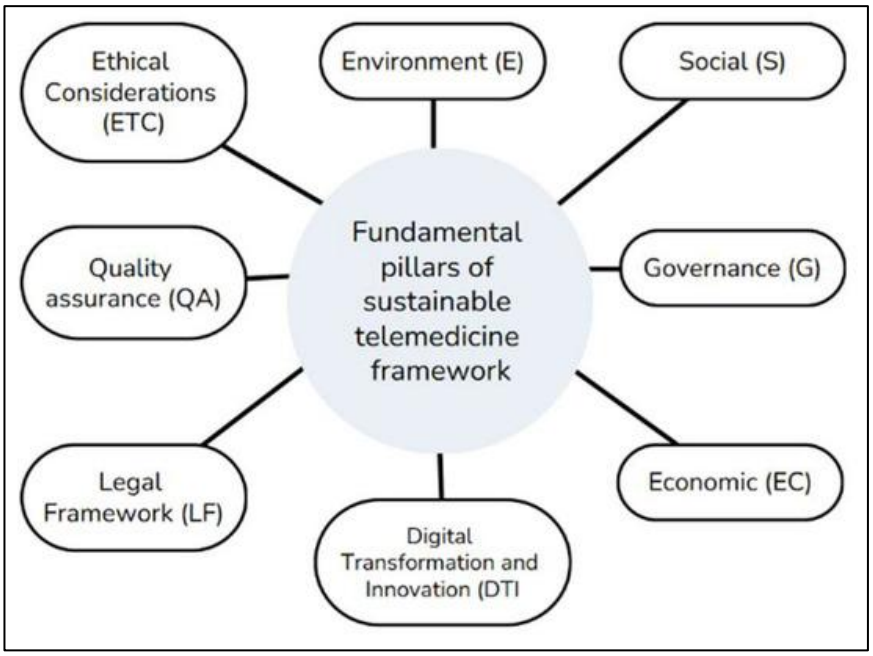

Figure 2.15 Fundamental Pillars of Sustainable Telemedicine Framework

Nevertheless, while these identified pillars offer a comprehensive and multidimensional perspective on sustainability, their direct application within the context of this study requires careful consideration. Existing models, particularly those developed within telemedicine governance, are primarily oriented towards healthcare systems, which may limit their contextual relevance to educational and library-based settings. For instance, although dimensions such as governance, social, and ethical considerations are broadly transferable, elements related to environmental and economic factors may require adaptation to align with the operational realities of Malaysian state public libraries and school resource centres.

In this regard, the identified pillars are not adopted uncritically but are instead selectively incorporated as a guiding reference in the proposed framework. Their value lies in providing a structured foundation for integrating sustainability principles; however, their applicability must be contextualised to reflect the specific needs of digital information literacy development and cross-institutional collaboration.

2.7.1.3 Framework Program Sustainability Assessment Framework

A framework for a sustainability assessment has been developed by Tam (2013). In dynamic and uncertain environments, programme managers rely on continuously evolving information through a process of sensemaking to generate potential options

(ideation), which are subsequently refined and evaluated (elaboration) before arriving at a decision (choice). Once a decision is made, responsibility is transferred to the project manager, who oversees the implementation of the project(s), with sustainability remaining a central consideration. In this regard, programme management for sustainability emphasises an iterative learning cycle that ultimately informs and strengthens decision-making processes.

Within the context of this study, the three-pillar approach (environmental, economic, and social sustainability) may be adapted as a guiding lens for evaluating initiatives under the proposed Digital Information Literacy Index Framework. In particular, programme or implementation decisions related to strengthening collaboration between Malaysian state public libraries and school resource centres can be assessed across these interrelated dimensions before final decision-making. This involves systematically examining the potential implications of each proposed initiative in terms of its resource efficiency (economic sustainability), long-term viability, and support for institutional collaboration (social sustainability), and broader operational or infrastructural impacts (where applicable to the digital environment context).

Depending on the specific context, the programme manager or responsible stakeholders may employ a series of guiding evaluative questions within each sustainability dimension to critically assess the feasibility and sustainability impact of proposed initiatives. This structured assessment process ensures that sustainability considerations are meaningfully embedded within the governance and implementation of digital information literacy initiatives, thereby supporting the robustness and long-term effectiveness of the proposed framework.

Therefore, while the framework can be usefully adapted as a sustainability lens within the proposed Digital Information Literacy Index Framework, it is not sufficient as a standalone framework for digital information literacy. It should be complemented with digital information literacy specific to information literacy theories to ensure conceptual robustness and contextual relevance.

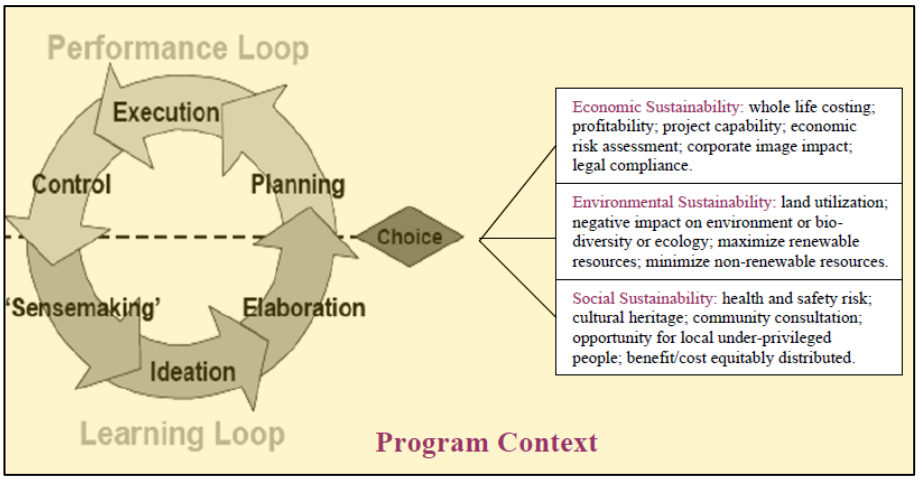

Figure 2.16 Framework Program Sustainability Assessment Framework

In conclusion, the various frameworks discussed in this study, particularly those derived from sustainability-oriented program management models such as the three-pillar approach and related governance perspectives, offer valuable conceptual insights that may be adapted to support the development of the proposed Digital Information Literacy (DIL) Index Framework. Although these frameworks were originally developed within different disciplinary contexts and are not specifically designed for digital information literacy, they nonetheless provide useful analytical lenses for examining sustainability in terms of economic, social, governance, and related dimensions.

However, it is also evident that there is a limited availability of established frameworks that explicitly integrate program sustainability with digital information literacy, particularly within the context of collaboration between public libraries and school resource centers. This gap highlights the need for contextual adaptation and theoretical integration rather than direct adoption of existing models.

Therefore, the proposed DIL Index Framework in this study is positioned as a potentially useful and forward-looking contribution that synthesizes relevant sustainability and program management principles within a digital literacy context. It is anticipated that this framework may serve as a foundation for future research and practice, particularly in strengthening sustainable collaboration, guiding implementation, and supporting continuous improvement in digital information literacy initiatives.

2.8 Theoretical Foundations Supporting the Study

This section reviews existing theories, models, and frameworks related to digital information literacy. As highlighted throughout the literature, digital information literacy evolved from earlier concepts of information literacy and digital literacy, reflecting the increasing integration of digital technologies in information practices (Hegarty et al., 2010). While these foundational concepts have been widely explored, digital information literacy as a distinct construct remains comparatively underdeveloped, particularly in terms of comprehensive theoretical and practical frameworks.

A critical analysis of the literature reveals that most existing studies primarily focus on individual competencies, especially teachers' digital information literacy skills, rather than examining digital information literacy from a collaborative or inter-organizational perspective. This indicates a significant limitation, as the development and implementation of digital information literacy in real-world contexts such as educational and library environments often require coordinated efforts among multiple stakeholders. Furthermore, current frameworks tend to address either literacy development or collaboration mechanisms in isolation, with limited integration of both dimensions into a unified model.

Consequently, there remains a clear gap in the literature regarding the development of a framework that combines digital information literacy and sustainable collaboration, particularly within the context of partnerships between state public libraries and school resource centres. Addressing this gap is essential, as such collaboration has the potential to enhance access to digital resources, strengthen instructional support, and improve users' ability to critically engage with digital information.

Therefore, this study seeks to contribute to the existing body of knowledge by proposing a Digital Information Literacy (DIL) Framework for Sustainable Collaboration, which integrates elements of literacy development, collaborative practices, and sustainability principles. It is anticipated that this framework will not only extend current theoretical understanding but also serve as a practical reference for future research and implementation in educational and library settings.

2.8.1 Digital Literacy Framework for Adult Learners

The Digital Literacy Framework for Adult Learners, developed by the Maryland Department of Labor (Harris et al., 2021), provides a comprehensive structure to support adult learners in navigating and participating effectively in an evolving digital environment. The framework aims to guide instructional planning, facilitate technology integration, and serve as a reference for evaluating digital literacy competencies. It identifies seven interconnected elements of a digitally literate individual: civic, technical, communicative, collaborative, computational thinking, investigative, and productive skills.

(a) Civic - Using digital tools safely, effectively, and appropriately
(b) Technical - Physical navigation and operation of digital tools, structures, and conventions
(c) Communicative – sharing ideas clearly, effectively, and creatively with different audiences following digital communication protocols.
(d) Collaborative – connecting and working with others while using appropriate digital platforms and tools.
(e) Computational thinking - Using critical thinking and problem-solving skills in conjunction with technology to gather data, analyse information, and find a solution
(f) Investigate – searching, identifying, and validating reliable and authentic digital resources.
(g) Productive - creating content and/or products using digital tools

These components collectively reflect a holistic understanding of digital literacy, integrating not only technical proficiency but also critical thinking, communication, and collaboration, which align with broader conceptualisations of digital information literacy discussed in earlier sections. Elements such as investigative and computational thinking correspond closely with information evaluation and problem-solving skills, while collaborative and communicative dimensions highlight the social nature of digital engagement.

Critically, the framework's strength lies in its comprehensive and interconnected structure, which recognises that digital literacy is multidimensional rather than skill-specific. This makes it highly adaptable for instructional use and

relevant across diverse learning contexts. However, its broad applicability also presents limitations. The framework is primarily designed for adult learners, which may restrict its direct application to school-level contexts without modification. Additionally, it focuses predominantly on individual competencies, with limited emphasis on inter-organizational collaboration or institutional partnerships, which are central to the present study. Furthermore, issues such as unequal access to technology and varying levels of digital readiness may affect its practical implementation, particularly in resource-constrained environments.

Therefore, while the framework provides a strong foundation for understanding digital literacy competencies, it requires contextual adaptation to be effectively applied in collaborative settings involving state public libraries and school resource centres. In this study, its emphasis on interconnected skills is particularly valuable for informing the development of a Digital Information Literacy (DIL) Index Framework, although additional elements related to collaboration and sustainability must be integrated to address the identified gaps in the literature.

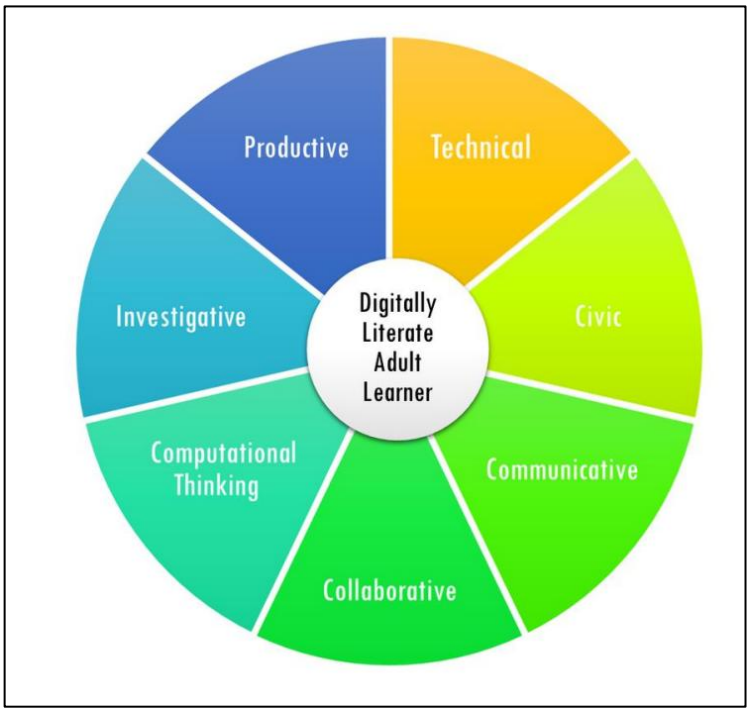

Figure 2.17 Digital Literacy Framework for Adult Learners.

2.8.2 The 8 Elements of Digital Literacies

The next framework considered in this study is the 8 Elements of Digital Literacies proposed by Belshaw (2014). Belshaw conceptualizes digital literacy as a multidimensional construct comprising eight interrelated elements: cultural, cognitive, constructive, communicative, confident, creative, critical, and civic. Unlike skills-based models that prioritize technical competencies, this framework adopts a more holistic perspective by integrating social, cognitive, and ethical dimensions of digital engagement. As such, it provides a useful lens for examining how individuals not only use digital tools but also interpret, create, and participate within digital environments.

Each element reflects a distinct yet interconnected domain of digital practice. For instance, the cultural and civic elements emphasize appropriate behavior and responsible participation in digital communities. In contrast, the cognitive and critical elements highlight the importance of higher-order thinking skills in interpreting and evaluating digital information. Similarly, the constructive, creative, and communicative elements extend digital literacy beyond consumption to active content creation and knowledge sharing. The inclusion of the "confident" element further underscores the role of identity, agency, and belonging in digital spaces, which is often underrepresented in more technical frameworks.

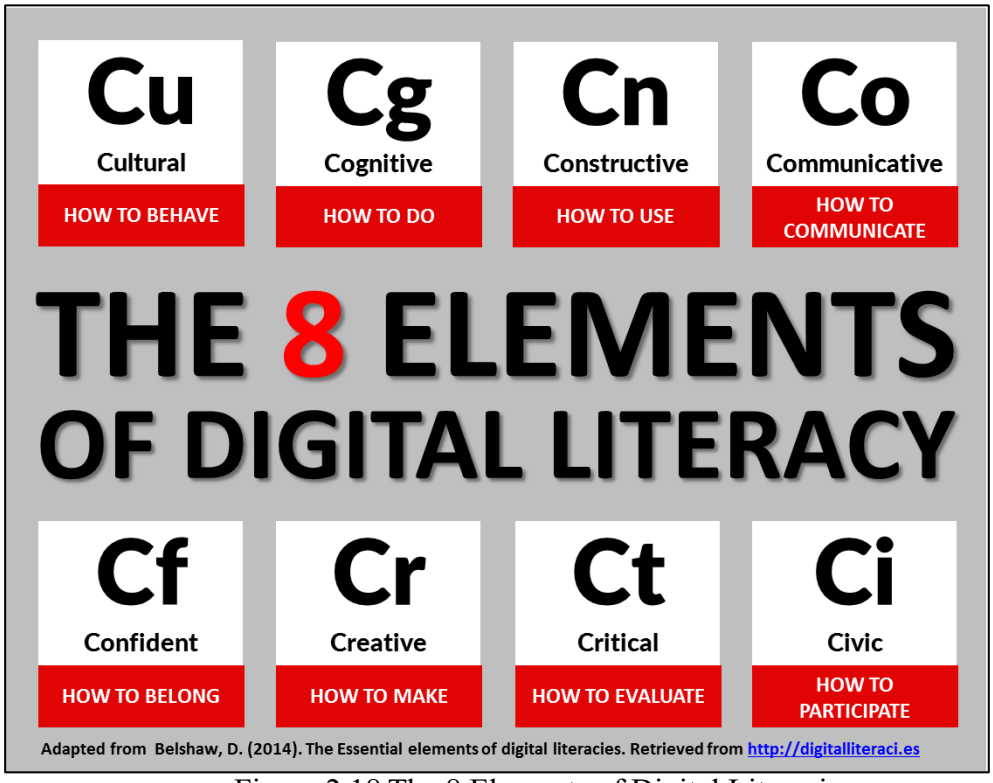

Figure 2.18 The 8 Elements of Digital Literacies

This interpretation aligns with Pewhairangi (2015), who reframes the elements into functional dimensions such as “how to behave,” “how to evaluate,” and “how to participate,” thereby reinforcing the framework’s applicability in educational and library contexts. However, while Belshaw’s model is conceptually comprehensive, its broad and flexible nature may also present challenges. Specifically, the lack of clearly defined indicators or measurable outcomes can limit its operationalization in empirical research and standardized assessment of digital information literacy.

Furthermore, although the framework acknowledges the importance of context, it does not explicitly address how socio-cultural or institutional differences may influence the development and application of these literacies. This limitation suggests that, while the framework is valuable as a conceptual guide for library and media teachers and library practitioners, it may require contextual adaptation and integration with more structured models to ensure practical implementation.

Belshaw’s 8 Elements significantly extend the discourse on digital information literacy by shifting the focus from functional skills to participatory, critical, and identity-oriented practices. Nevertheless, its effectiveness as a comprehensive digital information literacy framework depends on its empirical validation and contextual grounding in specific educational or library settings.

2.8.3 Digital Literacy Framework Toolkit

The third framework examined in this study is the Digital Literacy Framework Toolkit developed by Ferrar et al. (2019). This framework is designed as a practical guide for developing workshops, curricula, and other learning experiences, with the aim of aligning educational initiatives with clearly defined digital literacy outcomes. In contrast to more conceptual models, the toolkit adopts an applied orientation, positioning itself as both a design and implementation resource for educators and practitioners.

The framework is structured around seven key elements: identity and wellbeing, discovery, evaluation, ethics, creativity and scholarship, communication and collaboration, and curation. Collectively, these components reflect a comprehensive view of digital literacy that integrates personal, cognitive, and social dimensions. For example, the inclusion of identity and wellbeing highlights the importance of personal agency and digital resilience, while elements such as evaluation and ethics emphasize

critical engagement and responsible use of information. Meanwhile, creativity and scholarship, alongside communication and collaboration, extend digital literacy into knowledge production and participatory practices, aligning the framework with contemporary educational priorities.

A key strength of this toolkit lies in its explicit focus on practical application. Unlike broader frameworks that remain largely theoretical, Ferrar et al. provide structured guidance for embedding digital literacy into program design, making the model particularly useful for institutional implementation. This applied focus enhances its relevance for library practitioners and educators seeking to operationalize digital information literacy within specific learning contexts.

However, this emphasis on flexibility and adaptability also presents certain limitations. While the framework is designed to be context-sensitive, it does not prescribe standardized metrics or assessment strategies, which may lead to inconsistencies in implementation and evaluation across different settings. Additionally, its broad scope may require significant contextual customization to align with varying institutional goals, learner needs, and levels of technological infrastructure. As a result, the effectiveness of the toolkit is highly dependent on how it is interpreted and applied by practitioners.

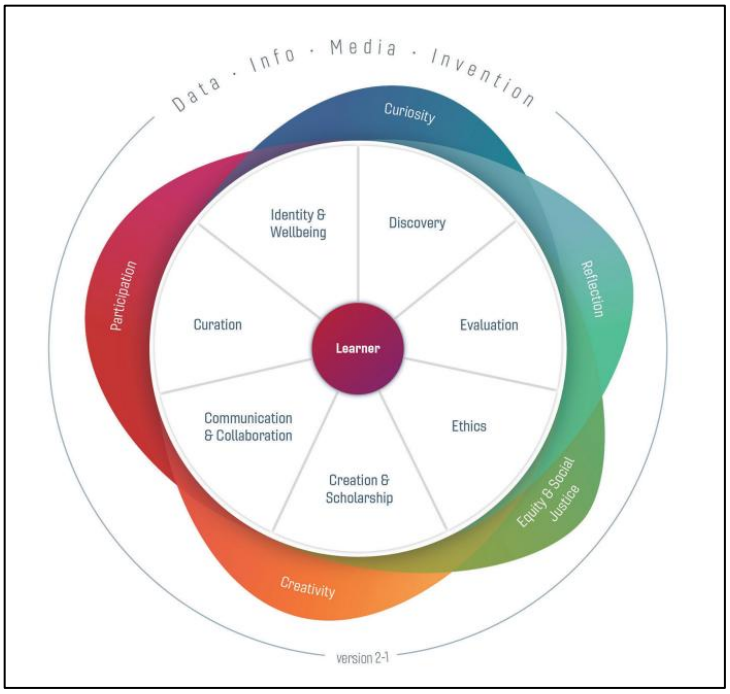

Figure 2.19 Digital Literacy Framework Toolkit

In general, the Digital Literacy Framework Toolkit makes a valuable contribution by bridging the gap between theory and practice in digital literacy education. Nevertheless, its impact as a robust framework for DIL depends on its integration with more structured assessment models and its adaptation to specific educational and institutional contexts.

2.8.4 Essential Digital Skills Framework

This framework was developed in 2018 by the UK Government as part of a national initiative to enhance adults' digital competencies. Specifically, the Essential Digital Skills Framework aims to promote progression, transferability, and measurable outcomes, thereby establishing a common reference point for stakeholders across education, employment, and public services. As illustrated in Figure 2.20, the framework comprises five categories of essential digital skills for life and work, and these domains provide a structured and accessible model for developing functional digital capabilities.

(a) Communicating- Communicate, collaborate, and share.

(b) Handling information and content - Find, manage, and store digital information and content securely.

(c) Transacting - Register and apply for services, buy, and sell goods and services, and administer and manage transactions online.

(d) Problem Solving - Find solutions to problems using digital tools and online services.

(e) Being safe and legal online - Stay safe, legal, and confident online.

A key strength of this framework lies in its clarity and applicability. Organizing digital skills into well-defined categories with measurable descriptors enables consistent implementation and assessment across diverse contexts. This makes it particularly valuable for policy alignment and large-scale educational initiatives. However, its predominantly skills-based orientation also represents a notable limitation. While the framework effectively addresses functional competencies, it places

comparatively less emphasis on higher-order cognitive processes, critical reflection, and the socio-cultural dimensions of digital engagement. As a result, it may not fully capture the broader and more complex construct of digital information literacy, which extends beyond operational proficiency.

The relevance of the Essential Digital Skills Framework to digital information literacy within libraries and school resource centres is nevertheless significant. In particular, the domains of handling information and content and problem solving closely align with core information literacy competencies, such as the ability to locate, evaluate, organize, and ethically use digital information. These skills underpin many instructional programmes delivered by libraries and school resource centres, highlighting the framework's practical utility in supporting digital information literacy development. Furthermore, the communicating domain facilitates collaborative learning, knowledge sharing, and digital content creation, all of which are increasingly mediated through library systems and learning management platforms. Similarly, the being safe and legal online domain reflects key principles of information literacy education, including digital ethics, copyright awareness, data protection, and responsible information practices of areas that have long been central to the mission of libraries and school resource centres.



Figure 2.20 Essential Digital Skills Framework

Within the school context, the framework reinforces the role of school resource centres as critical environments for fostering transferable digital competencies. Supporting learners in navigating digital resources, academic databases, and online learning platforms, it contributes to the development of essential skills required for both academic success and lifelong learning. While the Essential Digital Skills Framework provides a robust, structured, and measurable foundation for digital skills development, its effectiveness in supporting digital information literacy would be enhanced through integration with frameworks that emphasize critical thinking, reflective practice, and contextual understanding. In this way, it serves not as a comprehensive model of digital information literacy but as a complementary framework that strengthens its practical and operational dimensions.

2.8.5 European Framework for the Digital Competence of Educators (DigCompEdu)

The European Framework for the Digital Competence of Educators (DigCompEdu) was developed by the European Commission as a comprehensive tool to support educators in assessing and developing their digital competence across all levels of education, including early childhood, primary, secondary, vocational, higher, and adult learning contexts. The framework provides a progression model that enables educators to evaluate their competencies and identify areas for professional growth. In addition, it serves as a reference framework for policymakers, educational institutions, and training providers seeking to design or adapt digital competence initiatives.

DigCompEdu is structured into six interrelated areas comprising a total of 22 competencies:

a) Area 1 focuses on the professional environment;

b) Area 2 on sourcing, creating, and sharing digital resources;

c) Area 3 on managing and orchestrating the use of digital tools in teaching and learning;

d) Area 4 on digital tools and strategies to enhance assessment;

e) Area 5 on the use of digital tools to empower learners;

f) Area 6 on facilitating learners' digital competence.

Each of these areas represents a distinct yet interconnected dimension of educators' digital competence. Area 1 underscores the importance of professional collaboration and reflective practice, while Areas 2 and 3 focus on the effective selection and pedagogical integration of digital resources. Area 4 extends this integration into assessment, promoting data-informed and adaptive teaching approaches. Notably, Areas 5 and 6 shift the focus toward learners, emphasizing empowerment, inclusion, and the development of students' digital and information literacy skills.

A key strength of DigCompEdu lies in its structured and progressive design, which provides clear competency descriptors and proficiency levels. This makes it highly applicable for both self-assessment and institutional benchmarking. Furthermore, its strong pedagogical orientation distinguishes it from more skills-based frameworks, as it emphasizes not only the use of digital tools but also their meaningful integration into teaching and learning processes. In this regard, DigCompEdu aligns closely with the broader objectives of digital information literacy, particularly in fostering critical, creative, and responsible engagement with digital technologies.

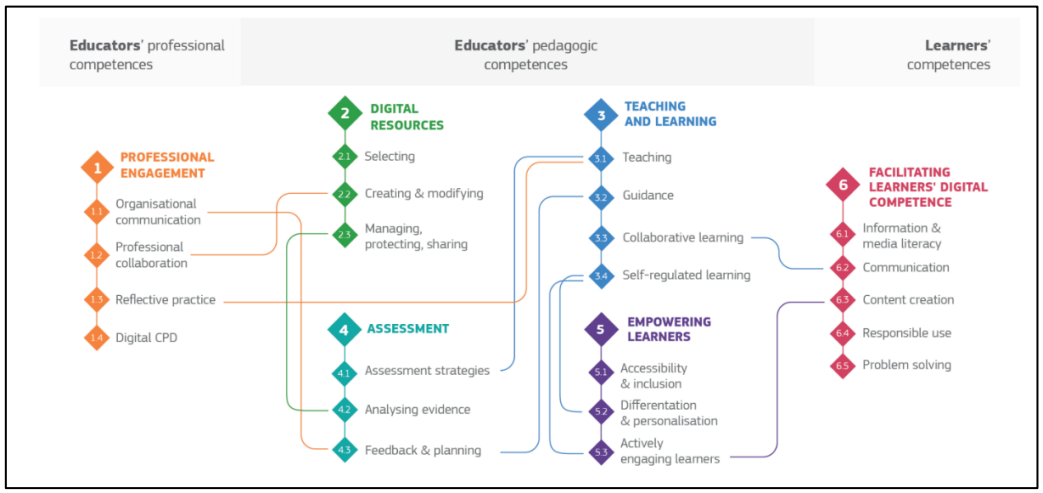

Figure 2.21 European Framework for the Digital Competence of Educators (DigCompEdu)

However, the framework also presents certain limitations. Its primary focus on educators means that it may not fully address the specific roles and practices of other stakeholders, such as library professionals, without contextual adaptation. Additionally, effective implementation is highly dependent on institutional support, access to professional development, and the availability of technological infrastructure. Without these enabling conditions, the framework's potential impact may be constrained.

Despite these limitations, DigCompEdu demonstrates strong relevance for both of the state public libraries and the school resource centres. In terms of professional engagement, it supports collaboration between educators and library staff in advancing digital pedagogy. The digital resources domain aligns with the roles of both institutions in developing, curating, and disseminating digital content. Similarly, the teaching and learning, and assessment areas apply to instructional practices in schools as well as training and evaluation activities in libraries. Finally, its emphasis on empowering learners and facilitating digital competence reinforces the shared mission of these institutions to cultivate digital information literacy among users.

DigCompEdu functions as a robust and pedagogically grounded framework for enhancing digital competence. While originally designed for educators, its adaptability allows it to support digital information literacy initiatives across educational and library contexts, provided that it is appropriately contextualized and supported.

2.8.6 Digital Literacy Concept

The Jisc Digital Capability Framework conceptualizes digital literacy through six interconnected domains: information, data, and content; teaching, learning, and self-development; communication, collaboration, and participation; digital identity, wellbeing, safety, and security; technical proficiency; and creation, innovation, and research. Designed primarily for higher education, the framework adopts a holistic approach that integrates technical, cognitive, and socio-emotional dimensions of digital capability.

A key strength of this framework lies in its developmentally grounded and interdisciplinary scope. By addressing areas such as well-being, identity, and ethical practice alongside technical and academic competencies, it extends digital literacy beyond functional skills to encompass responsible and reflective engagement in digital environments. Furthermore, its flexibility allows institutions to adapt the framework to their specific contexts, supporting its application across diverse educational settings. The emphasis on collaboration, particularly among libraries, information technology services, and academic departments, also highlights its potential to foster integrated institutional approaches to digital literacy development.

However, despite its conceptual comprehensiveness, the framework's high-level structure presents certain challenges for implementation. The absence of detailed

operational guidelines, such as explicit performance indicators, role-specific descriptors, or assessment rubrics, may limit its practical application. As a result, institutions may face difficulties in translating the framework into measurable learning outcomes or structured programmes without additional support or contextual interpretation. Nevertheless, the framework demonstrates significant potential in shaping long-term digital literacy development. As noted by Ahuja (2025), it not only supports immediate skill acquisition but also contributes to cultivating adaptable, ethical, and digitally competent graduates and academic staff. This forward-looking orientation aligns closely with the evolving demands of digital societies and knowledge economies.

Within this context, the framework is also relevant to libraries and school resource centres. School resource centres play a foundational role in introducing digital information literacy skills, particularly in areas related to information handling and ethical use. In contrast, public libraries extend this development through lifelong, community-oriented learning initiatives. Together, these institutions contribute to a continuum of digital literacy development, reflecting the framework's emphasis on adaptability, collaboration, and sustained engagement.

The Jisc Digital Capability Framework offers a comprehensive and flexible model for understanding digital literacy. However, its effectiveness depends on its translation into context-specific strategies and its integration with more structured tools to support implementation and assessment.

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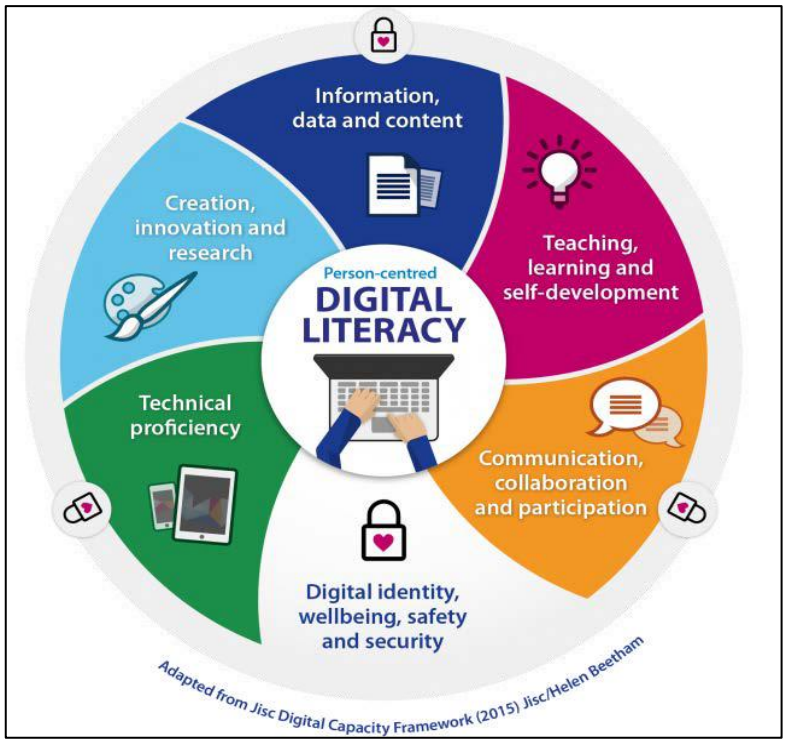

Figure 2.22 Digital Literacy Concept (JISC Digital Capacity Framework, 2015)

2.8.7 Digital Kids Asia-Pacific

The Digital Kids Asia-Pacific framework, developed by UNICEF, comprises five domains and 16 competencies that promote a holistic, rights-based, and child-centred approach to digital literacy. The framework seeks to balance the need to safeguard children in digital environments with opportunities for meaningful engagement, enabling them to use digital technologies safely, critically, and creatively. Unlike more skills-oriented models, this framework explicitly foregrounds children's rights, agency, and well-being, positioning digital literacy as both a protective and empowering construct.

A key contribution of this framework lies in its recognition of the social context in which digital literacy develops. As noted by Nascimbeni and Vosloo (2019), children's digital competencies are significantly shaped by their interactions within family and school environments. This socio-ecological perspective highlights that digital literacy is not acquired in isolation but is influenced by access, guidance, and support systems. Empirical findings further reinforce this view; for instance, a cross-national study by Shin et al. (2019) found that children demonstrated relatively high

levels of digital resilience and safety, but lower proficiency in digital creation and innovation. This imbalance suggests that while protective dimensions of digital literacy are being addressed, more emphasis is needed on fostering higher-order and creative competencies.

In this regard, public libraries and school resource centres play a critical mediating role. These institutions function as accessible learning environments where children can develop digital competencies through guided practice, access to resources, and collaborative activities. By supporting skills such as information seeking, evaluation, and application, they help bridge the gap between basic digital access and meaningful digital engagement. As highlighted by Gaung & Sri (2020), although students today have increasing access to the Internet across various settings, the ability to effectively locate, evaluate, and apply information remains essential for academic success. These information skills, closely aligned with digital information literacy, are consistently associated with improved learning outcomes.

However, while the Digital Kids Asia-Pacific framework offers a comprehensive and context-sensitive model, its implementation may require alignment with institutional capacities and educational priorities. In particular, translating its broad, rights-based principles into measurable learning outcomes and structured programmes can be challenging without additional pedagogical guidance.

Hence, the framework makes a significant contribution by integrating protection, participation, and empowerment within a single model of children's digital literacy. Its emphasis on social context and equity complements more technical or skills-based frameworks, although its effectiveness ultimately depends on how well it is operationalized within educational and community-based settings such as libraries and school resource centres.



Figure 2.23 Digital Kids Asia-Pacific

2.8.8 Evaluation of Digital Literacy Framework

A summarization of the seven digital literacy frameworks is presented

Table 2.2

in providing a concise comparative overview of the six frameworks examined in the preceding discussion.

Table 2.2
Evaluation of Digital Literacy Framework

MODEL	STRENGTH	LIMITATION	INTENDED AUDIENCE
Digital Literacy Framework for Adult Learners	To provide structure and definition, offer a reference for evaluation, encourage technology integration, and support adult educators and learners with digital literacy	1. Focus on individually learning outcomes 2. Limitation of resources regarding technological resources 3. Less applicable to the state public library and the school resource center	Adult educators and learners
The 8 Elements of Digital Literacies	Belshaw's model emphasizes the multifaceted nature of digital literacy in today's interconnected world and acts as a guide for both individuals and educators	Lacks clear instructional strategies or assessment tools	Educational institutions, educators, policymakers, curriculum developers, and individuals
Digital Literacy Framework Toolkit	The purpose of developing a workshop, curriculum, program, or any learning experience in the digital world	Focuses more on program development than day-to-day reference services	Not Assigned
Essential Digital Skills Framework	Aims to enhance adults' digital skills, promoting progression, transferability, and measurement, facilitating a common approach	Designed mainly for workforce readiness, not educational library settings	Adults
European Framework for the Digital Competence of Educators (DigCompEdu)	Progression model to help educators assess and develop their digital competence at all levels of education	Requires pedagogical expertise that some librarians may not possess	Educators
JISC Digital Capability	Non-prescriptive that may allow the library and school resource center to adapt to different age groups and digital skill levels	Too broad, high-level, and conceptual	Higher education (staff & students)
Digital Kids Asia-Pacific	Combine measures to safeguard children online with opportunities for them to use digital technology safely and thoughtfully	methodological focus on self-reporting and non-comprehensive sampling	Children

The comparison presented in the table indicates that, despite their conceptual differences, the selected frameworks share a common overarching objective: to enhance

digital literacy through structured progression models, the integration of technology, and the development of digital competencies via educational programmes, curricula, and learning experiences. Notably, these frameworks are predominantly oriented towards adult learners and professionals, emphasizing skills development, competence assessment, and the practical application of digital literacy in workplace and lifelong learning contexts.

This adult-centric focus reflects their design priorities, particularly in supporting institutional implementation, professional development, and measurable outcomes. However, it also highlights a limitation in directly addressing the developmental needs of younger learners. While these frameworks provide robust foundations for digital literacy, their applicability to children is not inherent and requires deliberate adaptation. Nevertheless, these frameworks can be effectively recontextualized for school students through appropriate modifications in content, language, and pedagogical approaches. Simplifying complex concepts, incorporating age-appropriate terminology, and aligning learning outcomes with children's cognitive and social development are essential steps in this adaptation process. Furthermore, the integration of visual and multimedia elements can enhance comprehension and engagement, making abstract digital literacy concepts more accessible to younger audiences.

In addition, interactive and participatory learning strategies, such as game-based activities, simulations, and guided practice, can further support the development of digital information literacy among school students. These approaches not only increase motivation and attention but also facilitate experiential learning, enabling school students to apply digital skills in meaningful and contextually relevant ways. On the whole, while the examined frameworks are primarily designed for adult populations, their underlying principles remain adaptable. With thoughtful pedagogical adjustments, they can serve as valuable foundations for fostering digital information literacy in school students, particularly when implemented in supportive environments such as schools, libraries, and community learning spaces.

2.9 Research Map

Figure 2.19 below presents a research map for understanding collaborative initiatives and dynamics between Malaysian State Public Libraries and School Resource Centers in promoting digital information literacy. In this study, the extension of theory

is applied in the development of the research map to guide the assessment of digital information literacy within collaborative relationships between state public libraries and school resource centers. The conceptual model illustrates the key components and contributing factors that support sustainable collaboration and the effective implementation of digital information literacy.

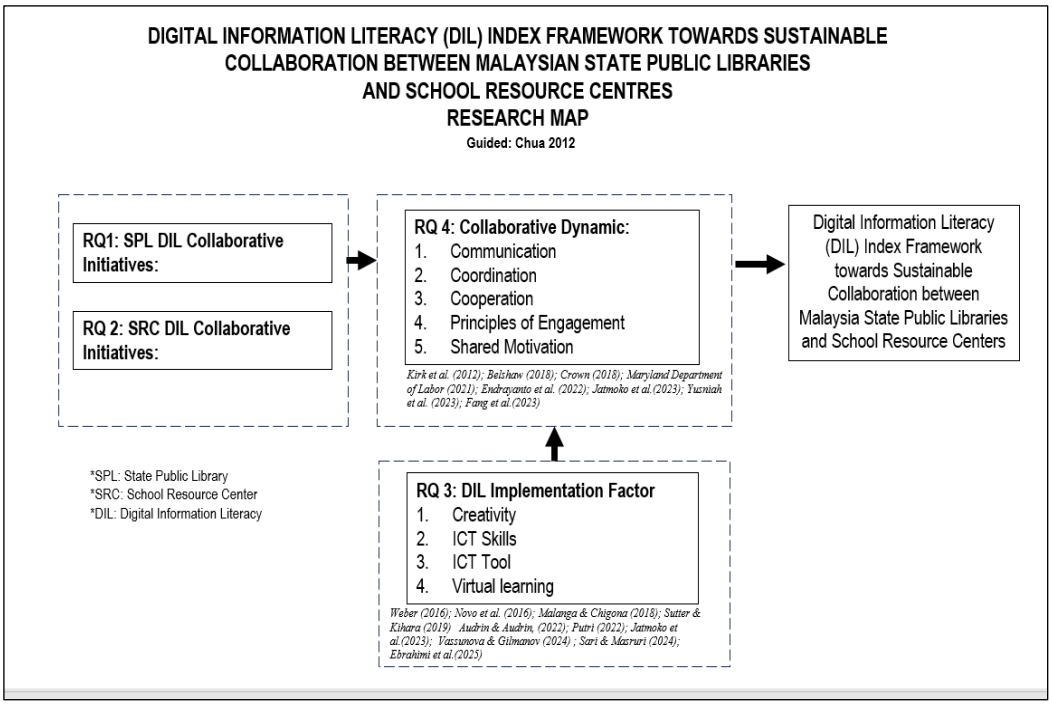

Figure 2.24 Digital Information Literacy Index Framework Towards Sustainable Collaboration Between Malaysian State Public Libraries and School Resource Centers

This research map serves as a guiding structure for the development of a comprehensive framework and its constituent elements derived from the literature. The research map is informed by seven collaborative approach frameworks and seven digital literacy frameworks. The elements incorporated into the research map are detailed in Table 2.3 and Table 2.4. As the input elements of the study, the researcher focuses on digital information literacy competencies as a foundational component for collaborative initiatives. The primary aim of this research is to examine and investigate existing collaborative digital information literacy initiatives implemented by Malaysia state public libraries and public-school resource centres (RO1 and RO2). Within this context, the digital information environment is considered integral to the operation and effectiveness of these initiatives, as it supports information access, sharing, and learning activities.

Furthermore, the study explores the factors influencing the implementation and sustainability of collaborative digital information literacy initiatives between State Public Libraries and School Resource Centres (RO3), as well as the collaborative dynamics that facilitate long-term and sustainable partnerships (RO4).

2.9.1 Elements of the Research Map

The discussion below is grounded in prior literature and theoretical perspectives related to the elements of the conceptual framework.

2.9.1.1 Collaborative Initiatives

This element presents the collaborative digital information literacy initiatives from both the state public library and the school resource center. In this regard, Latha & Suzzana (2024) mentioned that collaborative initiatives are when businesses work together to solve environmental and social problems. These partnerships help companies save money, come up with new ideas, build a better reputation, and create shared benefits, making them important for sustainability today. In this context, it focuses on how state public libraries collaborate to promote digital information literacy. Among the initiatives are providing free access to digital resources, especially through u-Pustaka and digital local content developed by state public libraries, enhancing digital information literacy among library users, and facilitating workshops and training for teachers and students.

Previously, Mendibil et al. (2013) indicated that collaborative innovation is a complex process shaped by many different factors. To be successful, partnerships must align not only on strategy but also on operations, commercial goals, and organizational culture to create real synergy (Easterling et al. 2013; Huxham & Vange, 2004). Collaborative initiatives refer to joint efforts between organizations, in this case, the state public library in Malaysia and the school resource center, through sharing knowledge, resources, and expertise. These partners pursue common objectives while reducing the risks associated with the innovation process (Pigola, 2022).

Within this study, the school resource centers collaborate with the state Public Library in an effort to integrate digital information literacy into the education curriculum. This involves providing teachers and students with access to digital tools,

resources, and training to improve their digital literacy skills. The equipment and training facilities are available at the state public library.

2.9.1.2 Digital Information Literacy Implementation Factor

In this part, highlights about creativity, ICT Skills, ICT tools, and virtual learning as an implementation factor for digital information literacy. All these factors combined will ensure the success of the DIL at either the state public library or school resource center level, as ICT skills and ICT tools are crucial factors in implementing digital information literacy. Students' use of social media for informational, recreational, and educational purposes has been impacted by basic ICT abilities such as computer operations, software applications, internet skills, and the World Wide Web (WWW) skills (Supardi et al., 2021).

Table 2.3
Digital Information Literacy Implementation Factor

Implementation Factor	Description	Literature Mapping
Creativity	Encouraging creative approaches by state public libraries and school resource centers to digital information literacy implementation, such as innovative programs and activities that engage users. Librarians must possess exceptional proficiency in embracing, utilizing, and executing digital innovations. It indicates that DIL skills provision is essential to librarians' efficient performance.	Weber (2016); Khan (2020), Putri (2022); Sari & Masruri (2024)
ICT Skills	Developing and enhancing Information and Communication Technology (ICT) skills among users, which are essential for effective digital information literacy.	Malanga & Chigona (2018); Sutter & Kihara (2019); Audrin & Audrin, (2022); Vassunova & Gilmanov (2024)
ICT Tools	Providing access to digital information literacy and training on ICT tools that	Sutter & Kihara (2019); Vassunova & Gilmanov (2024)

Implementation Factor	Description	Literature Mapping
	support, such as digital databases, e-books, and online learning platforms.	
Virtual Learning	Promoting virtual learning environments and resources that facilitate self-paced and interactive learning experiences.	Novo et al. (2016); Jatmoko et al. (2023); Ebrahimi et al. (2025)

Table 2.2

discusses the elements in the Digital Information Literacy Implementation Factors. Based on the literature, creativity, ICT Skills, ICT Tools, and Virtual Learning contribute as the implementation factors. First, the implementation of digital information literacy is influenced by creativity, technological skills, available tools, and learning environments. In particular, libraries and schools need creative approaches to design engaging digital programs, supported by librarians who are capable of using digital technologies effectively.

Next, ICT skills are essential because they enable users to access and manage digital information efficiently. In addition, the availability of ICT tools, such as digital databases and e-books, strengthens the practical application of these skills. Finally, virtual learning environments contribute to digital information literacy by providing a flexible and interactive learning experience

2.10 Summary of the Chapter

More specifically, the chapter situates the present research within the broader body of knowledge by comparing and contrasting previous studies, highlighting their contributions, and examining their limitations. Through this process, it identifies existing gaps, inconsistencies, and ongoing debates or controversies in the literature. These insights are crucial in demonstrating the necessity and relevance of the current research, thereby providing a clear justification for undertaking the study.

In addition, the literature review plays a significant role in supporting the subsequent data analysis and interpretation. By presenting an appropriate theoretical lens, it guides how the research findings are understood, interpreted, and discussed. This

theoretical grounding ensures that the analysis is not conducted in isolation but is instead meaningfully connected to established frameworks and scholarly perspectives.

Within this chapter, particular attention is given to several key themes central to the study, including sustainability, information literacy, digital literacy, and digital information literacy. Each of these themes is explored in depth, with discussions encompassing definitions, historical development, key components, and their relevance within educational and library contexts. The review also examines how these concepts intersect and evolve, especially in response to technological advancements and changing user needs.

Furthermore, the chapter explores a range of relevant models and theories that underpin the study. These include established information literacy frameworks, models of digital literacy, theories related to collaborative practices, and approaches to sustaining digital information literacy programs over time. Each model and theoretical perspective is carefully evaluated in terms of its applicability, strengths, and limitations in relation to the current research context. This critical evaluation ensures that only the most appropriate frameworks are selected to guide the study.

Consequently, the chapter demonstrates the researcher's comprehensive understanding of the subject area and the ability to engage critically with prior research. It showcases the researcher's capacity to synthesize diverse sources of information, draw meaningful connections, and identify areas requiring further investigation. In doing so, it effectively positions the current study within the wider academic discourse, clearly illustrating how it builds upon, differs from, or contributes to existing knowledge. Importantly, the literature review also highlights how previous studies relate directly to the research focus, thereby creating a logical progression toward the research questions and objectives. It establishes a clear link between theory and practice, ensuring that the study is both academically rigorous and practically relevant.

Finally, the chapter sets the stage for the subsequent methodology chapter. Having established the theoretical and conceptual groundwork, the next chapter will outline the systematic approach adopted in conducting the research. This will include a detailed explanation of the research design, the selection of participants, the data collection methods employed, and the techniques used for data analysis. Together, these elements will demonstrate how the study is methodologically structured to address the research questions and achieve its stated objectives.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

The methodology chapter outlines the systematic and structured approach employed to conduct the research, providing a comprehensive explanation of the procedures and strategies used throughout the study. It details key components such as the research design, target population and participants, sampling techniques, data collection methods, and data analysis procedures. By clearly describing these elements, the chapter ensures that readers can understand how the study was conducted and assess the appropriateness of the chosen methods in addressing the research objectives and questions. This chapter also plays a crucial role in establishing the credibility and rigor of the study. It justifies the selection of specific research methods by aligning them with the research aims, theoretical framework, and nature of the data required. In doing so, it demonstrates that the study is grounded in sound methodological reasoning. Furthermore, potential limitations and constraints are acknowledged and discussed transparently, allowing readers to critically evaluate the scope and boundaries of the research findings. In addition, the methodology chapter reflects the researcher's awareness and application of ethical considerations. This includes obtaining informed consent from participants, ensuring confidentiality and anonymity, minimizing potential harm, and adhering to relevant ethical guidelines and institutional requirements. Addressing these aspects reinforces the integrity of the research process and safeguards the rights and well-being of participants. Another important function of this chapter is to provide a clear and replicable framework for future researchers. By documenting each step of the research process in detail, the study becomes more transparent and reproducible, enabling other scholars to replicate or build upon the work in similar or different contexts. This contributes to the accumulation of knowledge within the field and strengthens the study's academic value. Moreover, the methodology chapter supports the validation of the study's findings by explaining how reliability and validity (or trustworthiness, in qualitative research) are ensured. This may include strategies such as pilot testing instruments, triangulation of data sources, consistency in data collection procedures, and the use of appropriate analytical techniques. Such

measures enhance confidence in the accuracy and consistency of the results. The methodology is a pivotal component of the research, as it provides a transparent and logical framework for evaluating the entire research process. It ensures that the study is conducted systematically and rigorously, while also allowing readers to assess the quality and credibility of the findings. By offering detailed insight into how the research was designed and implemented, the methodology chapter significantly contributes to the overall trustworthiness and scholarly merit of the study.

3.2 Design of the Research

The research design framework outlines the structure of this study, which includes research objectives, data collection methodologies, and analysis procedures. Research design ensures that each component of the study is properly planned and implemented, and it provides an organized approach for conducting the research (Virginia Tech, 2023; Pedersen & Mowla, 2024). According to Bostley (2019), a robust research design can safeguard the researcher from dissatisfaction by integrating the research process with a strategy that specifies how all key aspects of the study work together to address the research question.

3.2.1 Research Methodology (Qualitative)

Research designs can generally be categorized into two primary approaches: qualitative and quantitative (Kothari, 2004). A key distinction between these approaches lies in the nature of data collection and representation. Qualitative research emphasizes descriptive, text-based data, typically gathered through open-ended questions, enabling a deeper exploration of participants' perspectives and experiences. In contrast, quantitative research relies on numerical data obtained through structured, closed-ended questions, facilitating statistical analysis and generalization (Creswell & Creswell, 2018).

This study adopts a qualitative research approach, which is particularly suited to investigating phenomena that cannot be adequately measured through numerical data alone. Qualitative methodology focuses on understanding meanings, characteristics, and processes associated with social or contextual phenomena. By employing this approach, the researcher provides a comprehensive and nuanced account of the case

study on the state public library and the school resource center, enabling in-depth analysis and rich, contextualized insights into their operations and challenges.

The study of sustainability elements using a qualitative approach is characterized by several criteria: (1) it is non-numerical, descriptive in nature, applies reasoning, and relies on words; (2) it aims to capture meaning, feelings, and to describe situations; (3) qualitative data cannot be represented graphically; (4) it is exploratory; and (5) it investigates the "why" and "how" of decision-making processes (Rajasekar, et al. 2013). The researcher selected the qualitative approach to obtain a deep understanding of the complex experiences and perspectives of respondents regarding digital information literacy in state public libraries and school resource centers.

This approach allows for rich, detailed insights that quantitative methods may overlook, facilitating a more nuanced exploration of how individuals interact with and utilize digital information literacy resources, conduct programs, and initiate collaboration initiatives with other institutions, as well as set up a network. By engaging with participants through interviews, the researcher aims to capture the contextual factors that influence their experiences, as well as the challenges and opportunities they face in promoting and conducting digital information literacy in both institutions, which lead to sustainability. Finally, this in-depth understanding has an impact on the development of effective strategies and initiatives to improve digital information literacy throughout the educational environment.

The interview sessions were conducted with two categories of respondents, namely State Public Library Officers and officers from the Educational Resources and Technology Sector (SSTP). In each session, the researchers encouraged open dialogue, allowing participants to share their experiences, insights, and challenges related to digital information literacy in school resource centers. By fostering a comfortable environment, the researchers enabled participants to express their views openly, resulting in rich qualitative data that captured a diverse range of perspectives and practices. This approach allowed participants to articulate their experiences freely, providing valuable insights into their authentic feelings and viewpoints. The interview sessions not only highlighted the current state of digital information literacy but also identified areas for potential improvement and collaboration among stakeholders in the education sector.

Qualitative methodology is the best approach for this study, seeking a deep and detailed understanding of digital information literacy in the state public library and

school resource center, towards the sustainability collaborative initiative. Though there are different orientations and definitions of the qualitative approach, many researchers have agreed on the following characteristics of qualitative research; understanding from the perspective of the participants; the researcher as the primary instrument of data collection; a requirement for fieldwork; an inductive research strategy, whereby it builds theory from observations and intuitive understanding gained from field; and a descriptive report, with words and pictures to convey what is learned (Kuckartz et al., 2015; Sullivan & Sargeant, 2011; Taquette & Minayo, 2015).

Social science research is an iterative process of rationalization, observation, and validation (Bhattacherjee et al. 2017, as cited in Kuppusamy et al. 2020). The researcher observes a natural or phenomenal event that interests the researcher during the observation phase, then tries to make sense during the rationalization phase, and the researcher will later test the theories using the scientific method through data collection and analysis process during the validation phase. Respondents comprised 14 library officers and 13 *Sektor Sumber dan Teknologi Pendidikan* officers interviewed in order to collect significant data for this research. Table 3.1 summarizes the methodological approach in this research.

Table 3.1
The Methodological Approach in This Research

Research Methodology	**Qualitative**
Research Method	Semi-structured Interview
Research Technique	Interview
Research Instrument	Semi-structured interview guide Data collector: Researcher

The emergence of qualitative research does not allow any detailed plan before the research begins (Pickard, 2007). Qualitative research is all about understanding human beings' experiences, in an interpretative approach (Jackson et al., 2007). It is also about using humans as an instrument to collect data and perform analysis (Lincoln & Guba, 1988). Qualitative research allows the researcher to ask open-ended questions to understand the feelings and respondents' personal opinions about existing collaborative digital information literacy initiatives in Malaysia State Public Libraries and Malaysia public school resource centers, as well as sustainable collaborative

initiatives between state public libraries and school resource centers in Malaysia, and collaborative dynamic factors supporting sustainable digital information literacy initiatives between these two institutions.

The qualitative approach has been used in various fields, including anthropology, education, and even sociology (Castleberry & Nolen, 2018; Dent, 2007). Interviews using structured, semi-structured, or unstructured questions, focus groups, or case studies are the methods practiced in qualitative research. The researcher applied semi-structured interviews in this study. It allows the researcher to better understand each of the respondents' points of view regarding the topic under investigation. A lot of aspects can be focused on in qualitative research: humans' opinions, experiences, behaviours, understanding, and imagination of the respondents (Mason, 2002). In the context of this study, using semi-structured interviews allowed investigators to explore respondents ' perspectives on initiatives and collaborative dynamics between the State public library and the school resource center in promoting digital information literacy. This method provides a rich source of qualitative data, offering insight into how these entities work together, the challenges they face, and the strategies they implement to improve digital information literacy among their communities.

The qualitative approach is appropriate due to the objectives of this study, which seek to analyze existing collaborative digital information literacy initiatives in Malaysia State Public Libraries and Malaysia public school resource centers, as well as sustainable collaborative initiatives between state public libraries and school resource centers in Malaysia, and collaborative dynamic factors supporting sustainable digital information literacy initiatives that need to be adapted in the sustainability elements framework. Few studies (Hauke, 2019; Michnik, 2015; Omeluzor et al., 2017; Karioja, 2009, 2013; Sawaya et al., 2011) used a similar approach. Through this qualitative approach, the researcher specifically selected a case study methodology and performed a thematic analysis afterward.

3.2.2 Research Paradigm

This study adopts the interpretivist paradigm, which emphasizes gaining a deep understanding of phenomena within their unique social and contextual settings (Creswell & Creswell, 2018). This paradigm is particularly suitable for examining the

complex dynamics of rural libraries and collaborative digital information literacy (DIL) initiatives, where multiple perspectives and contextual factors influence outcomes.

> *"A paradigm is a structure or a set of suppositions and ideas that provide a pathway to see what the world looks like when its scientific aspect is related to its assumptions" (Khan, 2017).*

A research paradigm provides a philosophical lens that shapes how knowledge is constructed, understood, and interpreted. As Khan (2017) notes, a paradigm is a set of assumptions and ideas that guides how we perceive and study the world. In qualitative research, these assumptions extend to ontology (the nature of reality), epistemology (how knowledge is acquired), axiology (values in research), logic (reasoning processes), and phenomenology (study of lived experience) (Chalmers, 2002).

The interpretivist paradigm aligns with a qualitative case study design, which allows for an in-depth examination of a bounded system, such as the collaboration between state public libraries and school resource centers. By using a case study approach, the researcher can investigate the experiences of library officers and SSTP officers in planning, implementing, and sustaining DIL initiatives, while situating these experiences within the broader institutional and social context.

Furthermore, interpretivism justifies the researcher's role as an active interpreter, engaging with participants' perspectives to co-construct understanding. Through semi-structured interviews, follow-up interactions, and supplementary communications via WhatsApp, the researcher collects rich qualitative data, enabling nuanced interpretation rather than relying on purely numerical analysis. This approach supports the study's aim of developing a contextually grounded Digital Information Literacy Index Framework (DILIF), which reflects real-world practices and challenges in Malaysian public library and school resource center settings.

Hence, the theoretical justification for combining interpretivism with a qualitative case study is that both emphasize context, subjectivity, and the exploration of meaning, enabling the researcher to capture complex phenomena that cannot be adequately understood through positivist or purely quantitative approaches. The research objectives of this study were designed to answer the research questions. Based on the table below (Table 3.2), the researcher has matched the components of research questions, research objectives, respondents/ sources, and techniques used.

Table 3.2
Matched Components Of Research Questions, Research Objectives, Respondents/ Sources, and Techniques Used.

No.	Research Question	Research Objectives	Respondent/ Source	Techniques
1	RQ1: What are the current Digital Information Literacy (DIL) efforts in Malaysia state public libraries?	RO1: To analyze existing collaborative digital information literacy initiatives in Malaysia State Public Libraries	Library officer and the Educational Resources and Technology Sector (SSTP) Officer	Interview session
2	RQ2: What are the current Digital Information Literacy (DIL) initiatives in Malaysia Public School Resource Centers?	RO2: To investigate existing collaborative Digital Information Literacy (DIL) initiatives in Malaysia public school resource center.	Library officer and the Educational Resources and Technology Sector (SSTP) Officer	Interview session
3	RQ3: How is Digital Information Literacy (DIL) implementation factors strengthening sustainable collaborative initiatives between State Public Library and School Resource Center in Malaysia	RO3: To explore Digital Information Literacy (DIL) implementation factors towards sustainable collaborative initiatives between State Public Library and School Resource Center in Malaysia	Library officer and the Educational Resources and Technology Sector (SSTP) Officer	Interview session
4	RQ4: Does collaborative dynamic factors support Digital Information Literacy (DIL) sustainable initiatives between State Public Library and School Resource Center in Malaysia	RO4: To recognize collaborative dynamic factors supporting sustainable Digital Information Literacy (DIL) initiatives between State Public Library and School Resource Center in Malaysia	Library officer and the Educational Resources and Technology Sector (SSTP) Officer	Interview session

3.3 Research Process

The research process outlines the procedures through which the study is conducted. The outcomes of the research are influenced by the chosen research design and method, as well as the overall aim of the study (Chua, 2012). Furthermore, research design plays a crucial role in addressing key considerations, including the purpose of the study, the type of sampling employed, and the most appropriate methods for data collection (Akhtar, 2016).

3.3.1 Case-Study Approach

This study applies a multiple-case study method as proposed by Yin (2013). Figure 3.1 illustrates the steps involved in designing this research, which are organized into three phases: case selection, data collection, and data analysis. The study investigates and draws conclusions from several cases. The use of multiple case studies enables the researcher to examine each case in depth with regard to digital information literacy, particularly in school resource centers, while also exploring the sustainability of collaborative initiatives between the state public libraries and the school resource centers.

For this study, Figure 3.1 illustrates the adapted multi-case study design adopted in this research. This study involves 14 cases, each of cases comprising the state public library officer and the SSTP Officer.

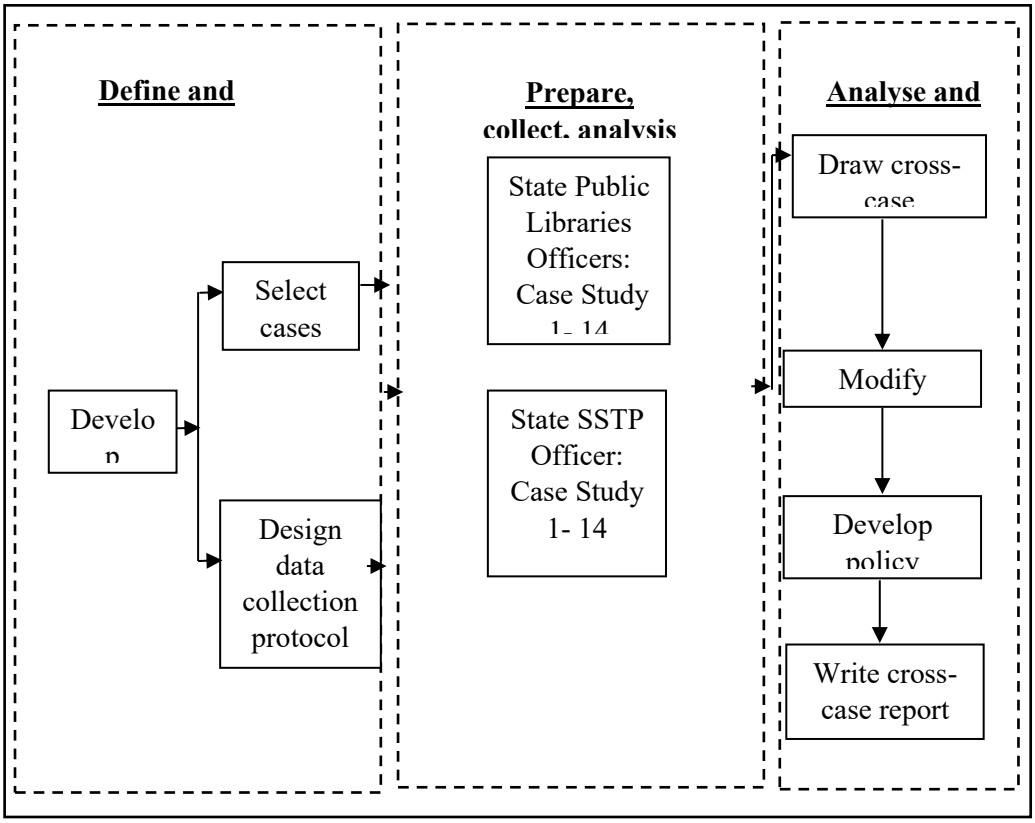

Figure 3.1 Case Study Design (Yin, 2013)

3.3.2 Research Setting

The setting of a research study refers to the physical, social, or experimental context in which the study is conducted, encompassing elements such as location, time period, population, and environmental conditions (Fonseca, 2023). The research setting provides detailed information about the context and environment of the study and clearly specifies where the research takes place.

In this study, the researcher engaged fourteen (14) state public libraries in Malaysia, along with fourteen (14) Educational Resources and Technology Sector (SSTP) units from the State Education Department in each state. A Librarian or Assistant Librarian was selected as a respondent from each state public library, as they are directly responsible for implementing programs and activities within the library. Furthermore, in initiating collaborative efforts between state public libraries and school resource centers, these individuals play a central role and are actively involved in the process.

3.4 Population and Sampling

A research population is generally a large collection of individuals or objects that is the main focus of research to be investigated. It is mainly for the benefit of the population that research is done. However, with the large size of populations, researchers often cannot test each and every individual in the population due to the time-consuming and costly. This is why researchers rely on sampling techniques. There are two types of sampling techniques: probability sampling and non-probability sampling. The common probability sampling techniques are simple random sampling, cluster sampling, systematic sampling, and stratified sampling. As for non-probability sampling, the common non-probability sampling techniques are purposive sampling, convenience sampling, snowball sampling, and quota sampling. According to Barreiro and Albandoz (2001), probability sampling is one in which each sample has the same probability of being chosen. A simple random technique is a sampling procedure that assures each element in the population has an equal chance of being included in the sample (Zamalia, 2008).

3.4.1 Population

For this research, community assessment needs to be studied through the study population. There are 7,780 schools in Malaysia; however, this study focuses specifically on the primary school resource centers. The table below shows the total number of primary and secondary schools in Malaysia. According to the Ministry of Education (2021), compulsory education is a law that requires every Malaysian parent residing in Malaysia to ensure that if their child reaches the age of six on the first day of January of the current school year, the child is enrolled in primary school. The duration of compulsory education is six years, which corresponds to the primary education stage. Parents who fail to ensure that their children comply with compulsory education requirements are committing an offence under the law. Parents convicted of an offense may be fined not more than five thousand ringgit or imprisoned not more than six months or both. This is the rationale for selecting primary schools, as they represent the initial stage where children are introduced to formal education. Therefore, it is essential to provide learners at this level with digital information literacy initiatives.

Table 3.3
Number of Primary and Secondary Schools in Malaysia

TYPES OF SCHOOL	NUMBER OF SCHOOLS
Primary	7,780
Secondary	2,440
Total	**10,220**

Source: Ministry of Education 2020

Table 3.4
Number of Schools' Teachers in Malaysia

SCHOOL	NUMBER OF SCHOOLS
Primary	236,993
Secondary	179,750
Total	**416,743**

Source: Ministry of Education 2020

Table 3.5
Number of Primary Schools in Malaysia

STATE	NUMBER OF PRIMARY SCHOOLS
Perak	852
Selangor	662
Pahang	543
Kelantan	418
Johor	906
Kedah	548
Melaka	238
Negeri Sembilan	352
Pulau Pinang	271
Perlis	74
Terengganu	352
Kuala Lumpur	221
Labuan	3
Sabah	1075
Sarawak	1265
Total	**7,780**

Source: Ministry of Education 2020

Each school operates its own resource center, which is managed collaboratively by the school administration and the library and media teacher. The researcher focuses only on primary schools. This focus is also due to time limitations, as it is not feasible

for the researcher to cover the entire population in Malaysia. The study is confined to primary schools because formal education begins at the primary level. Primary schools equip students with basic skills (3M): reading, writing, and counting, in contrast to secondary schools, which are more examination-oriented, as mentioned in the Malaysia National Education Blueprint 2013-2025:

> *"Goal of primary education is to provide a solid foundation in reading, writing, counting (3M) and reasoning skills; introduction to basic concepts of science; prevocational skills; generic skills; as well as the application of pure values." Malaysia National Education Blueprint 2013-2025*

The selection of respondents was based on several key considerations. Firstly, SSTP officers possess the necessary expertise and official responsibilities related to the planning, management, and implementation of digital information literacy programmes, with their scope of work extending beyond the school resource centre. In contrast, the roles of library and media teachers are relatively limited in this regard. Second, SSTP officers have a broader perspective on program implementation and collaboration, particularly in relation to cross-departmental initiatives. Library and media teachers, while serving as experts in school-level media and information resources, generally have limited access to inter-departmental programs and decision-making processes. As such, they may not be able to provide a comprehensive overview of program planning and execution at a systemic level. Furthermore, SSTP officers are able to explain and frame digital information literacy initiatives within a larger organizational and strategic framework, rather than focusing solely on individual school experiences. Involving SSTP officers as respondents also allows for the discussion of matters that may be considered sensitive, such as funding allocation, policy implementation, and strategic planning, which may not be fully accessible to library and media teachers due to the scope of their roles and knowledge.

According to Morse (1991), in sociology, the term "respondents" is commonly used in survey research to describe participants who answer structured or semi-structured questionnaires, whereas "informants" is a concept rooted in anthropology. Similarly, Manaher (2023) noted that respondents are typically invited to share their views, attitudes, beliefs, or personal experiences on a specific subject, with data collected through various methods such as face-to-face interviews, telephone interviews, online questionnaires, or mailed surveys. An informant, on the other hand,

is someone who supplies information to researchers or law enforcement about a particular issue or circumstance. Such individuals are commonly described as “tipsters” or “whistleblowers.” However, the question of the comparative value of respondent-based and informant-based methods remains unresolved, as existing arguments have not yet been supported by a direct comparative evaluation of both approaches within a single study (Sinha & Arif, 2014).

Therefore, in this study, the term respondents is used to refer specifically to public library officers and State Educational Technology Division (SSTP) officers, as these groups represent key institutional stakeholders directly involved in the planning, implementation, and coordination of digital information literacy (DIL) initiatives. Their roles, responsibilities, and practical engagement in collaborative programs position them as appropriate and information-rich participants for examining the dynamics of inter-institutional collaboration and framework development.

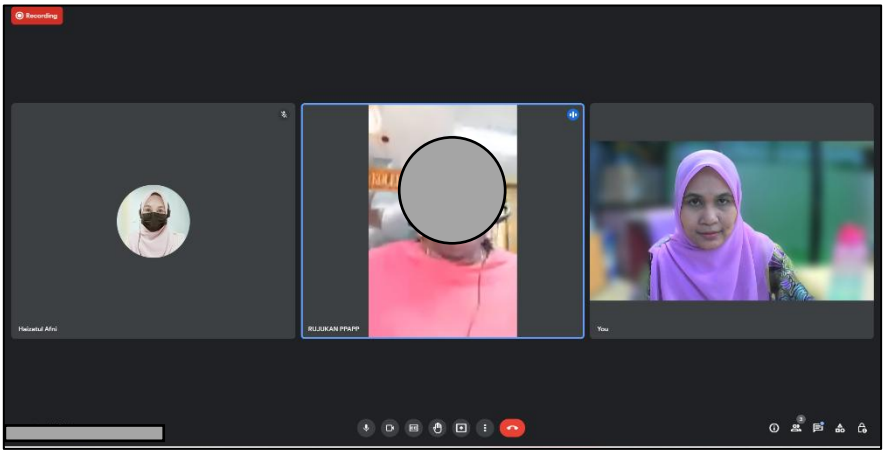

Figure 3.2 Interview Session with Respondent

For this study, 13 officers from the Educational Resources and Technology Sector (SSTP) were selected as respondents. The SSTP is responsible for the planning, management, coordination, and implementation of information literacy and educational technology programs, as well as the development and enhancement of school resource centers. In addition, teachers appointed as library and media teachers are required to undergo professional training courses conducted by the SSTP, further underscoring the sector’s central role in capacity building and program implementation. The SSTP also facilitated the research process by assisting in the selection of library and media teachers as participants and supporting the implementation of the initiative under investigation.

In addition, 14 public library officers were selected as respondents. These officers were directly involved in handling relevant activities and possessed practical experience in digital information literacy (DIL) initiatives. Their roles included the planning, management, and implementation of DIL programs, as well as participation in collaborative efforts with other institutions. As such, their involvement provided valuable insights into both the operational and strategic aspects of digital information literacy and inter-institutional collaboration. In Malaysia, there are fourteen state public libraries, with each state having one main library. Under the administration of each state library are regional libraries, branch libraries, town libraries, village libraries, and mobile library services (*Perpustakaan Negara Malaysia*, 2022).

Each respondent was interviewed individually, with interview sessions ranging from approximately 45 to 90 minutes. The interviews were conducted via an online platform, namely Google Meet, to ensure accessibility and flexibility. Figure 3.2 illustrates an example of an interview session conducted with a respondent using Google Meet.

3.4.2 Sampling

Sampling, as defined by Trochim (2002), is the process of selecting units (e.g., individuals or organizations) from a population of interest so that the study of the sample allows for generalizable insights to the population. Sharma (2017) further clarifies that sampling is a systematic technique used to select a relatively smaller, representative subset from a pre-defined population to serve as subjects for observation or data collection.

> *"Sampling is a technique (procedure or device) employed by a researcher to systematically select a relatively smaller number of representative items or individuals (a subset) from a pre-defined population to serve as subjects (data source) for observation or experimentation as per the objectives of his or her study," (Sharma, 2017).*

In this study, purposive sampling was employed. Purposive sampling is a non-probability technique in which participants are selected based on specific characteristics that make them information-rich and directly relevant to the research objectives (Chua, 2012; Creswell & Creswell, 2018). This method was appropriate for the study because

the focus was on exploring the practices, implementation, and collaborative processes of digital information literacy programs in public libraries and school resource centers.

A total of 28 respondents were appointed for this study, comprising 14 library officers and 14 SSTP officers, all of whom were directly involved in DIL initiatives and collaborative programs. Participants were chosen based on the following criteria, as presented in Tables 3.6 and 3.7, respectively. This approach enables the researcher to focus on cases that are most likely to yield meaningful and detailed information, which aligns with the study's qualitative, interpretivist approach as stated previously. The purposive selection ensured that the data collected would be rich, relevant, and capable of providing in-depth insights into the processes under study. This aligns with the study's qualitative, interpretivist approach, which prioritizes understanding meaning and context over statistical representativeness. While the sample size of 28 exceeds the minimum suggested for qualitative studies, previous research indicates that even smaller samples of 10–15 participants can yield meaningful and applicable findings (Shetty & Sakshi, 2021).

The researcher obtained approval from the UiTM Research Ethics Committee before contacting participants. Following this, official requests were submitted to the Ministry of Education Malaysia via the ERAS 2.0 system, accompanied by supporting documents, including the student confirmation letter, research proposal, participant information sheet, and study questionnaire. Once permission was granted, respondents were notified via telephone, email, and WhatsApp, and follow-up communication was made when necessary to confirm participation. Scheduling of interviews was coordinated to accommodate the respondents' availability, consistent with best practices for voluntary, qualitative data collection (Hajibah & Kamarul, 2021).

Out of the 28 respondents appointed, one withdrew voluntarily, resulting in a final sample of 27 participants. Interviews were conducted according to schedule, with minor rescheduling to accommodate official work commitments. This structured and purposive approach to sampling ensured that participants were information-rich and that the study collected detailed, relevant, and contextually grounded data. Information regarding this matter can also be found in Section 3.9: Ethical Approval.

3.4.2.1 Inclusion Criteria

Inclusion criteria refer to the characteristics that prospective participants must possess in order to be included in the study. These criteria ensure that the selected respondents are appropriate and capable of providing relevant information for the validation of the study findings. To determine eligibility, the researcher follows a formal process of obtaining permission from the relevant authorities, ensuring that all participants are treated ethically and equitably. Table 3.6 presents the inclusion criteria for this study.

Table 3.6
Inclusion Criteria

Inclusion Criteria	Description
Organization	State Public Library Educational Resources and Technology Sector
Job Position	Librarian / Assistant Librarian SSTP Officer
Demographic Characteristic	Age ≥ 21 years of age and male or female gender
Geographic Location	Perlis, Kedah, Pulau Pinang, Perak, Selangor, Kuala Lumpur, Negeri Sembilan, Melaka, Johor, Pahang, Terengganu, Kelantan, Sabah and Sarawak.
Language Proficiency	Respondents were least comfortable and willing to communicate in Malay or English, ensuring that they could respond accurately to the interview questions and fully understand the process.
Informed Consent	Informed consent must be obtained from all participants as evidence that they comprehend the purpose and procedures of the study.
Digital Information Literacy Experience	Participants with basic experience in digital tools and resources. Involved in planning, managing, and implementing digital information literacy programs in digital information literacy or collaborative programs

3.4.2.2 Exclusion Criteria

Exclusion criteria refer to the characteristics that disqualify prospective participants from inclusion in the study. These criteria are important for ensuring the integrity of the data and preventing the involvement of respondents who may distort the findings. The specific exclusion criteria for this study are presented in Table 3.7.

Table 3.7
Exclusion Criteria

Exclusion Criteria	Description
Language Proficiency	Respondents who are not proficient in Malay and English are excluded from the study to ensure the understanding and accuracy of the data
Current Employment Status	Respondents who are not employed as library officers or SSTP officers (Retired / unemployed) are exempted to ensure that each respondent is aware of current practices and active with their essential work.
Institutional Affiliation	Respondents who work in institutions that have specific digital information literacy programs or initiatives that differ significantly from the study's focus may be excluded to ensure relevance to the study context.
Recent Library Usage	Respondents who are not involved in using digital information literacy services in libraries or schools are exempted so that the data provided by the respondent is recent and has relevant experience.

3.5 Instrument Development

This section discusses the development of the research instrument for the study. Instrument development is a crucial preparatory stage for collecting data from respondents.

3.5.1 Interview Questions Development

The study by Mason (2002), as cited in Ruslin et al. (2020), identifies several essential elements of qualitative interviews: (1) the interview functions as a form of internal dialogue, encompassing one-on-one interactions, group interviews, or focus groups, which may be conducted in person, by telephone, or via online platforms such as WhatsApp, Instagram, Twitter, Facebook, and other internet-based tools; (2) the semi-structured interview is relatively informal; (3) it follows a thematic, topic-centred, biographical, or narrative approach; and (4) it operates from the perspective that knowledge is situated and therefore contextual (Mason, 2002). Additionally, Taherdoost (2016) highlights the advantages of using questionnaires in research, noting that they provide accurate information, are cost-effective, and are reliable for obtaining

both qualitative and quantitative feedback. When properly designed, tested, and administered, survey questionnaires yield accurate and meaningful results.

To develop the questionnaire, the researchers referred to the research questions that guided its purpose. For this study, a semi-structured interview instrument was developed based on previous studies (Khadijah et al., 2021; Kumar, R., 2020; Mansour, 2017; Shaffer, 2017) and supplemented with additional follow-up questions by Asadullah (2014). The semi-structured format enables a comprehensive understanding of respondents' skills, knowledge, and attitudes toward digital information resources. The development process involved reviewing existing literature to identify relevant constructs, formulating clear and concise questions, and ensuring alignment with the study's objectives. Pilot testing was conducted to refine the instrument based on feedback from a small group of participants, enhancing its clarity and effectiveness. The final instrument is designed to collect meaningful data to inform insights and recommendations for improving digital information literacy in educational settings.

The questions developed for this study are simple and concise, avoiding jargon in the questionnaire. As noted by Cavana, Delahaye, & Sekaran (2001), the wording of the questionnaire should align with the respondents' level of comprehension, considering their educational background, language use, and cultural context. Four (4) questions about the respondent's age, gender, working experiences, and educational attainment are included in Part A. The level of digital information literacy awareness and knowledge, as well as the response to using digital information literacy and digital information literacy skills, are evaluated in Part B. Part B is divided into three (3) primary subjects. Three (3) questions are included in the first topic to gauge knowledge and understanding of digital information literacy. Four (4) questions in Topic 2 evaluate the answer to the use of digital information literacy, and five (5) questions in Topic 3 do the same. In qualitative research, as outlined by Creswell (2008), research instruments serve as tools for gathering pertinent information related to the study. The primary data collection method in this study, titled Sustainable Collaborative Digital Information Literacy Index Framework for State Public Library and School Resource Center in Malaysia, is semi-structured interviews, aligned with the research map discussed in the previous Chapters 1 and 2. The semi-structured questionnaire is systematically organized into three sections, namely Section A, Section B, and Section C. Section A focuses on collecting demographic data, encompassing variables such as respondents' gender, age, level of education, and professional experience as library and

media teachers.

Section B of the questionnaire comprises self-developed items designed to measure respondents' awareness, responses, and skills related to digital information literacy. This section is organized into three topics: the level of awareness and knowledge of digital information literacy, which includes three questions; responses to the use of digital information literacy, consisting of five questions; and digital information literacy skills, containing four questions to assess respondents' competencies. Section C similarly contains self-developed items aimed at measuring the collaborative efforts between state public libraries and school resource centers.

Table 3.8
Area in the Research Instrument

Research Question (RQ)	**Focus Area**	**Guided Interview Questions**
RQ1	Current Digital Information Literacy (DIL) efforts in Malaysian state public libraries	1. What types of activities have been conducted between state public libraries and school resource centers? 2. What form of collaboration do you hope to achieve for success in digital information literacy at schools? 3. Do state public libraries/school resource centers have a specific budget for promoting digital information literacy activities? 4. Do state public libraries/school resource centers provide adequate equipment to support the process of digital information literacy? 5. Do these activities have an impact on library staff, teachers, and students? 6. Do you agree with the costs associated with participating in this collaboration? 7. If this collaboration is successful, it will be implemented in schools and state libraries. What are your thoughts on this? 8. What are your expectations from this collaboration?
RQ2	Digital Information Literacy Initiatives in Malaysia's Public School Resource Centers	1. How is the collaboration between state public libraries and school resource centers? Is it necessary to have a good relationship between the two organizations? 2. Do you think state public libraries make a sufficient contribution to the development of digital information literacy in school resource centers? 3. Do you find that state public libraries are capable of assisting school resource centers in digital information literacy?
RQ3	DIL implementation factors strengthening sustainable collaboration	1. Does upper management support digital information literacy? 2. Are state public libraries/school staff aware of the existence of digital information literacy? 3. Do you agree that digital information literacy will help

Research Question (RQ)	Focus Area	Guided Interview Questions
		teachers in the teaching and learning process?
RQ4	Collaborative dynamic factors supporting sustainable DIL initiatives	1. Do you agree that digital information literacy will help teachers in the teaching and learning process? 2. Do you agree that having complete equipment plays a crucial role in the success of digital information literacy? 3. Do you agree that the staff in state public libraries and school resource centers are already proficient in digital information literacy? 4. Are you using any modules to teach digital information literacy? 5. Do state public libraries have experts in digital information literacy? Is this sufficient to support school resource centers? 6. What challenges do you face when conducting programs in person? 7. What is the significance of digital information literacy to you? Why is it important? 8. What would you like to change or add in the module? 9. What challenges do you face when running online programs? 10. Where would you place yourself regarding digital information literacy, particularly in terms of your knowledge and skills? 11. Which do you prefer: physical programs or online ones? 12. In your opinion, what barriers might hinder the process and progress of digital information literacy?

3.5.2 Preliminary Study

Although this terminology may share some common aspects, it has specific definitions, goals, and is associated with a particular approach to analysis (Vogel & Jerry, 2017). In addition, Doody and Doody (2015) stated that such preliminary studies are helpful to researchers as they allow for the evaluation and preparation of data collection and analysis methods for several reasons. Specifically, a preliminary study is conducted with a small group of participants to ensure they understand and are familiar with the research, as noted by Ayesha Aziz and Khan Nashi (2021). Thus, it is a small-scale study carried out before the main study to assess the feasibility of undertaking the larger investigation.

For this study, the participant was selected based on specific criteria to ensure meaningful, relevant data, with particular attention to their relevance to the research area, demographic characteristics, and experience level regarding the digital

information literacy and sustainability collaborative initiative between the state public library and the school resource center. Respondent selection is facilitated by leveraging strong personal relationships with teachers. Researchers contacted teachers who agreed to participate and were available for online interviews lasting between 45 minutes and 1 hour and 30 minutes, ensuring that their work schedules were not disrupted. The feedback gained from the preliminary study is essential for researchers to refine their interview questions and gain insights from participants regarding the issues raised. The results of the preliminary study provide valuable guidance for researchers in reorganizing and revising the interview questions (Kezar, 2000).

The interview sessions conducted during the preliminary study proved to be highly beneficial for researchers in finalizing the format and strategy for the question-and-answer sessions. The preliminary study conducted yielded several outcomes, including the refinement of interview questions, the identification of sensitive issues during the interview process, and the assessment of respondents' understanding of the questions, as well as the clarity and comprehensibility of the language used, for example, the use of broad and vague phrases to more precise refinements. These discussions also generated additional ideas stemming from the primary questions posed. In addition, the preliminary study helped determine the actual duration of the interview sessions and enabled the researcher to prepare and practice for the actual interviews, given that the appointed respondents were management-level officers.

The study further assisted researchers in developing effective listening skills, allowing respondents to express their views without interruption, manage reactions to each response, and create a harmonious interview atmosphere while maintaining good time control. Throughout the interview process, professionalism and ethical conduct were emphasized to avoid adversely affecting the image of any individual or department, even when a close relationship existed between the researcher and the respondent. Maintaining this professional relationship was essential for establishing trust, mutual respect, and mutual understanding, thereby enhancing communication, improving data quality, and achieving positive research outcomes.

3.6 Data Collection

The data collection section outlines the procedures and methods employed to obtain research data, ensuring transparency, consistency, and reproducibility. In this

study, data were collected through semi-structured online interviews conducted via Google Meet, in line with the approach suggested by Sekaran & Bougie (2016). This method was selected to allow in-depth exploration of participants' perspectives while maintaining flexibility in the interview process.

A systematic data collection protocol was developed to guide the research process, detailing the procedures, instruments, and ethical considerations involved in gathering data. This protocol ensured accuracy, consistency, and adherence to ethical standards, thereby enhancing the reliability and validity of the findings. Table 3.3 presents the data collection protocol used to investigate collaborative digital information literacy initiatives between state public libraries and school resource centers, beginning with the development of the interview guide and concluding with the reporting of results.

Each respondent was contacted once through a single interview session during the data collection process. However, each respondent was also contacted multiple times, both before and after the interview sessions. Before the interview, this involved arranging a suitable date and time, while after the interview, it included the member checking process. The member checking process entails providing participants with a summary of the identified themes for their verification. Additionally, the analysis process was discussed with the supervisor through peer debriefing to enhance the credibility and dependability of the study's findings.

Data collection was conducted in stages, with online interviews carried out sequentially on a one-to-one basis with respondents up to the 27th participant between June 2021 and February 2022, as the researcher conducted the study on a part-time basis. Each interview session was conducted privately to ensure a comfortable environment for both parties and to prevent the interview responses from being overheard by third parties. The interviews were conducted online using Google Meet, with each session lasting between 45 minutes and 1 hour and 30 minutes.

Google Meet is a widely used online platform since the onset of the COVID-19 pandemic (Chia et al., 2020). Moreover, Wakelin et al. (2024) stated that Google Meet's approach enabled meaningful online engagement by creating opportunities for participants to articulate and exchange their perspectives. Conducting online face-to-face interviews offers convenience by enabling participation across geographically dispersed locations, saving time and resources for both researchers and participants, while also contributing to the achievement of global environmental sustainability goals

(Saarijärvi & Bratt, 2021; Leona et al., 2022). The researcher is grateful that during the data collection period, movement control orders were still in effect, and this online medium greatly facilitated the interview process. This was especially important as ministry directives required interviews to be conducted online, and access to educational premises was still restricted at that time.

One day before each interview session, the researcher sent a notification to respondents via the WhatsApp application containing details of the interview date, time, and access link. The researcher used the WhatsApp application to communicate information to respondents after formal correspondence had been conducted via official letters. WhatsApp provides a responsive research approach that supports efficient communication with participants who are geographically dispersed (Mwanda, 2022).

During the interview sessions, respondents were encouraged to keep their cameras turned on, allowing the researcher to observe facial expressions and body language. They allow the researcher to capture the participant's essence by responding to visual and auditory cues, while facilitating a conversational style of interview (Wakelin et al., 2024). Respondents were also informed and their consent obtained for the interview sessions to be recorded for transcription purposes after the interviews were completed. In addition, the interview questions were provided to respondents in advance to allow sufficient preparation before the interview session. The recorded interview sessions were subsequently downloaded for the next stage of the process, namely transcription. Upon completion of the transcription work, the researcher conducted member checking with the respondents and peer debriefing with the supervisor, which enabled the finalisation of the transcription results. Where necessary, follow-up interviews were carried out with selected respondents to seek clarification, obtain further elaboration, and ensure the accuracy and completeness of the data. These follow-up exchanges were also facilitated via WhatsApp, either through short online sessions or additional voice notes, ensuring rich and comprehensive data collection while accommodating respondents' schedules.

As presented in Tables 3.11 and 3.12, each respondent was assigned a pseudonym to ensure anonymity and confidentiality. Personal information, such as names and job positions, was not disclosed to protect respondents' privacy and maintain ethical standards in the research process. Concerning privacy and ethical considerations in online interviews conducted via web-conferencing platforms, the procedures largely mirror those of traditional face-to-face interviews (Chia et al., 2020).

The interview sessions were conducted using a set of prepared semi-structured questions, with additional probing questions introduced as the discussions progressed. This approach facilitated an in-depth exploration of the research topic and allowed the researcher to obtain rich and detailed insights into the respondents' experiences and perspectives related to the study.

Data saturation was considered achieved when no new themes, significant variations, or perspectives emerged from the interview sessions. After 11 interviews in each respondent category, recurring patterns became evident, confirming existing findings, while subsequent interviews served to refine and consolidate established themes rather than generate new ones. Additional interviews were conducted to further ensure data saturation and strengthen the robustness of the study's findings. Accordingly, 14 respondents in each category were deemed sufficient to achieve data saturation and to support the credibility, trustworthiness, and validity of the study.

To ensure that sufficient data were collected and the objectives of the study were achieved, this research involved 14 state library officers and 13 SSTP officers. Data saturation is achieved when sufficient information has been collected to allow the study to be replicated, no new insights can be gained, and additional coding is no longer possible (Fusch & Nesh, 2015). Braun & Clarke (2021) stated that saturation refers to the point at which additional data no longer produce new themes or codes, resulting in information redundancy. This concept is commonly applied in thematic analysis (TA) research within sport and exercise studies, as well as across other disciplines. On the other hand, Mwita (2022) identifies five factors that influence data saturation: predetermined codes and themes, sample size, the relevance of research participants, the number of research methods used, and the duration of data collection sessions. With a total of 27 state library officers and SSTP officers, it is expected that sufficient information can be obtained based on the respondents' experiences in the field of digital information literacy.

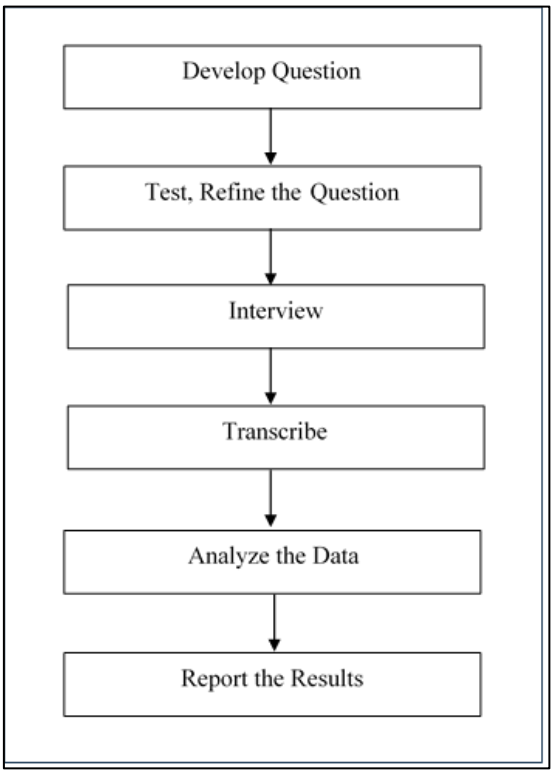

Figure 3.3 Data Collection Protocol

3.6.1 Interview

Qualitative interviews usually involve follow-up questions and are conducted in a conversation or discussion format. Semi-structured interviews are more like natural conversations than written questionnaires (Durantxi, 2011). In semi-structured interviews, the interviewer uses open-ended questions "to discuss some topics in more detail" (Hancock et al., 2007). The other types of interviews are unstructured and structured interviews. Unstructured interviews, in which the interviewer interviews without any (pre) planning, could be equivalent to unplanned conversations. This type of interview has some disadvantages. For example, ensuring that the conversation will produce data needed for the research is challenging, and frequently a second or even third interview will be needed. Researchers need to lead the conversation to a point to extract the required data. Consequently, collecting data through unstructured interviews in qualitative research would be very difficult and may not enable the researcher to gain the desired information.

Semi-structured interviews were selected based on their flexibility and suitability for this study. According to Chua (2012), several criteria should be

considered when conducting semi-structured interviews. First, questions may be delivered using different language forms, acknowledging that not all respondents may be familiar with specific terms or terminology. Second, the researcher is able to modify or rephrase questions to enhance respondents' understanding. Third, the level of language can be adjusted during the interview to ensure clarity and comprehension. In this study, the researcher assisted respondents in understanding the questions and employed brief prompts and encouragement to elicit more detailed responses. This approach facilitates the collection of more accurate and in-depth data. The interview questions used in this study were developed based on previous literature.

As the interviews were conducted during the Movement Control Order (MCO), all sessions with respondents from the state public libraries and the Education Resources and Technology Sector (SSTP) were carried out online via Google Meet in an informal setting. Each interview session was scheduled individually by the researcher. The interviews were conducted in the Malay language at the request of the respondents, as they were more comfortable expressing and elaborating on their responses in Malay. All interview sessions were recorded, downloaded, and securely stored in Google Drive. Before each session, the researcher obtained the respondents' consent to record the interviews.

The researcher also made an initiative to take notes as a backup because of a bad internet connection. The recorded interviews were then transcribed and translated from Malay to English for documentation. It consists of 27 questions for state public library officers and 20 questions for Education Resources and Technology Sector (SSTP) officers.

3.7 Qualitative Research Approach

A data analysis approach is crucial for research, particularly while gathering data. The interview session was recorded in Google Meet, and some notes were taken.

3.7.1 Thematic Analysis

Thematic analysis is a widely used, flexible, and accessible method for analysing qualitative data (Braun & Clarke, 2012). Simply put, it helps researchers make sense of rich, complex data by identifying and organizing important ideas, patterns, and themes (Nielsen Norman Group, 2023). There are several ways to approach thematic analysis. One option is using software, such as Atlas. ti, NVivo, or Aurelius, which can handle large amounts of data, assist with coding, and even transcribe audio or video recordings. While efficient, software often comes with high subscription costs, requires learning, and can be time-consuming.

Another approach is journaling, which involves manually annotating and highlighting data while recording researchers' reflections and thought processes. This method is flexible, low-cost, and allows researchers to think deeply about the data as they work. A third method is affinity diagramming, where data segments are cut or highlighted and grouped into meaningful clusters until patterns emerge. This approach works well collaboratively and can speed up theme identification. For this study, journaling was chosen, as it allowed the researcher to engage deeply with the data, reflect on ideas, and carefully document how themes were formed.

The study used thematic analysis in a systematic and step-by-step process. Data analysis began after interviews with 27 respondents. The recordings were transcribed, and the researcher carefully familiarized themselves with the data through repeated reading, allowing a deep understanding and immersion in the participants' experiences. Next, the data were manually coded for each respondent, following the six-phase framework of Braun & Clarke (2006). Codes were developed based on the transcripts and the study's objectives, which focused on digital information literacy programs in the state public libraries and the school resource centers. Meaningful text segments were then grouped into broader categories. Recurring patterns were examined, leading to the development of key themes that addressed the research questions. To ensure the analysis was trustworthy, member checking with respondents and peer

debriefing with the supervisor were conducted throughout the process. Thematic analysis was particularly suitable for this study because it allowed the researcher to explore not just what respondents said, but also how they behaved, their knowledge, and their perspectives in depth

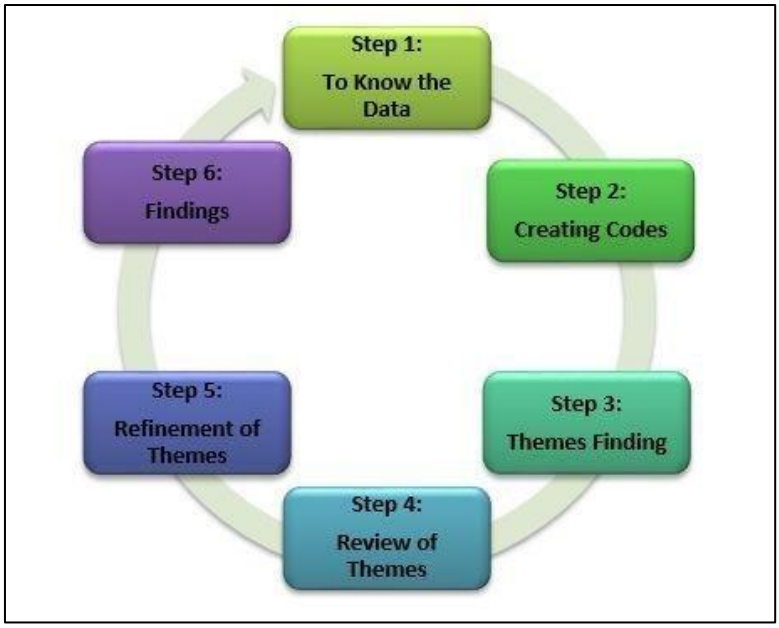

Figure 3.4 Six-Phrase Framework of Thematic Analysis by Braun and Clarke (2006)

To further organize and interpret the data, Miles and Huberman's (1994) interactive model was used. This model has three main components:

(a) Data condensation – selecting, simplifying, and transforming the collected data from transcripts, notes, and documents to highlight the most important information.
(b) Data display – arranging the condensed data in a way that makes patterns, trends, and connections visible. This helps the researcher understand what is happening and decide on the next steps.
(c) Conclusion drawing and verification – interpreting patterns, explanations, and causal relationships to make meaningful conclusions from the data.

As a result, the researcher was able to obtain quality data that is closely aligned with the objectives and research questions of this study, particularly concerning the collaboration in digital information literacy between state public libraries and school resource centers.

The COVID-19 pandemic changed how teaching, learning, and research could be conducted, limiting face-to-face interactions. This study was carried out during this period, making online qualitative interviews the most practical method. With

technology becoming more sophisticated and interconnected (Wolff, 2021), research into digital information literacy in libraries and school centers is particularly timely. This study captures the experiences of respondents during a period of rapid change, while also providing insights that can help shape future initiatives.

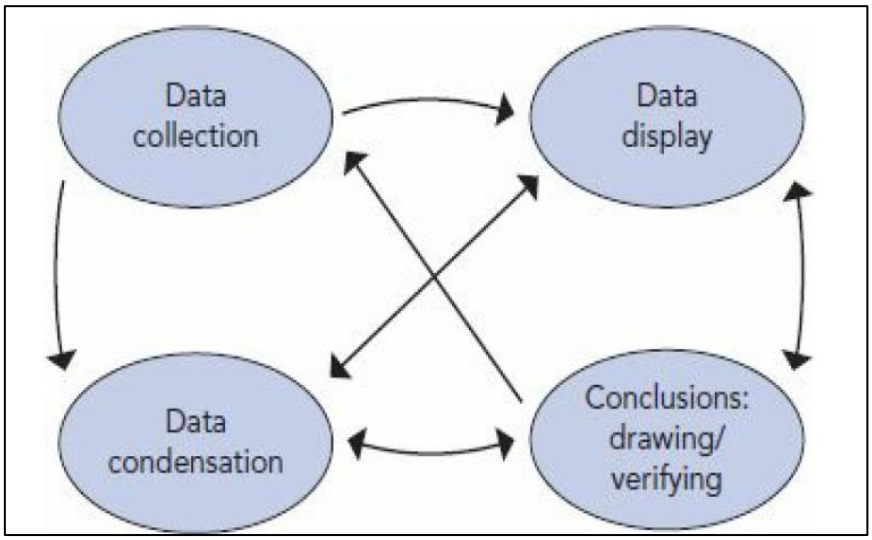

Figure 3.5 Components of Data Analysis: Interactive Model Miles, M. B., & Huberman, A. M. (1994)

3.8 Trustworthiness

According to Lincoln and Guba (1985), as cited in Allison (2013), four criteria have been proposed for assessing the trustworthiness of qualitative research. The four alternatives are credibility, dependability, conformability, and transferability. Trustworthiness provides the researchers, especially qualitative researchers, with a set of tools by which they can illustrate the worth of their project (Given & Saumure, 2008). Chua (2020) defined validity as the correlation value between measurement and the true value of a variable. If a measurement accurately reflects the true value of the variable, the value of the correlation will be high, and the research will have high quality. The credibility of the research depends on five effects, which are concept effect, location effect, focus effect, elite effect, and situational effect. Allison (2013) mentioned that establishing trustworthiness in qualitative research consists of four elements: credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985).

To enhance the credibility and depth of findings, this study used a variety of triangulation techniques. Data source triangulation was accomplished by collecting information from a variety of respondents, including 13 SSTP officers and 14 public

library officers, who had different but complementary perspectives on digital information literacy (DIL) initiatives and collaborative programs. Methodological triangulation was achieved through a combination of semi-structured interviews conducted via Google Meet, additional communication via WhatsApp, including text messages and voice notes, and follow-up interactions to clarify or expand on initial responses. This multi-method approach allowed for cross-validation of information, reduced the possibility of bias, and provided a deeper and more nuanced understanding of the phenomenon under study.

To establish trustworthiness in qualitative research, Allison (2013) has emphasized these four points: credibility, transferability, dependability, and confirmability.

3.8.1 Confirmability

Confirmability in qualitative research refers to the degree to which the findings are grounded in the data rather than influenced by the researcher's biases or preconceptions (Allison, 2013). In this study, researchers ensure the validity and impartiality of the data by employing a reflective approach, critically examining respondents' assumptions, beliefs, and potential biases to assess how these factors may affect the research processes and outcomes. This reflective practice ensures that conclusions are based on the data itself rather than on subjective interpretations. Additionally, the researchers' 14 years of experience as assistant librarians contribute to refining the analysis process, offering a deeper, more informed perspective.

3.8.2 Transferability

Transferability in qualitative research refers to the ability to apply findings to similar contexts, rather than broadly generalizing the results (Jensen, 2008). In this study, to enhance transferability, the researcher considered two key factors: (a) the connection of respondents to the school resource center and state public library, and (b) the clear definition of the contextual boundaries, specifically the role of the Educational Resources and Technology Sector (SSTP) as the policymaker. Essentially, transferability in this study is about determining how this study's findings can be applied to other contexts with similar characteristics, rather than making broad generalisations.

3.8.3 Credibility

Credibility involves evaluating research findings from the perspectives of participants and readers; it is rooted in the ability to be trusted and believed. One effective strategy for enhancing credibility is to involve respondents in the post-fact verification of researchers' interpretations (Stahl & King, 2020). To establish credibility, researchers must ensure that participants are accurately recognized and profiled (Elo et al., 2014).

In this study, the researcher collected basic demographic data, including age, gender, education level, and occupation, to better understand each respondent's background. Additionally, respondents were informed about how their data would be used, thereby fostering trust and transparency. Additionally, the experience of state public library officers and Educational Resources and Technology Sector (SSTP) officers in their job scope and careers further underscores their credibility as qualified respondents.

3.8.4 Dependability

Dependability is concerned with how the research is carried out; proof that the methods and procedures used are applied suitably and pertinently to the subject must be presented. (Allison, 2013). The idea of reliability in qualitative research is similar to that in quantitative research. It speaks to the consistency and stability of the study's conclusions. For this study, the research process is documented in detail, including data collection methods, analysis procedures, and any changes made during the study, thereby supporting its dependability.

Table 3.9
The Research Trustworthiness of This Study

Element of Trustworthiness	Action
Confirmability	Throughout the research process, the researcher does journaling in which the researcher has to write down notes and thoughts that related to related to the research topic and respondents. This action helps the researcher to avoid bias.
Transferability	The researcher gives an in-depth explanation of the setting, participants, and background of the study.
Credibility	To conduct a semi-structured interview, the researcher prepared an interview question as a guide for the respondent, and each respondent was profiled accordingly.
Dependability	A sustainable framework for the future use of state public libraries and school resource centers for digital information literacy is proposed.

Ensuring that all of the above are taken into account is very important to ensure that researchers confirm whether the findings obtained have the same meaning as what is desired (Stahl & King, 2020). The research trustworthiness of this study is mentioned in Table 3.9 above.

3.9 Ethical Approval

The ethical approval section in the thesis underscores the commitment to research integrity. It assures compliance with ethical standards, protecting participants' rights and ensuring data confidentiality. This ethical framework reinforces the study's credibility, essential for maintaining trust and upholding ethical standards in the research process.

3.9.1 Universiti Teknologi MARA (UiTM) Approval

Upon conducting this study, it went to other organizational ethical and administrative approvals from the Research Ethics Committee, *Universiti Teknologi MARA* (UiTM), before the data collection and supposedly after the defence of the research proposal. This application is mandatory for human research conducted by UiTM staff, UiTM postgraduate students, UiTM undergraduate students (Final Year Projects), and external researchers embarking on research in UiTM premises and or

UiTM students/staff (Research Ethics Committee UiTM). In this regard, the researcher is a UiTM postgraduate student and must obtain an application. The application of research ethics is important to protect the rights and well-being of respondents, UiTM, and researchers. Following the successful defence of the research proposal on May 19, 2021, the researcher applied for research ethics approval on July 9, 2021, which was subsequently granted on February 4, 2022. Researchers must submit a research proposal along with forms REC2, REC3, REC4, REC5, REC11, and interview questions in Malay/ English for further action by the secretariat. The researcher next applied for approval, namely from the state public libraries and the Ministry of Education Malaysia, and explained the details below.

3.9.2 State Public Library Approval

Researchers sent an application letter to each state public library via email. The email included the application letter, a student endorsement form, interview questions, and a respondent permission form. To confirm receipt of the application letter, the researcher followed up with a phone call to each state public library. The libraries then nominated their officers for interview purposes. The researcher subsequently contacted the nominated officers via phone or WhatsApp to schedule appointments. Once the appointment date was confirmed, the Google Meet link and relevant appointment details were sent to the officers. Additionally, a set of interview questions was provided to the respondents to give them a preview of what to expect during the interview session. Library officers were identified using the codes outlined below.

Table 3.10
Coding for State Public Library Respondent

State Public Library	Code
Perlis	SPL1
Kedah	SPL 2
Pulau Pinang	SPL 3
Perak	SPL 4
Selangor	SPL 5
Kuala Lumpur	SPL 6
Negeri Sembilan	SPL 7
Melaka	SPL 8

State Public Library	Code
Johor	SPL 9
Pahang	SPL 10
Kelantan	SPL 11
Terengganu	SPL 12
Sabah	SPL 13
Sarawak	SPL 14

3.9.3 Ministry of Education Approval

For the Educational Resources and Technology Sector (SSTP) and school resource centers, researchers are required to submit an application form through the Ministry of Education's online system, ERAS 2.0. Upon receiving approval from the Ministry, the researcher must download the approval letter, which is then submitted along with an application letter, student confirmation letter, respondent consent form, and survey questions to the State Education Department in each state. Following approval from the State Education Department, the same set of documents, together with the department's approval letter, is forwarded to the respective SSTP. Subsequently, the researcher contacts the SSTP via email to confirm the officer who will participate in the interview and survey sessions.

Next, the researcher contacted the officers via phone or WhatsApp to schedule interview dates and to share the survey link, which was hosted on Google Meet. During the introduction, the researcher explained that the purpose of the study was to investigate digital information literacy in school resource centers. The findings are intended to inform cooperative initiatives for digital information literacy between state public libraries and school resource centers and to develop a standardized framework for joint ventures between these entities. Participants were assured that the study was risk-free and were invited to seek clarification or additional information if needed. The researcher emphasized that all information provided would be used solely for research purposes and that responses would remain anonymous.

A brief overview of the study's content was provided, along with the researcher's contact information for any follow-up inquiries. In addition, the researcher attended a discussion session with the Educational Resources and Technology Sector of the Ministry of Education Malaysia to explain the study to management. The session was successful, with management expressing full support for the research and indicating

that it was expected to benefit all parties within the Ministry of Education. Respondents were assigned codes as shown in Table 3.11.

Table 3.11
Coding for Educational Resources and Technology Sector (SSTP) Respondent

SSTP	Code
Perlis	SSTP 1
Kedah	SSTP 2
Pulau Pinang	SSTP 3
Perak	SSTP 4
Selangor	SSTP 5
Kuala Lumpur	SSTP 6
Negeri Sembilan	SSTP 7
Melaka	SSTP 8
Johor	SSTP 9
Pahang	SSTP 10
Kelantan	SSTP 11
Terengganu	SSTP 12
Sabah	SSTP 13
Sarawak	SSTP 14

3.10 Organization of the Chapter

This study adopts a qualitative research approach to explore collaborative digital information literacy initiatives between Malaysian State Public Libraries and School Resource Centers. The selection of a qualitative design is particularly appropriate, as it facilitates a deep and nuanced exploration of .participants lived experiences, perspectives, and interpretations of digital information literacy practices. Unlike quantitative methods, which primarily focus on numerical measurement and generalization, the qualitative approach allows the researcher to capture the complexity and context of collaborative efforts, as well as to examine the underlying factors that contribute to the sustainability of such initiatives, dimensions that are often difficult to quantify.

The focus of this study is on officers from Malaysian state public libraries and officers from the Educational Resources and Technology Sector, who are directly involved in digital information literacy initiatives. These participants were selected using purposive sampling, a technique that enables the researcher to deliberately choose

individuals who possess relevant expertise, experience, and knowledge related to the research topic. By targeting participants who are actively engaged in collaborative activities, the study ensures that the data collected are both meaningful and directly aligned with the research objectives.

Before conducting the interviews, ethical approval was obtained from the relevant authorities to ensure that the study adhered to established research ethics and standards. Participants were fully informed about the purpose and scope of the study, as well as the voluntary nature of their involvement. They were also made aware of their right to withdraw from the study at any stage without any negative consequences. To maintain confidentiality and protect participants' privacy, all identifying information was anonymized, and data were handled with strict care and responsibility.

Data collection was carried out through structured interviews, guided by a carefully developed interview protocol based on the four research questions of the study. This ensured a clear alignment between the study's objectives and the data collection process. Although the interviews followed a structured format, they also allowed for a degree of flexibility, enabling participants to elaborate on their responses and share detailed insights into their experiences and perspectives. This balance between structure and openness helped to generate rich, in-depth data.

The collected data were analyzed using thematic analysis, a method well-suited for identifying, analyzing, and interpreting patterns within qualitative data. Interviews conducted online via the Google Meet platform were recorded and transcribed verbatim to preserve the accuracy and integrity of participants' responses. The transcripts were then systematically coded, with similar ideas and patterns grouped into broader themes. These themes were continuously reviewed, compared, and refined throughout the analysis process to ensure their relevance and alignment with the research objectives.

To enhance the trustworthiness and rigor of the study, several validation strategies were employed. Member checking was conducted by sharing the findings or interpretations with participants to verify the accuracy of the data and to ensure that their perspectives were correctly represented. In addition, peer debriefing was carried out, allowing colleagues or experts to review and provide feedback on the research process and findings, thereby strengthening the study's credibility and reliability.

In conclusion, the qualitative approach adopted in this study is highly suitable for generating rich, detailed, and contextually grounded insights into collaborative digital information literacy practices. It enables a comprehensive understanding of how

such initiatives are implemented and sustained within the Malaysian educational and library context. The findings derived from this approach offer valuable contributions to both theory and practice. The following chapter presents and discusses the key findings of this study in detail.

CHAPTER 4
ANALYSIS AND FINDINGS

4.1 Introduction

Chapter Four presents the findings and discussion, representing the culmination of the research process through the systematic analysis and interpretation of collected data. This chapter highlights the key outcomes and insights derived from the study, linking them directly to the research objectives. Specifically, it addresses Research Objective 1, which aims to analyze existing collaborative digital information literacy initiatives in Malaysia State Public Libraries; Research Objective 2, which investigates collaborative digital information literacy initiatives in Malaysian public school resource centers; Research Objective 3, which explores the factors influencing the implementation of digital information literacy towards sustainable collaborative initiatives between State Public Libraries and School Resource Centers; and Research Objective 4, which identifies the dynamic collaborative factors that support the sustainability of digital information literacy initiatives between these institutions. In addition, this chapter provides a detailed account of the study's response rate, offering insight into the level of participation and engagement among respondents. It also presents the demographic profiles of the participants, including relevant background characteristics that may influence their perspectives. Descriptive analysis is employed to summarize and organize the data, enabling a clear and systematic presentation of the findings. The data for this study were collected through online interviews conducted via Google Meet, involving State Public Library officers and State Education Technology Division officers. The use of online interviews allowed for flexibility and accessibility while ensuring comprehensive data collection from geographically dispersed participants. This chapter systematically presents and discusses the views, experiences, and opinions of respondents regarding digital information literacy with particular emphasis on collaborative practices, challenges, and opportunities.

Furthermore, the discussion integrates the findings with existing literature and theoretical perspectives, providing a deeper interpretation and critical analysis. By doing so, this chapter not only reports the results but also situates them within the broader academic context, highlighting their implications for policy, practice, and future research. Chapter Four serves as a critical component of the study, offering a coherent and evidence-based understanding of digital information literacy initiatives and their collaborative dynamics in Malaysia.

4.1.1 State Public Library Institutional Background

Fourteen Malaysian state public libraries were selected as case studies. Each state public library operates as a statutory body under its respective State Library Corporation Enactment and receives joint financial allocations from the state and federal governments (50:50 basis). These allocations support staffing, collections, infrastructure, activities, and training factors directly influencing digital information literacy implementation capacity. All the state public libraries manage networks comprising branch, district, community, mobile, and village libraries. This network structure strengthens outreach capacity, particularly for rural schools and School Resource Centers. The availability of mobile libraries and community libraries enhances accessibility and supports collaborative digital information literacy activities beyond urban centers.

In terms of digital information literacy capacity, several of the state public libraries provide, 1) computer labs and ICT facilities; 2) access to subscribed databases and digital collections; 3) u-Pustaka access terminals; 4) Makerspaces and technology-based learning spaces, and advisory services for school resource center development.

Twelve of the fourteen state public libraries are members of the U-Pustaka Consortium, a national collaborative initiative supported by the National Library of Malaysia and the Malaysian Communications and Multimedia Commission. U-Pustaka provides free membership to Malaysians and offers access to physical and digital resources, including e-books, journals, databases, and government publications. Participation in U-Pustaka significantly strengthens the state public libraries' digital content provision and underpins their digital information literacy programs, particularly in training users to access and evaluate online information resources.

The institutional structure, funding model, ICT facilities, and consortium membership collectively form the foundational capacity for digital information collaboration between the state public libraries and the school resource centers. Figure 4.1 below shows the distribution of state public libraries throughout Malaysia.

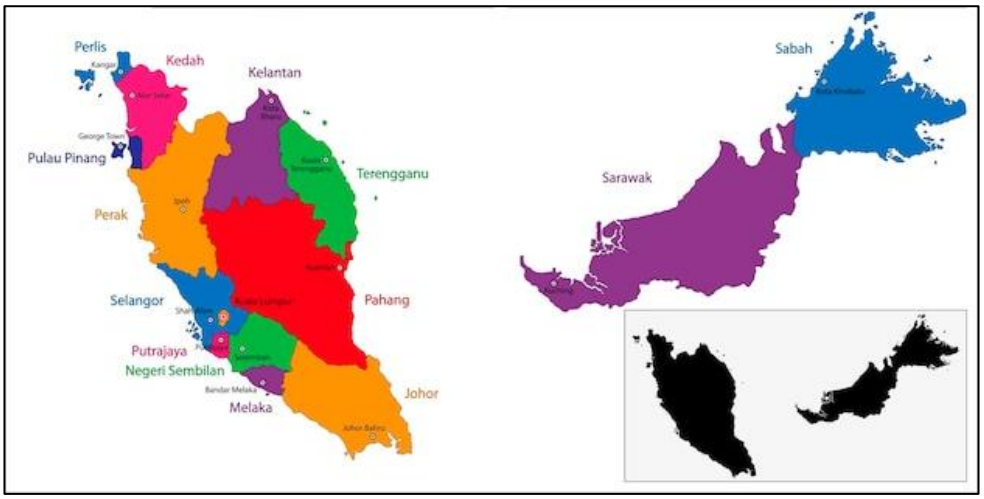

Figure 4.1 The Distribution of State Public Libraries Throughout Malaysia

4.1.2 Education Resource and Technology Sector (SSTP) Institution Background

The Education Resource and Technology Sector (SSTP) operate under the Ministry of Education Malaysia and is responsible for 1) planning and coordinating educational technology programs; 2) developing and monitoring School Resource Centers; 3) training library and media teachers, and 4) supporting ICT integration in teaching and learning. The SSTP functions as a strategic intermediary between schools and state public libraries. Its involvement enhances coordination, legitimizes collaborative programs, and supports digital information literacy integration within formal education structures. The institutional mandate of SSTP strengthens the sustainability of collaborative digital information literacy initiatives by aligning library programs with educational policy and teacher training frameworks.

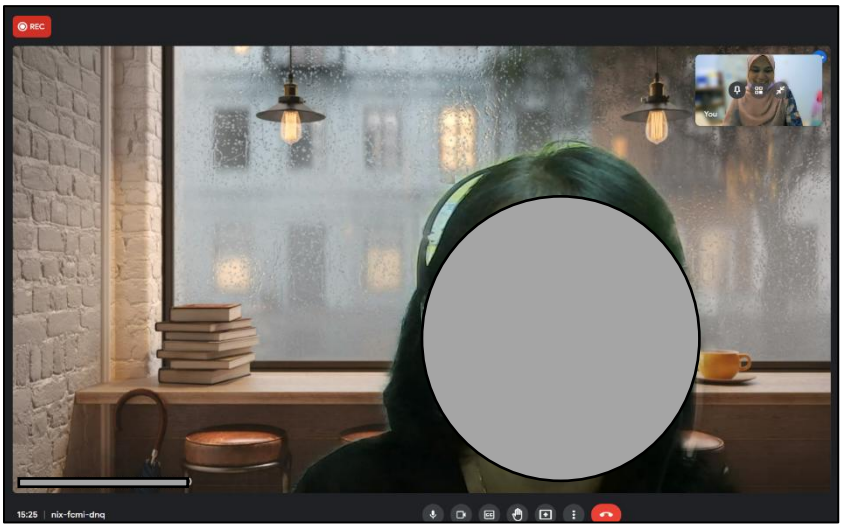

Figure 4.2 Online Interview Session with Education Resource and Technology Sector (SSTP) Respondent

4.2 Demographic Profile of Respondents

The demographic profile of the respondents provides important contextual information about the respondents involved in the study. Understanding the demographic characteristics of respondents can help researchers analyze several factors, namely age, gender, education, and work experience, that can affect their statements and research topics. The respondents consist of library officer which is whether a librarian, an assistant librarian, or a librarian assistant. As for the SSTP officer, teachers serve as the officers in SSTP. All selected participants agreed to take part in the interview, except for one individual who declined to participate.

As mentioned in Chapter 3, this study focuses on state public library officers and SSTP officers who are directly involved in digital information literacy initiatives. Participants were selected through purposive sampling, as they possess the relevant background knowledge and practical experience in digital information literacy and collaborative activities. Before conducting the interviews, ethical approval was obtained from the relevant authority. All participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any stage without consequence. To ensure confidentiality, the identities of all respondents were kept anonymous. The table below shows the demographic information of the respondents who participated in this online interview session.

Table 4.1
Respondent's Demographic Information

Category	State Public Library (n=14)	SSTP (n=13)
Role	Librarian, Assistant Librarian, Library Assistant	SSTP Officers (Education Resource & Technology)
Gender	7 Male, 7 Female	7 Male, 6 Female
Age Range	25–50 years	30–55 years
Years Of Experience	5–21+ years in librarianship	Extensive experience in education technology & school resource center development
Qualification	Degree/Diploma in Information Management (mainly from Universiti Teknologi MARA)	Education, Educational Technology, and related fields

Table 4.1 presents the demographic profiles of the respondents, including their gender, age, academic qualifications, professional experience, and educational background. All 27 respondents who participated in the interview sessions had at least five years of experience in library-related activities, including digital information literacy. The comparison between respondents from the state public libraries and the SSTP officers reveals both similarities and notable distinctions in their demographic and professional profiles.

In terms of roles, state public library respondents consist of librarians, assistant librarians, and library assistants, reflecting a structure centered on operational and service-oriented responsibilities. In contrast, SSTP officers are primarily engaged in education resource and technology functions, indicating a more specialized and strategic role within the educational ecosystem. This distinction suggests that while public library staff are directly involved in information service practices, SSTP officers are more focused on the development and integration of educational resources and technologies. Regarding gender distribution, both groups demonstrate near parity, with an equal number of male and female respondents in the public library sample and only a slight imbalance in the SSTP group. This balance indicates a relatively inclusive workforce in both sectors and suggests that gender is not a distinguishing factor between the two groups.

The age range of respondents highlights a difference in career stages. The state public library staff range from 25 to 50 years, indicating the presence of early-career to

mid-career professionals. Conversely, SSTP officers fall within a slightly older range of 30 to 55 years, implying a more experienced cohort. This is further supported by the description of SSTP officers as having extensive experience in educational technology and school resource center development. In terms of professional experience, public library respondents report from 5 to over 21 years in librarianship, demonstrating considerable experience within a defined field. SSTP officers are characterized by extensive and likely diverse experience across education and technology domains. This suggests that SSTP roles may have broader competencies and cross-disciplinary expertise compared to the more specialized career path of librarians.

The educational qualifications of the two groups further reinforce these differences. The state public library staff predominantly hold degrees or diplomas in Information Management, with many graduating from *Universiti Teknologi MARA*, indicating a strong alignment with a specific academic discipline. On the other hand, SSTP officers possess qualifications in education, educational technology, and related fields, reflecting a more interdisciplinary academic background that supports their multifaceted roles.



Figure 4.3 Online Interview Session with State Public Library Respondent

The findings indicate that while both groups share similarities in gender distribution and general professional experience, they differ significantly in terms of role orientation, academic background, and career stage. Public library staff are characterized by specialized training and a service-oriented focus, whereas SSTP officers exhibit broader expertise and a strategic orientation within the educational and

technological landscape. These differences have important implications for collaboration, professional development, and the implementation of information and resource services across public and educational institutions.

4.3 Thematic Analysis and Findings

This chapter presents the findings in alignment with the four research questions (RQ1–RQ4). Section 4.3.1 addresses RQ1 by examining the current Digital Information Literacy (DIL) efforts implemented in Malaysian state public libraries. Section 4.3.2 addresses RQ2 by examining existing DIL initiatives in Malaysian Public School Resource Centers. Section 4.3.3 addresses RQ3 by analysing how DIL implementation factors contribute to strengthening sustainable collaborative initiatives between State Public Libraries and School Resource Centers. Finally, Section 4.3.4 addresses RQ4 by examining whether collaborative dynamics support the sustainability of DIL initiatives across these institutions.

This structure ensures that each theme is systematically mapped to the corresponding research question, thereby providing a coherent and focused analysis of Digital Information Literacy practices and collaborative sustainability in the Malaysian context. A total of 14 Library officers and 13 Education Resource and Technology Sector (SSTP) officers were involved in this interview session. The data collection process involves interviews with respondents. During the interview session, respondents also shared about materials, teaching aids, or modules that have been used in applying digital information literacy. This data is also helpful in addition to the existing data obtained from the interview session.

4.3.1 RQ1: What are the Current Digital Information Literacy (DIL) Efforts in Malaysia State Public Libraries?

The objective of RQ1 is to analyze existing collaborative Digital Information Literacy (DIL) initiatives in the Malaysian state public libraries. Below is the finding based on the online interview via Google Meet with the state public library officers. The findings reveal that collaboration primarily occurs through structured programs, resource-sharing practices, and institutional support mechanisms. The impact of these

initiatives spans library staff, teachers, and students, demonstrating both operational and strategic benefits.

a) Activities

Findings indicate that collaborative digital information literacy initiatives between the state public libraries and the school resource centers are primarily implemented through structured programmes, particularly workshops, school visits, and promotional activities. These initiatives commonly include information literacy workshops, multimedia training, research writing sessions, e-resource promotion, NILAM-related activities, and the school resource center management workshops. Most collaborations are activity-driven and often aligned with school-based events or upon invitation from schools. One respondent explained:

> *"Recently, we have been to three schools…to hold a target A+, SPM A+ workshop where we have revealed to students how to find information or even notes and exercises in the u-Library using i-learn ace. During the study tour, we revealed to the students the ways to access reading materials through e-journals and OPAC through the library's website."*
>
> *SPL 1*

In the meantime, SPL 1 also added that the State Public Library conducts activities at schools at the invitation of schools to fill slots in certain programs supported by SPL 8 and SPL 9.

> *"The activities that have been carried out between the public library and the school resource center are doing activities in conjunction with school activities, for example, School Resource Center Day and the NILAM Program as well as visits to promote e-resources and library services on a regular basis."*
>
> *SPL 1*

> *"As I said before, we do workshops or classes in the mobile library as well as weeks of school time."*
>
> *SPL 8*

> *"Visits, exhibitions, PSS management workshops, creativity activities"*
>
> *SPL 9*

This response suggests that digital information literacy initiatives are program-based rather than formally embedded in the curriculum. While such structured activities

provide exposure to digital platforms and search strategies, they are often episodic and driven by an event such as a special program, etc. This suggests that digital information literacy integration remains incremental, largely dependent on school invitations and scheduled events rather than systematic or scheduled long-term planning.

Next, some respondents demonstrated a broader interpretation of digital information literacy by incorporating multimedia skills, new technologies, and research competencies into their collaborative programs.

> *"First of all, we have conducted an information literacy workshop, then we also held a multimedia workshop and a 3D printer workshop. Before this, we also held an Arduino workshop for GPM, a research writing workshop was held here as well."*
>
> *SPL 2*

> *"Ok, we have cooperatively, it can be said that every time there is an application from the school resource center to conduct a visit session with the library, or we ourselves will go to school to conduct workshops or lectures, not lectures, workshops, or training sessions on the use of databases. We also have a list of questions to help you get familiar with digital marketing, the concept of digital marketing."*
>
> *SPL 4*

These initiatives reflect an expanded digital information literacy framework that goes beyond basic information retrieval to new areas such as digital productivity, technological fluency, and academic research skills. By introducing tools such as databases and digital technologies, state public libraries are positioning themselves as facilitators to strengthen the readiness of students and teachers for digital education and environments.

Apart from that, in certain states, the findings show that digital information literacy initiatives are strengthened with institutional support from state education authorities and committees from various agencies.

> *"In fact, Alhamdulillah for us in the state…, we have strong support from the State Education Department, and it just so happens that we have the Pahang State Level Reading Committee, which consists of the JPN itself, representatives from the state government, finance division, and so on. And in that, there are also representatives from librarians from IPTA and IPTS who are in the state of Pahang, especially Kuantan, and if in terms of this activity, there is a lot of activity that we have done. Even if we implement it in the library as well, indeed, the JPN will help; among them, we have Night at the Library, we have information literacy, digital literacy, and we have programs that have a basic cultural foundation. And we also have activities that are geared towards history, so that these children have a patriotic spirit, and they need to know what is related to the history of the country.*
>
> *SPL 10*

This suggests that digital information literacy implementation is more sustainable when supported by governance structures and interagency collaboration. Institutional involvement enhances coordination, legitimacy, and strategic direction. Such systemic support suggests that successful digital information literacy practices are not only operational but are reinforced at the policy and administrative levels to ensure their sustainability over time.

The study findings also show that resource sharing mechanisms, especially the group lending scheme provided by state public libraries, function as a strategic intervention to overcome the budgetary constraints faced by school resource centres.

> *"There are a lot of collaboration programs that we are having with the school resource center. Even so, we also open space for the school resource center to become our group loan members, where group loan members at PPAP are free. They can come, register as members, and they can borrow in bundles. 100 to 300 books in one to three months. This is because when we made a site visit to the school resource center, they did not have enough material, up-to-date material on their school resource center. And when talking to the teacher, with principals, library, and media teachers, it can be concluded that they do not have a large amount of money to make book purchases. So, what the library can do is to provide material loans so that these students get space, get the opportunity to use materials that are in the library but in their own library."*
>
> *SPL 10*

This practice demonstrates the adaptive role of state public libraries in addressing structural inequalities in funding school resource centers for a variety of purposes. By providing bulk loans and up-to-date materials, state public libraries increase students' access to relevant information resources. Access is a fundamental

component of digital information literacy, and this initiative indirectly strengthens students' opportunities to interact with reliable and diverse materials.

The study findings also show that the digital information literacy initiative is closely linked to reading programs and national digital platforms, especially u-Pustaka under the National Library of Malaysia and NILAM (Ministry of Education Malaysia).

> *"...children always come to the Perpustakaan Bestari to use tablets and computers. For what purpose we are not sure, but we have enough needs at our state public library. In addition, we have provided computers for the convenience of the use of u-Pustaka."*
>
> *SPL 1*

This shows that the integration of u-Pustaka access and NILAM activities reflects the alignment between state public library initiatives and national education objectives. By combining digital access and reading promotion, libraries connect traditional and digital literacy. This integration can strengthen lifelong learning habits by improving digital navigation and information search skills among students, teachers, and library staff.

The study also showed that state public libraries provide technological infrastructure and teaching materials to support the teaching and learning process of digital information literacy. Respondents reported the availability of computer labs (SPL 8), briefing equipment such as slides and promotional materials (SPL 13), and access to digital databases, including Lincoln Corner resources (e.g., JSTOR, ProQuest). In addition, u-Pustaka workshops are organized periodically. Below is the insight from the respondent.

> *"..., we have provided computers for the convenience of the use of u-Pustaka."*
>
> *SPL 1*

In this regard, the provision of appropriate infrastructure from state public libraries strengthens the enabling environment for digital information literacy. Access to devices, databases, and guided workshops ensures that the development of digital information literacy is supported by tangible resources. This also reflects the dual role of state public libraries as information providers and digital access facilitators.

In addition, the study results also show that collaborative digital information literacy initiatives generate measurable and tangible benefits for library staff, teachers, students, and the institutions involved. Respondents reported the following:

i) Such initiatives enhance the knowledge base and professional competencies of library staff in delivering and promoting services, facilities, and information resources that are aligned with school education. They also facilitate meaningful engagement with teachers and students, thereby broadening librarians' professional scope and providing practical experience in collaborating with School Resource Centers (SRCs).

ii) Through these initiatives, teachers gain greater awareness of the resources and services offered by the state public library. They are thus able to utilise these resources to strengthen instructional materials and enrich students' learning experiences. Furthermore, a strong collaborative relationship between the state public library and the School Resource Center facilitates teachers' access to curriculum-related support, reference materials, and participation in programmes organised by the state public library.

iii) Programmes such as *Nadi Ilmu Amalan Membaca* (NILAM) and e-resource promotional visits provide students with opportunities to identify, access, and effectively utilise the resources available at the state public library. These activities contribute to the development of information literacy, research competencies, and technological proficiency. Moreover, they position the library as a vital source of knowledge, thereby fostering students' interest in reading and lifelong learning. The NILAM programme, in particular, aims to enhance primary school students' reading performance (Kangathevi & Ainul Md Zamin, 2022) and to cultivate a sustained reading culture as part of the lifelong learning process (KPM, 2024).

iv) The establishment of strategic networking and collaboration between the state public library and schools, particularly School Resource Centers, strengthens institutional partnerships and resource sharing.

v) Knowledge-sharing initiatives between library staff and teacher-librarians or media teachers contribute to the enhancement of professional knowledge and competencies in librarianship and information management.

vi) These initiatives equip students with the necessary skills to independently locate, evaluate, and select appropriate information resources for their academic assignments as they progress to secondary and higher education. A clear and comprehensive understanding of information-seeking strategies is essential for academic success at advanced levels of study.

vii) The programmes contribute to measurable improvements in information-searching skills among both teachers and students.

viii) Library staff benefit from continuous professional development, acquiring new knowledge and refining their skills through engagement with programme participants.

ix) These initiatives contribute to a statistically significant increase in library usage, including the number of registered users, physical visits, and participation in programmes organised by the state public library.

These impacts were found to affect multiple levels or groups. At the professional level, library staff refined service delivery and promotional capabilities to users. At the individual level, students developed research skills and technology use, while teachers gained awareness of available resources. At the institutional level, increased statistics and participation indicated increased visibility and relevance of state public libraries in the education ecosystem. These results indicate that digital information literacy collaborations will yield operational gains, such as skills and usage, as well as strategic benefits, such as networking and institutional positioning.

The findings discussed above reveal several consistent patterns across state public libraries in Malaysia. First, digital information literacy programs or activities are workshop-based and event-driven. Second, some libraries adopt a broader digital information literacy framework that integrates technology and research skills. Third, Institutional and policy support strengthen the sustainability of the program. Fourth, resource-sharing mechanisms between organizations address financial and material constraints in schools. Finally, Positive outcomes are clearly visible across students, teachers, and library staff.

The conclusion that can be drawn is that State Public Libraries in Malaysia function as active partners in advancing Digital Information Literacy through structured programs, promotion of digital platforms, infrastructural support, and collaborative networks with School Resource Centers. While many initiatives remain activity-oriented rather than curriculum-integrated, the collaborative ecosystem shows significant potential to strengthen the development of digital information literacy in the national education context.

b) Collaboration

The form of collaboration that library staff expects to succeed in digital information literacy in school is always working together to make activities. Being in constant contact and being familiar with the library and media teacher can strengthen digital information literacy, and can convey it to users, especially to young children, so that later they will finish school. Thus, the library staff also hopes that, if possible, schools across the states can visit the library to participate in this program and use it in their schools. Not so much to stop there. Good cooperation from teachers toward the state public library and the SSTP makes the library staff happy to serve the schools. A short cost workshop for participants, expertise sharing to improve knowledge for staff and students to gain full exposure to digital information literacy knowledge, will contribute to the successful digital information literacy implementation at schools.

> *"If the cooperation between the library and the school, I think, the library and education go hand in hand. But when it is restructured, it is placed directly under the State Education Department, even though that part is still there. So, I think maybe with the cooperation between the library and the department that manages the PSS, maybe we can help in terms of providing briefings or partnerships with PSS teachers about resource center management, briefings about information literacy, even digital information literacy, and another thing we see is, maybe they have constraints in terms of because the teacher, they have time to teach and so on. With the help of our team, we can create an environment that will serve both students and teachers. Maybe we can help with this collaboration. And, as I said, if the school needs any help with the development of their PSS, they can just come to the library for advice or to get help. So far, Alhamdulillah, in PPAP we have indeed come down to schools in our CSR project, which is where we identify schools that are far from the city, which have a library that is dilapidated, and we will go for CSR, we help them to add to the collection they have in their school resource center."*
>
> *SPL 10*

While most findings describe existing collaborative practices, one respondent (SPL 11) proposed a structural improvement to strengthen digital information literacy implementation in schools. Rather than presenting this as an existing initiative, it is more appropriately understood as a recommendation to address identified implementation challenges. The respondent spoke passionately and hoped that this proposal could be realized. Several respondents highlighted that library and media teachers are overburdened with teaching responsibilities, administrative duties, and resource center management. This workload limits their capacity to focus consistently on digital information literacy initiatives.

In this regard. SPL 11 suggested:

> *"You need to train teachers who are specialized in this field. There must be an information literacy officer. If not all schools, you should have at least one. If possible, each Pusat Kegiatan Guru (PKG) will have an information officer. At school, the task is given to the library and media teacher. They do not have time, they must teach, and they must take care of the school resource center. When I go to school, I ask the teacher about the problem, and that is it. They have no time to teach exam classes, extra classes, and headmaster orders to manage the library. So, it is necessary, if it is possible, to make this work. This Information Management Officer at the school. This means that he has a role to play in the development of the model. In other words, it is the ability of FPM students to work. Otherwise, graduate and wait for job vacancies. SPL 11*

This recommendation reflects a clear awareness of the structural challenges affecting the sustainability of digital information literacy, particularly limited time and the lack of specialized expertise among school staff. By proposing the appointment of a dedicated Information Management Officer at the school or *Pusat Kegiatan Guru* (PKG) level, the respondent is essentially suggesting that responsibility for digital information literacy should be formally assigned to someone with the appropriate focus and training, rather than added to an already heavy workload.

At the same time, the practicality of this proposal must be viewed realistically. Many schools operate within tight budgets, face staffing constraints, and must prioritize core academic responsibilities. Although creating a specialized role could provide stronger continuity and professional oversight for digital information literacy initiatives, doing so would require policy support from the Ministry of Education, sufficient

financial allocation, and clearly defined job responsibilities to ensure the role is effective.

Therefore, this recommendation offers an important insight from practitioners in the field; sustaining digital information literacy efforts may require more than collaborative activities and short-term programs. Instead, it may call for structural adjustments and systemic support to address the capacity gaps identified earlier, particularly those related to time, expertise, and workload distribution. In conclusion, based on the findings of the study, it is proven that the public library has collaborated with various agencies, including the school resource centre, in implementing the digital information literacy program and activities.

4.3.2 RQ2: What are the current Digital Information Literacy (DIL) Initiatives in Malaysia Public School Resource Centers?

As discussed in section 4.2 regarding state public library Digital Information Literacy (DIL) initiatives, this section focuses on school resource centers. Research Question 2 (RQ2) aims to explore the factors influencing the implementation of digital information literacy initiatives for sustainable collaboration between state public libraries and school resource centers in Malaysia. Below are the key discussions related to the initiatives undertaken by school resource centers.

(a) School Resource Center Initiatives

The findings showed that almost all respondents perceive a strong, positive, and mutually beneficial relationship between the school resource center and the state public library have a good relationship and they often work together in carrying out activities at school, such as the Reading Month campaign, *Jom Baca 10 Minit,* and various webinar sessions. Respondents also seemed very happy and enthusiastic in expressing their views on this bilateral relationship, as one respondent stated,

> *"I think there is enough contribution, where if SSTP has activities, PPAT will cooperate; they will cooperate by sending the relevant officials to help the school, either online or offline."*
> *SSTP 12*

Respondents also added that state-level collaboration between schools and public libraries fosters networking, joint programs, training initiatives, and official support, enhancing educational impact.

> *"Indeed, at the state level, it is very encouraging. Schools have networks or relationships with other agencies, especially public libraries and rural libraries, so that they make beneficial connections together. Each one benefits together. And it's very necessary, for example, for schools to network with rural libraries. Conduct a joint program, each of which has had a positive impact through this collaboration. We collaborated with the first PPAP in terms of training, for example, the use of u-Pustaka."*
> *(SSTP 10)*

Another respondent added that: -

> *"Very necessary. In meetings with desk officers at all PPDs, we encouraged them to collaborate with public libraries in their respective places."*
> *(SSTP 2)*

Another respondent emphasized the necessity of this partnership.

> *"Yes, the public library and school resource center must have a good relationship and help each other in managing the resource center."*
> *(SSTP 11)*

According to the respondent's interview, the workshop is the activity that is most frequently implemented between the state library and the school resource center. Workshops include information literacy, multimedia, research writing, school resource center management, school resource center day, and promoting e-resources. Regarding the inquiry concerning the collaboration between these two entities, the participants overwhelmingly concurred that they enjoy a positive working relationship that has allowed them to carry out a variety of activities together for ages. It makes no difference if the program is held at the state public library or in a school.

By way of the library and media teacher's initiative, there is also a school or school resource center that networks with the state public library for all of the school's programs. In the meantime, schools that apply for the School Resource Center (APSS) Award will receive credit for the networking concept. Excitedly, one respondent mentioned that the State Public Library occasionally takes the lead in enhancing efforts to help the school resource center in activities. Below is feedback from respondents

regarding activities that were carried out in collaboration between the state Public Library and the school resource center.

These responses demonstrate interdependence between institutions, where collaboration is normalized and operationalized through joint activities, sharing of expertise between staff, and technical support. The emphasis on online and offline engagement reflects adaptive collaborative models, particularly relevant in the contemporary digital learning context. The enthusiasm expressed by respondents further indicates that such relationships are not merely procedural but are viewed as strategically important to strengthen the management of resource centers and digital information literacy initiatives in schools.

Findings also reveal an uneven implementation and perceived gaps in collaboration. Although there was a positive perception from most respondents, there were respondents who reported limited or inconsistent cooperation, thus revealing differences in the implementation of activities between schools and the state. Like what this respondent expressed the disappointment: -

> *"If so far, we see that cooperation, it is sorely lacking. So far what we have done is that if it is the association, the resource center he has the Resource Center Association. If this in Kelantan is called PUSTAKA, the Association of Resource Center. Not all schools are involved. There are schools that go into membership, and some do not become members. So here we see, which we used to see, we did the Book Festival. This is organized by the Association of Resource Center and the state branch library. But there is a point in that, he does not see uniformity, which means there is something he has done alone with the State Education Department. But still there. We know the officers at PNM who are always dealing with us. If we do the Nilam Program, we will invite the officers from the PNM as judges. That is what we do. It means that it must be that relationship and collaboration."*
>
> *(SSTP 11)*

There were also suggestions from respondents stating limited awareness of contributions outside of school-based programs and suggesting financial assistance as an additional support mechanism.

The views of these respondents reveal structural inconsistencies and fragmented implementation across states. Membership-based participation, for example, through resource centre associations, excludes some schools, thereby reducing uniformity. The perception that collaboration is limited primarily to programme implementation, without broader strategic, financial, or systemic involvement, only highlights the policy-practice gap. This suggests that while collaboration exists, it has not been

institutionalised through a standardised framework that can be used by all parties, particularly state public libraries and school resource centres.

The findings indicate that there is an extended collaboration beyond public libraries that contributes to strengthening institutional capacity and organizational effectiveness. Respondents believe that the involvement of additional agencies, including universities, banks, and private sector entities, will enhance collaboration and development of digital information literacy between state public libraries and school resource centers. One respondent suggested the following:

> *"I do not see any other agency. The State Library, SSTP, and the library and media teacher may be able to work together in developing modules to suit us. If you want to get involved, contact the bank. More than money. We understand that funding to schools is quite limited, especially small schools, their funding is limited, they need contributions from other parties to make the program successful. The university, I agree. The same parties in fields such as polytechnics, universities, and the field of resource center management, we collaborate to share, for example, library management, and so on. I can agree with that."*
>
> *SSTP 14*

Some respondents recommended engaging private-sector agencies, including multimedia authorities, to enhance support for digital information literacy expertise. These findings reflect a shift towards multi-sector collaboration, recognizing that digital information literacy requires diverse expertise, financial resources, and technological infrastructure. In this case, school resource centers provide participants or end users, public libraries contribute professional expertise and materials, and external agencies offer funding and technical knowledge. Such distributed collaboration can enhance sustainability and innovation, positioning school resource centers as community-centered knowledge hubs rather than isolated school units.

The findings also indicate that workshops and literacy-based programs are the dominant form of collaboration. The study findings show that literacy-related workshops and initiatives represent the most frequent and structured form of collaboration often implemented between school resource centers and state public libraries.

> *"We collaborated with the first PPAP in terms of training, for example, the use of u-Pustaka."*
>
> *(SSTP 10)*

In addition, the state public library also contributes to or collaborates in matters that become their core business, namely books, as one of the respondents said: -

> *"Contributions from the point of view of what they have, especially books. The contribution from that point was very satisfying to us at school. Group loans contribute a lot. Programs are also contributed by the library to the school as it is to encourage the reading of books."*
>
> *(SSTP 11).*

Examples of findings from this study from respondents illustrate that collaboration is program-oriented and literacy-driven, with a focus on capacity building and resource sharing. Workshops can improve information literacy, digital literacy and professional competence among teachers and students. Book lending and Current Awareness Services strengthen reading culture and access to curated information in line with the functions of a library, including a school resource center. This shows that this collaboration goes beyond traditional collaboration to functional support that is in line with the core mandate of both institutions, which is to promote literacy and access to information.

Across the findings, three dominant patterns emerged: 1) a strong foundation of relationships. Most respondents reported positive and long-standing collaboration between the two organizations; 2) program- and activity-centered collaborations, such as workshops, reading campaigns, and training, dominated the most common joint activities; and 3) structural incoherence, where implementation varied across states and schools, indicating uneven engagement and limited systemic standardization.

It can be concluded that these three patterns indicate that collaboration is active and valued but lacks standardized mechanisms to ensure equitable, measurable, and sustainable implementation across contexts.

a) Collaboration Efforts

As suggested by Creech (2018), school libraries should attempt to form partnerships with public libraries. State public libraries and school libraries seem to have a unique relationship because of the same purpose of serving the nation. Lisedunetwork (2023) stated that play essential roles in promoting literacy and access to information; their distinct audiences, collections, focus, and functions result in

different experiences and offerings for their respective communities, and ‘a close alliance of school library media centers and public libraries can be an effective support system for students' (Fitzgibbons, 2000).

Concerning the question about the collaboration between these two institutions, respondents strongly agreed that they have had a good relationship in carrying out various activities since time immemorial, not only with the state public library, public and private universities, but also with other government agencies. It does not matter whether the program is conducted in school or at the state public library. There is also a school or school resource center, initiated by the library and media teacher, that partners with the state public library on every program in the school. Meanwhile, the concept of networking will also provide marks to schools if the school is a candidate for the School Resource Center (APSS) Award. One of the respondents excitedly said that state public libraries, from time to time, have taken the initiative to improve efforts to help schools. They have recently received a letter to distribute the Current Awareness Service, which is a collection of articles, information resources, and targeted library materials. However, earlier responses showed dissatisfaction in certain states due to limited program continuity.

This contrast highlights a policy-practice gap. While national-level strategic intent and encouragement promote partnership models, local implementation depends largely on leadership initiatives, state-level commitment, and available resources. As a result, the quality of collaboration varies geographically, limiting systemic impact.

Despite these implementation disparities, the findings demonstrate that existing collaborative efforts meaningfully contribute to the development of digital information literacy through the sharing of expertise, training, and access to digital resources between state public libraries and school resource centers. Respondents reported that collaborative efforts include information literacy workshops, multimedia workshops, research writing, and the use of digital platforms such as u-Pustaka for hands-on activities. Respondents also reported that public libraries distribute Current Awareness materials that are sent to schools, further supporting access to curated information. This initiative can indirectly improve the competence of students and teachers in finding, evaluating, managing, and using digital information. However, without a structured evaluation mechanism, the real impact on literacy outcomes is still difficult to measure. This limitation underlines the need for standardized monitoring tools.

Therefore, while collaboration between Malaysian State Public Libraries and School Resource Centers is consistently encouraged at the policy level, the empirical findings demonstrate uneven implementation across states. This indicates a clear policy and practice gap, where strategic intentions have not yet translated into structured, measurable collaboration. Such state-level variance underscores the need for the proposed Digital Information Literacy (DIL) Index Framework to standardize expectations, monitor implementation, and support sustainable inter-institutional partnerships.

4.3.3 RQ3: How Digital Information Literacy (DIL) Implementation Factors Strengthen Sustainable Collaborative Initiatives Between State Public Library and School Resource Center in Malaysia?

This section outlines how the implementation factors of Digital Information Literacy (DIL) enhance sustainable collaborative initiatives between state public libraries and school resource centers in Malaysia. Research Question 3 (RQ3) seeks to identify the dynamic collaborative factors that support sustainable digital information literacy initiatives between these institutions. The statements below reflect the key factors derived from interviews with the respondents from the state public libraries officers and Education Resource and Technology Sector (SSTP) officers.

a) Adaptability in resource-limited contexts

Adaptability in resource-limited contexts is a key factor enabling the implementation of various digital information literacy programs and activities. Rather than reflecting creativity alone, the findings indicate that respondents demonstrated adaptive capacity by developing program modules after participating in relevant courses or workshops. This approach illustrates how institutions strategically leverage existing training opportunities to strengthen internal expertise despite limited financial and human resources. Such adaptive practices contribute to the sustainability of digital information literacy initiatives by reducing dependence on external support and fostering long-term institutional capacity, for example, SPL 2 stated that: -

"The module was developed independently based on the attended courses. However, it is only suitable for secondary schools and below."

SPL 2

Additionally, the state public library officer has utilized creativity to combine several activities into one program due to budget constraints, as stated by SPL 11.

"There is no specific budget; everything is included in the activity budget. We conduct information literacy training throughout the year, with sessions happening every month. Since we frequently receive school visits, we incorporate information literacy training into those visits."

SPL11

In urgent situations, the state public libraries strive to ensure that all tasks and responsibilities are carried out effectively. This is also true for the state public libraries, which leverage all available resources to implement programs, even in the face of staffing shortages as stated by SPL 10 below. This is when the state public libraries have the creativity to make use of all their manpower available to support the digital information literacy implementation.

"In terms of manpower, we are indeed short-staffed. However, we try to compensate by relying on the District Library Heads, most of whom have qualifications in library science and are knowledgeable about information literacy and digital literacy. With the support of our ambassadors at the district and branch levels, we request their assistance in the field, particularly at the school resource centers (PSS), to provide information and deliver briefing sessions to schools, teachers, and students."

SPL 10

Creativity has also been employed by state public library officers to diversify the use of existing modules according to the specific needs and circumstances of their libraries, as stated below.

"So far, we have based our module on the one developed by the National Library of Malaysia (PNM). The Information Literacy Division has created a module, and we attended their courses. They also offer a Train-of-Trainer (ToT) program. We adopted their content completely, but we modified the teaching methods to suit our needs. As for the notes, we obtained them directly from them."

SPL 12

Based on interviews with respondents, it can be analyzed that creativity is a factor that strengthens sustainable collaborative initiatives between state public

libraries and school resource centers in Malaysia. Creativity plays a vital role in enhancing various aspects of our initiatives. It allows state public libraries and school resource centers to develop innovative solutions and adapt existing resources to better fit the institutional needs.

By fostering a creative environment, state public libraries and school resource centers can overcome challenges, improve program delivery, and ultimately achieve state public libraries and school resource centers objectives more effectively. This adaptability is especially crucial in resource-limited settings, where conventional approaches may fall short. Emphasizing creativity not only enriches state public libraries and school resource centers' programs but also empowers the institutional team and the communities that the state public libraries and school resource centers serve.

b) Digital infrastructure and competence

The study's findings reveal that the capacity of library and media teachers to organise, implement, and provide guidance services, along with their technological know-how, plays a critical role in fostering innovation and adaptability in teaching and learning (PdPc). From the perspective of the Education Resource and Technology Sector (SSTP), respondents indicated that many media and library teachers still lack proficiency in digital information literacy (DIL). While they possess fundamental information literacy skills, their application of DIL in school resource centers remains limited. Both teachers' technical abilities and personal motivation are crucial in overcoming these challenges.

Several respondents highlighted systemic and institutional constraints. For example, some school resource centers are not managed by dedicated staff, which underscores the need for greater awareness and collaboration between teachers, libraries, and the State Education Department. As one respondent noted.

> *"It can be used in the case of the State Education Department, which is aware, but they don't want to know about DIL. You need to know everything because it's all at your fingertips."*
> *SSTP10*

Another respondent emphasized that underutilization of equipment often stems not from the tools themselves but from teachers' attitudes, willingness to engage, and time constraints:

> *"…We provided the equipment, but the teachers did not use it, leading to its deterioration. The damage occurred because it was unused. Therefore, the issue lies not with the equipment itself, but with the teachers' attitudes, their willingness to engage, and time constraints."*
>
> *SSTP13*

Respondents also underscored the importance of ICT tools and internet connectivity in enabling digital literacy practices. While limitations such as mobile phone banned and resource constraints exist, teachers stressed that even basic equipment combined with internet access can significantly support DIL implementation, particularly in remote areas:

> *"I agree very much as discussed earlier. The obstacles we got earlier. For example, in today's schools, there is still a ban on carrying mobile phones. So, it is a constraint for teachers to teach or use technology in the classroom due to limited and incomplete equipment. So, I agree that this equipment plays an important role in assisting teachers in implementing digital information literacy in schools."*
>
> *SSTP 11*

> *"We need to have equipment. If there is no equipment, we cannot access that information. That equipment is very important. The most important is internet access."*
>
> *SSTP 14*

These findings were reinforced by data from state public libraries, which demonstrate that libraries are generally equipped and organized to foster digital literacy among users. Respondents described available facilities, including iMacs, iPads, laptops, tablet facilities, computer labs, and supplementary materials such as banners and pamphlets:

> *"Our library provides complete and adequate equipment to support digital information literacy, including tablet facilities in the Smart Library and the Cyber Studio.*
>
> *SPL 8*

"Yes, we provide a computer lab to support the digital information literacy process."
SPL 9

"Yes, PNS provides equipment during briefings to users and staff, such as slides, websites, banners, brochures, and pamphlets."
SPL 14

Together, these findings suggest that digital infrastructure, which includes ICT tools and human competence such as library officers and teacher skills and motivation, is an interdependent factor that enable the effective implementation of digital information literacy programs. Where resources and training are available, teachers can adapt creatively to deliver programs despite contextual constraints. In this way, the synergy between infrastructure and competence strengthens sustainable collaborative initiatives between state public libraries and school resource centers in Malaysia, supporting both program effectiveness and long-term resilience.

Based on the factors discussed above, the implementation of digital information literacy in Malaysia is influenced by interrelated elements such as adaptability/creativity, ICT tools, ICT skills, and virtual learning, all of which contribute to sustainable collaborative initiatives between the State Public Library and School Resource Centers. These elements collectively enable the delivery of digital information literacy programs, whether in public libraries or school resource centers.

Virtual learning, in particular, has emerged as a key mechanism for bridging resource and skill gaps. Respondents noted that access to digital platforms, online training, and internet-based materials allows teachers and librarians to continue developing their competencies despite physical or logistical limitations. As one respondent from the Education Resource and Technology Sector highlighted: -

"In my opinion, for someone who is literate in DIL, the tool he uses does not need to be very high-end; the important thing is that he has access to the internet. If outside the city, we do not accept this reason. We have many ways. Of course, we cannot follow 100mbps in the city. Even with basic equipment, as long as there is material that can be downloaded, even that allows us to access, except for social media, we can't.
SSTP 14

Similarly, state public library staff emphasized that digital platforms, online databases, and mobile library resources facilitate learning beyond the physical library environment:

> *"Our library provides iMac computers and iPads for internet browsing and accessing databases. Additionally, our two mobile libraries are equipped with laptops and e-books."*
> *SPL 6*

These findings indicate that virtual learning is not an isolated factor but operates in synergy with ICT tools and skills. Teachers' and librarians' ability to utilize these platforms effectively is supported by adequate infrastructure and training, and enhances the sustainability of collaborative programs. By integrating virtual learning into the broader theme of digital infrastructure & competence, it is evident that technology, human capability, and adaptive strategies collectively underpin successful and enduring digital information literacy initiatives across the Malaysian schools and libraries.

4.3.4 RQ4: Does collaborative dynamic factors support Digital Information Literacy (DIL) sustainable initiatives between the State Public Library and School Resource Center in Malaysia?

This section examines whether collaborative dynamics between State Public Libraries and School Resource Centers in Malaysia facilitate sustainable Digital Information Literacy initiatives. According to Jucevičius & Jucevičienė (2022), a collaborative dynamic facilitates the development of innovative products and services that span several industries and the integration of various technologies. Based on the findings, it shows that a collaborative dynamic significantly supports the sustainability of digital information literacy initiatives between the state public library and the school resource center.

The findings demonstrated that collaborative dynamics can be implemented effectively through structured communication, coordination, cooperation, shared motivation, principles of engagement, and capacity for joint action. Table 4.2 outlines the six key collaborative dynamic factors.

Table 4.2
Collaborative Dynamic Factors

Collaborative Dynamic Factor	Description	Contribution to Sustainable DIL Initiatives
Communication	The exchange of information, ideas, and feedback between the state public library and the school resource center to implement collaborative programs effectively.	Ensures alignment of objectives, reduces misunderstandings, and maintains continuity of digital information literacy initiatives.
Coordination	Managing interdependent activities, schedules, and resources of the state public library and the school resource center to ensure programs and services are harmonized.	Optimizes use of resources, avoids duplication, and ensures smooth execution of joint activities.
Cooperation	Building and maintaining collaborative relationships at both the national and state levels between the state public library and the school resource center	Strengthens trust, enables resource-sharing, and expands the reach and impact of digital information literacy programs.
Principles of Engagement	Creating an environment where all participants feel valued, respected, and motivated to contribute.	Encourages active participation, enhances commitment, and fosters innovation in digital information literacy initiatives.
Shared Motivation	Mutual commitment of the state public library and the school resource center to achieve successful digital information literacy outcomes.	Aligns goals, drives joint action, and ensures long-term sustainability of programs.
Capacity for Joint Action	The ability to work together toward shared goals, supported by leadership, trust, conflict resolution, and resources.	Enhances the effectiveness of collaboration, builds resilience, and enables adaptive responses to challenges in digital information literacy implementation.

These collaborative dynamics factors collectively enhance the sustainability of digital information literacy initiatives by ensuring alignment of objectives, minimizing duplication of effort, and optimizing shared resources. It can be concluded that, first, communication reduces misunderstandings and maintains program continuity. Effective exchange of information, ideas, and feedback between the state public library and the school resource center ensures that all stakeholders remain aligned in their

objectives. Clear communication minimizes misunderstandings and facilitates continuous improvement of digital information literacy programs.

Second, coordination, which is closely related to communication, ensures the smooth implementation of joint activities such as systematic management of interdependent tasks, schedules, and resources. Proper coordination ensures that collaborative activities are harmonized, preventing redundancy and maximizing efficiency. This is particularly important in contexts where resources may be limited, making strategic planning and execution essential.

Next, cooperation and the principle of engagement can strengthen institutional trust and commitment, enabling long-term partnerships between state public libraries and school resource centers. Strong cooperative relationships foster trust and mutual understanding, which are critical for effective collaboration. Through cooperation, both the state public library and the school resource center can leverage each other's strengths, share resources, and extend the reach of digital information literacy initiatives to a broader audience. The principle of engagement can build mutual respect between organizations and create a supportive environment for both institutions. This sense of inclusion not only strengthens commitment but also encourages creativity and innovation in the design and delivery of digital information literacy programs

Furthermore, the capacity for joint action can increase institutional resilience and adaptability in addressing emerging digital information literacy challenges. A strong capacity for joint action enhances the resilience of collaborative efforts, enabling both parties to adapt to challenges and evolving demands in the digital information landscape. It also ensures that digital information literacy initiatives remain relevant and impactful over time. Therefore, the collaborative dynamics factors as collected in this study function as structural and relational mechanisms that sustain digital information literacy initiatives between state public libraries and school resource centers in Malaysia.

4.3.5 Enablers and Barriers

This section presents the enabling and inhibiting factors influencing the implementation of digital information literacy initiatives, as identified by the state public library officers and the SSTP officers. The findings are analytically reorganised into three categories, which are enablers (internal supporting factors), inhibitors

(internal limiting factors), and external contextual factors. This categorisation strengthens conceptual alignment with the proposed DIL Index Framework by distinguishing institutional capacity from structural constraints.

4.3.5.1 State Public Library

The findings from the State Public Libraries reflect not only institutional practices, but also the lived realities of implementing digital information literacy initiatives within diverse operational environments. Respondents shared experiences that revealed strengths, limitations, and contextual challenges that shape the capacity of libraries to collaborate effectively with school resource centers. While these insights were initially presented thematically, a deeper analytical structuring was necessary to enhance conceptual clarity and strengthen alignment with the proposed DIL Index Framework. To achieve this, the themes were reorganised into three interrelated analytical categories, which are enablers, inhibitors, and external factors. Table 4.3 presented enables and barriers derived from the interview with the library officer, and Table 4.4 presents those with the SSTP Officer.

Table 4.3
The State Public Library Enablers and Barriers

Category	Theme	Evidence from Findings
Enablers (Internal Supporting Factors)	ICT Facilities & Infrastructure	Availability of smart libraries, cyber-studios, computer labs, tablets, free Wi-Fi, 3D printers, digitization units, e-library bus services, and access to digital databases (e.g., u-Pustaka, ProQuest, JSTOR). Allocations are sometimes distributed via *Perpustakaan Negara Malaysia.*
	Staff Adaptability & Commitment	Staff participate in workshops, online training, and continuous learning. Although not self-identified as "experts," they are confident in supporting schools and users.
	Institutional Support for Schools	Libraries conduct workshops, user education sessions, and promotional activities for digital resources upon request from schools.
Inhibitors (Internal Limiting Factors)	Budget Constraints	No specific budget allocation dedicated solely to digital information literacy; activities are embedded under general library funding. Limited flexibility for expansion and sustainability.

Category	Theme	Evidence from Findings
	Competency Gaps	Uneven digital proficiency among staff; turnover in rural libraries; some staff struggle with database navigation; school staff are not fully aware of digital platforms.
	Resource & Time Limitations	Limited manpower; multitasking staff; time conflicts; cost of organizing workshops (logistics, incentives).
External Factors (Contextual Influences)	Internet Access & Digital Divide	Slow/unstable internet, limited Wi-Fi in schools, rural connectivity issues, and restricted student device usage.
	Policy & Institutional Regulations	School rules (e.g., smartphone bans); varying levels of awareness and implementation of digital platforms promoted through *Perpustakaan Negara Malaysia* initiatives.
	Language & Demographic Factors	Language barriers (Tamil schools, international schools); varying literacy levels; geographical distance.

The key insight is that the state public libraries are well-equipped with ICT tools and demonstrate proactive staff engagement in implementing digital information literacy. The findings also indicate the readiness of state public libraries to implement and promote digital information literacy. Internal challenges, such as a lack of dedicated funds and staff competency, are among the internal challenges that can limit scalability driven by unforeseen factors such as internet stability, language issues, and certain policies.

4.3.5.2 Education Resource and Technology Sector (SSTP)

SSTP represents library and media teachers in decision-making, ensuring that their perspectives and expertise are considered in shaping policies and practices that impact educational resources and digital information literacy initiatives. Therefore, the library and media teachers are responsible for implementing programs related to the school resource center receive assistance and training from the sector. As mentioned in the previous chapter, each of the school resource centers was managed by the library and media teachers.

Thus, from the perspective of the SSTP, the following are key points that need to be emphasized to make collaborative initiatives between the state public library and the school resource center a success.

Table 4.4
The SSTP Enablers and Barriers

Category	Theme	Evidence from Findings
Enablers (Internal Supporting Factors)	Budget Sharing & Collaborative Costing	Schools utilise PCG (Per Capita Grant); cost-sharing between agencies; willingness to share resources; state government supportive of digital learning.
	Awareness of DIL (Post-Pandemic Exposure)	Teachers used digital tools during COVID-19; indirect implementation of DIL despite unfamiliarity with the term.
	Existing Information Literacy Module Distribution	Information literacy module distributed to schools (e.g., Sarawak); plans for strengthening implementation.
	Recognition of ICT Importance	Strong agreement that internet access and equipment are essential for digital information literacy success.
	Informal Integration of Cybersecurity Awareness	Guidance on evaluating credibility, ethical use of information, and copyright awareness.
Inhibitors (Internal Limiting Factors)	Limited Dedicated Funding	PCG insufficient; equipment purchases restricted; reliance on justification for allocations.
	Teacher Competency Gaps	Only ~50–60% proficiency; older teachers are resistant to technology; new teachers lack exposure; no dedicated resource center staff.
	Attitudinal & Time Constraints	Equipment underutilized; teachers constrained by workload and time; lack of initiative.
	Equipment Underutilization	Tools available but not optimally used; maintenance issues due to non-use.
External Factors (Contextual Influences)	School Policy Restrictions	A ban on student smartphone use limits classroom digital engagement.
	Internet Accessibility (Urban-Rural Divide)	Rural limitations: lower bandwidth; reliance on basic downloadable materials.
	Cybersecurity Risks & Legal Framework	Risks of misinformation, data breaches, compliance with national regulations such as the Copyright Act

Category	Theme	Evidence from Findings
		1987, and oversight by the Malaysian Communications and Multimedia Commission.

4.4 Organization of the Chapter

Chapter Four presented the findings derived from in-depth interviews with a total of 27 respondents, comprising 14 officers from State Public Libraries and 13 officers from the Education Resource and Technology Sector (SSTP). The chapter focused on exploring digital information literacy initiatives and provided a comprehensive examination of existing collaborative efforts between Malaysian state public libraries and school resource centers. Particular emphasis was placed on identifying the various forms of collaboration and the key factors that contribute to the sustainability of these initiatives within the Malaysian context.

In addressing the study's four research questions, the chapter systematically analyzed the data obtained from the respondents. With regard to RQ1, the findings reveal that state public libraries have actively implemented a range of digital information literacy programmes aimed at enhancing users' competencies in accessing, evaluating, and utilizing digital information. Similarly, in response to RQ2, the results indicate that school resource centers have also undertaken comparable initiatives, demonstrating a shared commitment across both types of institutions. These programmes are commonly delivered through workshops, training sessions, promotional campaigns, and other related activities designed to engage diverse user groups.

Furthermore, the findings highlight that collaborative initiatives between state public libraries and school resource centers are carried out through several structured approaches, including formal programmes, resource sharing mechanisms, and institutional support systems. These collaborative practices reflect a coordinated effort to maximize available resources and expertise in promoting digital information literacy.

In relation to RQ3, the analysis identifies two key dynamic factors that support the sustainability of collaborative digital information literacy initiatives. The first factor is adaptability in resource-limited contexts, which refers to the ability of institutions to remain flexible and innovative despite constraints such as limited funding, staffing, or technological resources. The second factor is digital infrastructure and competence,

which underscores the importance of having adequate technological facilities and skilled personnel to effectively design and implement digital information literacy programmes.

With respect to RQ4, the findings demonstrate that effective collaboration is underpinned by several critical dynamics. These include structured communication, which ensures clear and consistent information exchange; coordination and cooperation, which facilitate the alignment of goals and activities; shared motivation, which reflects a common commitment to promoting digital literacy; clearly defined principles of engagement, which guide collaborative interactions; and the capacity for joint action, which enables institutions to work together efficiently toward shared objectives.

In addition to addressing the research questions, this chapter also provides a detailed account of the factors that both facilitate and hinder the implementation of digital information literacy initiatives, as reported by the respondents. These factors are analytically categorized into three main groups. The first category, enablers, includes internal supportive elements such as leadership, staff commitment, and institutional readiness. The second category, inhibitors, refers to internal constraints, including limited resources, lack of training, and organizational challenges. The third category encompasses external contextual influences, such as policy environments, technological advancements, and community engagement, which can either support or impede the successful implementation of initiatives.

Chapter Four offers a rich and comprehensive presentation of the empirical findings, providing valuable insights into the current state of digital information literacy collaboration in Malaysia. It not only highlights existing practices and achievements but also identifies critical challenges and areas for improvement.

Finally, the subsequent chapter will build upon these findings by undertaking a cross-case analysis. This analysis aims to synthesize patterns and variations across different states, thereby generating higher-level analytical insights into the strengths, gaps, and future directions of digital information literacy collaboration between state public libraries and school resource centers in Malaysia.

CHAPTER 5
CROSS-CASE STUDY ANALYSIS AND DISCUSSION

5.1 Introduction

Chapter Five presents a cross-case synthesis aimed at addressing Research Objective 4 (RO4): to recognize the collaborative dynamic factors that support sustainable digital information literacy initiatives between State Public Libraries and School Resource Centers in Malaysia. This chapter analyzes cross-case findings from fourteen (14) State Public Libraries and thirteen (13) Education Resource and Technology Sector (SSTP) units to identify key elements that contribute to successful collaborative partnerships. Through this synthesis, the chapter examines the roles and contributions of both institutions in fostering digital information literacy and highlights the collaborative frameworks and strategies that underpin these initiatives. In addition to addressing RO4, the analysis also reflects broader themes emerging across the study's findings, providing a deeper understanding of how institutional collaboration supports sustainable digital information literacy practices. By identifying best practices and shared strategies, this chapter emphasizes the importance of long-term cooperation between the state public libraries and the school resource centers. Such collaboration is essential for strengthening the capacity of both institutions to meet the evolving digital literacy needs of educators and students while supporting Malaysia's national education policies and broader digital development goals.

5.1.1 Institutional Perspectives on Collaborative Digital Information Literacy Initiatives

Based on the findings presented in Chapter 4, both the state public libraries and the Education Resource and Technology Sector share similar perspectives regarding collaborative dynamic factors that support sustainable digital information literacy initiatives between State Public Libraries and School Resource Centers in Malaysia. Respondents from both institutions emphasized that collaboration has strengthened the implementation of digital information literacy programs through the sharing of resources, expertise, and program funding. These collaborative efforts enable both

organizations to work towards common goals in promoting digital literacy among educators, students, and the wider community. Other than that, several collaborative dynamic factors were identified as important for sustaining these initiatives, including effective communication, coordination, cooperation, principles of engagement, and shared motivation. These elements facilitate stronger institutional partnerships and enhance the capacity of both organizations to implement digital literacy programs effectively.

However, respondents from both institutions also acknowledged several challenges that may affect the sustainability of digital information literacy initiatives. These challenges, as shown below (SPL 6, SPL14, SSTP 7, and SSTP 14), include financial constraints, limited technological infrastructure, insufficient equipment, language barriers, lack of digital literacy awareness, and inconsistent internet access, particularly in rural areas.

> *Okay, in my opinion, this affects digital information literacy. For example, with the availability of digital facilities, people, like school students, are less inclined to go to the library because they feel they can just Google, call, or email for information. On the positive side, it makes information dissemination easier. I just hope that this can align, so that users or residents of Kuala Lumpur will come to the library while also utilizing digital resources.*
>
> *SPL 6*

> *"Obstacles that will interfere with the process and progress of digital information literacy are the absence of internet coverage, equipment, and the distance between locations, as well as language barriers in rural areas."*
>
> *SPL14*

The same goes for the SSTP officer when they highlighted those challenges that may affect the digital information literacy initiatives.

> *"First, in terms of technology, devices, and equipment, not all schools are adequately equipped. We need a medium to access information. Second, there is the issue of internet access. Additionally, the culture of digital literacy is not yet widespread."*
>
> *SSTP 7*

> *"The first barrier is the lack of digital information literacy knowledge among officials and library and media teachers. The second is limited access in rural areas."*
>
> *SSTP 13*

Despite these limitations, collaboration between the state public libraries and school resource centers remains an important strategy for addressing resource gaps and ensuring the continued implementation of digital information literacy initiatives. In conclusion, the perspectives of both institutions demonstrate a shared commitment to strengthening collaboration to support sustainable digital information literacy initiatives in Malaysia.

5.2 Cross-Case Study Analysis, Findings, and Discussion: Comparison

This section presents the cross-case analysis of the fourteen (14) state public libraries and thirteen (13) Education Resource and Technology Sector (SSTP). This analysis focuses on the similarities and differences between these two entities based on the four objectives of this research: RO1: To analyze existing collaborative Digital Information Literacy (DIL) initiatives in Malaysia State Public Libraries, RO2: To investigate existing collaborative Digital Information Literacy (DIL) initiatives in Malaysia public school resource centers., RO3: To explore Digital Information Literacy (DIL) implementation factors towards sustainable collaborative initiatives between State Public Library and School Resource Center in Malaysia., RO4: To recognize collaborative dynamic factors supporting sustainable Digital Information Literacy (DIL) initiatives between the State Public Library and School Resource Center in Malaysia., and RO5: To construct a Digital Information Literacy (DIL) Index Framework towards Sustainable Collaboration between Malaysian State Public Libraries and School Resource Centers.

This cross-case analysis investigates the sustainable collaborative initiatives between state public libraries and school resource centers, highlighting effective strategies, shared resources, and best practices that enhance digital information literacy programs. By examining various case studies, the analysis aims to identify key factors that contribute to successful partnerships and the long-term impact of these collaborations on community engagement and learning outcomes.

Upon examination, the selection of respondents among state public library officers and officers from the Education Resource and Technology Sector (SSTP) reflects distinct roles. Officers from the state public library are directly involved in promoting reading activities, including digital information literacy. In contrast, officers from the SSTP) oversee the management of school resource centers at the state level

and guide library and media teachers in implementing policies, instructions, programs, and regulations as they arise.

Notable differences in program management and implementation between state public libraries and school resource centers are outlined as follows.

(a) Governance structure - different governing bodies manage state public libraries and school resource centers. State public libraries operate under the authority of the state government, with the exception of the Perlis State Public Library, which is managed by the National Library of Malaysia, Ministry of National Unity. In contrast, school resource centers are administered by the Educational Resources and Technology Sector of the State Education Department (Ministry of Education Malaysia). This difference in governance structures may create administrative barriers in coordinating collaborative initiatives, as each institution follows different policies, reporting structures, and planning procedures. As a result, effective communication, coordination, and the principle of engagement become critical collaborative dynamic factors to ensure alignment between the two systems.

(b) Professional background of personnel - library staff are appointed officers under the Social Service Scheme with qualifications in library science, whereas officers at the SSTP and school resource centers are typically teachers who hold degrees in education. These differences in professional expertise may influence how digital information literacy programs are designed and delivered. However, this diversity can also strengthen collaboration when both institutions share their expertise through cooperation and knowledge exchange.

(c) Funding mechanism - the managing expenditure guide is allocated directly to each state public library and collected according to specific expenditure codes. In contrast, funding for school resource centers is channelled to the school and then distributed. Typically, the financial resources for school resource centers come from the Per Capita Grant (PCG), *Yuran Khas Sekolah* (YKS), and non-governmental sources, such as parent-teacher associations (PIBG), contributions, and various programs. Differences in funding structures and budget cycles may create challenges in coordinating joint activities, particularly when program planning timelines do not align. This situation highlights the importance of shared motivation and collaborative planning in sustaining joint digital information literacy initiatives.

(d) Collection development and user focus - The collection of materials in the state public library is diverse and caters to all library users, whereas the materials in the school resource center are limited to the school community. While these differences reflect their respective institutional roles, they also create opportunities for complementary collaboration, where resources from both institutions can be utilized to expand access to digital information literacy materials for students and the wider community.

(e) Physical infrastructure and facilities - In terms of physical space, the state public library is larger than the space of the school resource center due to the varying number of library users, facilities, and equipment. These differences may influence the scale and type of digital information literacy programs that can be conducted. However, collaboration between the two institutions allows School Resource Centers to leverage the facilities and technological resources available in public libraries to support educational activities.

Despite the structural differences between the state public libraries and the school resource centers, both organizations share a common purpose: to provide access to reading materials, facilities, and programs tailored to their respective user groups. Both organizations strive to promote literacy and learning, fostering a culture of reading within their communities while addressing the unique needs of their users, whether they are the public or the school community. Below is a table showing a cross-case comparison of institutional differences and their implications for collaboration of digital information literacy initiatives.

Table 5.1
Cross-Case Comparison of Institutional Differences and Their Implications for Collaborative DIL Initiatives

Institutional Aspect	State Public Library	School Resource Center (SSTP)	Impact on Collaboration	Collaborative Dynamic Factors
Governance Structure	Operates under state government administration (except Perlis, under the National Library of Malaysia).	Operates under the State Education Department through SSTP under the Ministry of Education	Different administrative systems and reporting structures may create challenges in coordinating joint programs and	Communication, Coordination, principle of engagement

		Malaysia.	decision-making.	
Professional Background of Personnel	Library officers with professional qualifications in Library and Information Science.	Teachers or education officers are responsible for managing school resource centers.	Differences in professional expertise may influence program design, but also create opportunities for knowledge sharing and complementary skills.	Cooperation, Shared Motivation
Funding Mechanism	Receives direct financial allocation from state budgets with specific expenditure codes.	Funding is channelled through schools from PCG, YKS, and contributions such as PIBG.	Differences in funding structures and budget cycles may affect joint planning and scheduling of collaborative programs.	Coordination, Shared Motivation
Collection Development and user focus	Diverse collections serving the general public and multiple user groups.	Collections focused on supporting teaching and learning within schools.	Resource differences create opportunities for complementary access to digital and educational materials.	Cooperation
Physical Infrastructure and Facilities	Larger facilities with more space and technological resources.	Smaller spaces within school environments with limited facilities.	Differences in infrastructure may influence the scale of programs, but also encourage resource sharing between institutions.	Coordination, Cooperation

The above cross-case comparison clearly shows that although the state public library and the school resource center operate under different administrative structures, professional backgrounds, and resource systems, these differences do not necessarily prevent collaboration between the two organizations. On the contrary, when supported by communication, coordination, cooperation, and shared motivation, and the principle of engagement, these institutional differences can complement each other and strengthen the sustainability of digital information literacy initiatives. This highlights the importance of collaborative dynamic factors in facilitating successful partnerships between the two institutions.

5.3 Collaborative Dynamic Factors Supporting Sustainable DIL Initiatives

Based on the findings presented in Chapter 4 and the cross-case analysis in Section 5.2, several collaborative dynamic factors have been identified as important in supporting sustainable Digital Information Literacy initiatives between State Public Libraries and School Resource Centres in Malaysia. These factors reflect the mechanisms that enable the two organizations to collaborate effectively despite differences in administrative structures, resources, and institutional roles.

This analysis highlights five key collaborative dynamic factors, namely communication, coordination, cooperation, principles of engagement, and shared motivation. These factors play a crucial role in strengthening institutional partnerships and ensuring the sustainability of digital information literacy initiatives in the state public library and the school resource center.

5.3.1.1 Communication

Communication is an essential dynamic factor that supports collaboration between the state public library and school resource centers in implementing digital information literacy programs. Effective communication allows both institutions to exchange information, plan activities, and maintain relationships that support joint initiatives. Price (1991) emphasizes that communication is fundamental to successful collaboration in educational environments because it enables stakeholders to align goals and coordinate activities. Additionally, Abdullayev (2020) highlights that the integration of information and communication technologies in educational settings can enhance learning motivation and facilitate knowledge sharing.

Evidence from both SPL and SSTP respondents indicates that communication between the two institutions occurs regularly during the planning and implementation of collaborative programs. Respondents from the state public library noted that library and media teachers frequently communicate with library officials regarding program implementation, information sharing, and advisory support. For example, SPL 11 explained that communication with school resource centers is maintained when organizing activities and implementing programs at the school level. This demonstrates that communication functions as a key mechanism for coordinating collaborative initiatives and ensuring that both parties remain informed about program developments.

> *"Very, very good with the public library. Before the MCO, when PPAT organized the Book Festival, we were directly involved. We held a video competition for the school resource center, themed around books, and we were given space to promote TV PSS. We are PSS, and they are the State Library, so for any activities, we stay connected with each other."*
>
> *SSTP 11*

Similarly, respondents from school resource centers acknowledged the importance of maintaining close communication with the state public library. This suggests that communication is a reciprocal process in which both institutions actively engage in maintaining their collaborative relationship. Through communication channels such as emails, correspondence, and coordination meetings, both organizations are able to share updates, discuss program plans, and provide feedback. These interactions help strengthen professional relationships and foster a collaborative spirit between library staff and library and media teachers.

The findings suggest that communication contributes significantly to the success of collaborative initiatives, particularly in facilitating program planning and information exchange. Through continuous communication, both institutions are able to coordinate activities, share expertise, and support digital information literacy initiatives for students. However, the study also indicates that respondents did not clearly describe structured communication mechanisms or formal procedures guiding the collaboration. This suggests that communication may rely largely on informal interactions between individuals rather than institutionalized systems.

Despite this limitation, communication remains a critical factor in sustaining collaboration between the state public library and school resource centers. The ongoing exchange of information, combined with relationship building between stakeholders, helps ensure that collaborative initiatives can continue to support digital information literacy programs effectively.

5.3.1.2 Coordination

Coordination is another important dynamic factor that enables effective collaboration between the state public library and school resource centers. Malone and Crowston (1994) define coordination as the process of managing dependencies between activities, while Jennings (1996), as cited in Guido and Torre (2006), describes

coordination as the process through which agents align their actions with others to ensure coherent outcomes within a community. In collaborative environments, coordination allows organizations to plan activities together, share responsibilities, and utilize resources efficiently.

The findings of this study indicate that coordination occurs through collaborative planning and joint participation in activities organized by both institutions. Respondents from the state public library emphasized the importance of maintaining close contact with library and media teachers to ensure that programs related to digital information literacy can be implemented effectively. For example, SPL 7 highlighted the need to maintain frequent communication and collaboration with teachers, noting that strong relationships between public libraries and school resource centers can help strengthen digital information literacy among young users.

> *"Always collaborate on activities. Keep in touch frequently; the more we get to know library and media teachers, I believe, it can strengthen digital information literacy. We can reach out to users, especially young people, once they finish school."*
>
> *SPL 7*

Similarly, SSTP respondents emphasized the importance of maintaining good relationships with the public library to support the management of school resource centers and collaborative initiatives. One respondent (SSTP 11) described how school resource centers actively participate in activities organized by the state public library, such as the Book Festival, where they were involved in competitions and promotional activities related to reading and digital content. Such collaborative events illustrate how coordinated efforts between both institutions allow them to share platforms, resources, and expertise in promoting literacy programs.

These findings demonstrate that coordination enables both institutions to align their activities and avoid duplication of efforts. Through joint planning and participation in events, the state public library and school resource centers are able to optimize the use of available resources while reaching a wider audience of students and young users. Coordination also facilitates the development of integrated programs that leverage the strengths of both institutions to promote digital information literacy.

However, similar to communication, coordination practices appear to depend largely on personal relationships and informal arrangements between library staff and teachers. While this flexibility allows collaboration to occur smoothly, the absence of

formal coordination structures may affect the consistency and long-term sustainability of collaborative initiatives.

In a nutshell, coordination plays a significant role in sustaining collaboration between state public libraries and school resource centers. By aligning activities, sharing responsibilities, and organizing joint programs, both institutions can effectively support digital information literacy initiatives and strengthen their collaborative partnership.

5.3.1.3 Cooperation

Cooperation represents an important dynamic factor that supports collaboration between state public libraries and school resource centers in promoting digital information literacy. Emerson et al. (2012) describe cooperation as a mechanism that enables multiple organizations to work together toward shared goals through mutual support and resource sharing. In collaborative environments, cooperation allows institutions to combine expertise and resources to achieve outcomes that would be difficult to accomplish independently.

Evidence from both the state public library and the Education Resource and Technology Sector respondents demonstrates a generally positive perception of cooperation between the two institutions. Several state public library respondents emphasized the importance of continuing collaborative initiatives. For example, SPL 4 highlighted the need to sustain physical collaboration activities, while SPL 5 noted that school visits to public libraries provide students with early exposure to information resources and technology-based learning. These perspectives indicate that cooperation between libraries and schools serves as a platform for introducing students to digital information literacy practices.

> *"This collaboration needs to be continued, especially the physical collaboration."*
>
> *SPL 4*

> *“It needs to be continued because schools often organize visits to expose students to information, education, and the resources available in libraries. Educating them early on to use technology for learning is essential."*
>
> *SPL 5*

Similarly, SSTP respondents acknowledged the benefits of cooperation with state public libraries. SSTP 7 described the collaboration with teachers and public libraries as positive and mutually beneficial, while SSTP 8 expressed a desire for closer cooperation in future initiatives. In addition, SPL 10 highlighted the development of collaborative networks involving schools, public libraries, and village libraries, particularly in training programs such as the use of u-Pustaka. These examples demonstrate how cooperative relationships allow institutions to share expertise, organize joint programs, and expand access to information resources.

> *"At the state level, this is very encouraging. Schools are forming networks and collaborations with other agencies, particularly public libraries and village libraries, to create beneficial connections. This way, everyone involved can reap mutual benefits. For instance, schools partnering with village libraries to conduct joint programs leads to positive impacts through this cooperation. We collaborated with PPAP initially in terms of training, such as the use of u-Pustaka."*
>
> *SPL 10*

Findings also indicate that cooperation extends beyond bilateral relationships and may involve broader community participation. SPL 3 emphasized that digital information literacy initiatives should involve not only libraries but also the wider community, including other organizations and digital platforms such as social media. This perspective suggests that cooperative networks can strengthen outreach efforts and enhance the dissemination of digital literacy knowledge among students and communities.

> *"When it comes to digital information literacy, we can't rely solely on libraries to assist resource centers and students in their information-seeking efforts. The entire community should collaborate. There are many things we can share on social media, like posters and various types of content, including videos. We need to take advantage of those opportunities. We can't place the burden on just one person; we must share the responsibility and promote our databases more actively."*
>
> *SPL 3*

However, despite the overall positive perception of cooperation, some respondents highlighted limitations in the current level of collaboration. SSTP 12 noted that public libraries could be more actively involved in school programs, suggesting

that existing partnerships may not yet be fully optimized. This indicates that although cooperation exists, opportunities remain to strengthen institutional engagement and expand collaborative initiatives.

> *"I feel that public libraries should be involved in this. It would be better if we included them in our programs. Having two is good, but having three would be even better when we run a particular program. That's my perspective."*
> *SSTP 12*

In conclusion, the findings suggest that cooperation plays a significant role in sustaining collaboration between state public libraries and school resource centers. Through joint programs, shared expertise, and network building, cooperative relationships enable both institutions to promote digital information literacy more effectively within the education ecosystem.

5.3.1.4 Principal Engagement

Principled engagement refers to the process through which stakeholders actively participate in collaborative initiatives and contribute to shared decision-making. In collaborative governance, stakeholder engagement ensures that initiatives are relevant to user needs and that participating organizations develop a shared sense of ownership and responsibility.

The findings of this study indicate strong support from institutional leadership for digital information literacy initiatives. Responses from SSTP officers consistently highlight that top management actively supports the integration of digital information literacy within schools. For instance, SSTP 2 noted that several schools are developing digital library platforms.

> *"Yes, very supportive of moving towards digital technology. For example, the Public Library of Kedah has several schools that are attempting to implement digital libraries. Each school has a site for its digital library."*
> *SSTP 2*

While SSTP 10 emphasized that digital information literacy initiatives are supported within the broader education system.

"On behalf of JPN, specifically SSTP, we strongly support the use of DIL, especially in schools, for teachers, students, and school management. This will facilitate the dissemination, utilization, and sharing of information among the education community."
SSTP 10

Similarly, SSTP 12 stated that these initiatives align with the national education development plan.

"Yes! The top management supports and is included in Pelan Pembangunan Pendidikan."
SSTP 12

This strong institutional support demonstrates the role of leadership engagement in facilitating collaborative initiatives between public libraries and school resource centers. Support from upper management enables the allocation of resources, encourages policy alignment, and legitimizes collaborative programs within the education system. The study also highlights the involvement of multiple stakeholders in supporting digital information literacy initiatives. These stakeholders include the Ministry of Education, the Ministry of National Unity, the National Library of Malaysia, library and media teachers, public library staff, and students. Each stakeholder contributes to the collaboration through different roles, such as policy development, resource provision, program implementation, and participation in digital literacy activities.

The engagement of these stakeholders strengthens the collaborative ecosystem surrounding digital information literacy. When multiple institutions participate in planning and implementation, initiatives are more likely to address diverse user needs and achieve broader impact. This collective involvement also reinforces accountability and ensures that collaborative initiatives remain aligned with national educational and information policies.

Something to note is that stakeholder engagement plays a crucial role in supporting collaborative initiatives between state public libraries and school resource centers. In this study, key stakeholders include the Ministry of Education, the Ministry of National Unity, the National Library of Malaysia, state public libraries, library and media teachers, library staff, and students. Each stakeholder contributes to the implementation of digital information literacy initiatives through policy support, resource provision, program implementation, and user participation.

Within this collaborative ecosystem, the Ministry of Education provides policy direction and institutional support for digital learning initiatives in schools through the Education Resources and Technology Sector (SSTP). Meanwhile, the Ministry of National Unity oversees the National Library of Malaysia and state public libraries, which contribute expertise, digital resources, and training that support information literacy initiatives. At the operational level, library and media teachers and public library staff play a key role in implementing digital information literacy activities, while students represent the primary beneficiaries of these programs.

This multi-stakeholder involvement reflects the principle of engagement, where different actors actively participate in planning and implementing initiatives. Their collective participation helps ensure that digital information literacy programs remain relevant, supported by institutional leadership, and responsive to the needs of students and educational communities. Through such engagement, collaboration between state public libraries and school resource centers can be sustained and strengthened. Thus, principled engagement plays a critical role in sustaining collaboration by ensuring that stakeholders remain actively involved in supporting and implementing digital information literacy initiatives.

5.3.1.5 Shared Motivation

Shared motivation is another key factor that sustains collaboration between state public libraries and school resource centers. Shared motivation emerges when participating organizations recognize common goals, develop mutual trust, and maintain a collective commitment to achieving collaborative outcomes.

The statements from respondents reveal both alignment and differences in perspective in the shared motivation to promote digital information literacy. While both the state public library and the Education Resources and Technology Sector (SSTP) recognize the importance of digital information literacy, their perspectives highlight differences in roles, expertise, and expectations within the collaboration.

Respondents from the state public library emphasized their professional responsibility in information dissemination and literacy education. For example, SPL 11 indicated that the library can guide teachers in using library management systems and information retrieval techniques, but acknowledged limitations in providing financial support or technological resources.

> *"We can help in terms of information. Regarding knowledge, we can guide them on how to use the library management system and how to search for information. We can provide instructions on that. As for financial assistance to purchase equipment, I don't think we're at that level yet. However, we can help them with applying information; we can teach them that."*
>
> *SPL 11*

Similarly, SPL 12 highlighted the role of librarians as information literacy experts responsible for educating users on evaluating and verifying information sources.

> *"Certainly, we in the library have a significant responsibility to provide and teach people about information literacy. Libraries are indeed agents of information dissemination. So, whether we like it or not, as librarians, it is our duty to keep and distribute information. We need to inform people how to find information, how to determine if that information is valid or not, and distinguish between good and bad information. This is all part of our expertise. That is the key role of a librarian. Those who work in libraries must be information literate."*
>
> *SPL 12*

In contrast, SSTP respondents suggested that digital information literacy practices are already embedded in school activities. SSTP 10 noted that teachers had applied digital information literacy practices during the COVID-19 pandemic, although they might not explicitly recognize the term "digital information literacy."

> *"In my view, the school, especially the GPM, is aware of DIL in a digital context and has already been using it during the pandemic. However, the term DIL may not be familiar to them. Previously, they understood and knew about information literacy, but they might not fully grasp the term digital information literacy. Nonetheless, they have been using it indirectly in their teaching and learning activities."*
>
> *SSTP 10*

SSTP 5 further confirmed that SSTP staff already implement digital information literacy in their management practices.

> *"SSTP staff are indeed aware of and apply digital information literacy in management."*
>
> *SSTP 5*

These responses suggest that while both institutions share a common objective of strengthening digital information literacy, differences exist in how each organization conceptualizes its role in the collaboration. Public libraries tend to emphasize their expertise in information literacy training, whereas school stakeholders view digital information literacy as an existing component of teaching and learning practices.

This variation in perspectives does not necessarily weaken the collaboration; rather, it reflects the complexity of inter-organizational partnerships where institutions bring different expertise and expectations. The findings, therefore, indicate that shared motivation exists at the level of overall goals, but there are role and knowledge gaps that may affect how digital information literacy initiatives are implemented collaboratively. In conclusion, the results suggest that collaboration between state public libraries and school resource centers would benefit from clearer role definition and stronger integration of expertise, enabling both institutions to complement each other's strengths in promoting digital information literacy.

5.4 Digital Information Literacy Implementation Factor

The following is an analysis of these implementation factors. It is a contributing factor to digital information literacy, and these factors support its dynamic aspects. The following is an analysis of these implementation factors.

5.4.1 Adaptability in Resource-Limited Contexts and Coordination

Adaptability in resource-limited contexts emerged as an important factor that supports coordination between state public libraries and school resource centers in implementing digital information literacy initiatives. Respondents described how library staff adapt existing modules, integrate digital literacy training into school visits, and combine activities to overcome limited budgets and staffing constraints. For example, SPL respondents noted that modules developed through training programs were modified to suit local needs and school contexts.

These practices demonstrate how adaptability in resource-limited contexts helps institutions coordinate programs despite resource limitations. By adapting materials and integrating activities, both organizations are able to continue collaborative initiatives even when financial and staffing constraints exist. This finding suggests that adaptability in resource-limited contexts functions as a practical mechanism that strengthens coordination between institutions while ensuring the sustainability of digital information literacy programs.

5.4.2 Digital Infrastructure, Competence and Collaborative Capacity

The findings also indicate that digital infrastructure and competence influence the effectiveness of collaboration between state public libraries and school resource centers. Several respondents noted that many library and media teachers still lack sufficient digital information literacy competencies. Similarly, SPL respondents indicated that public library staff often rely on self-learning and workshops to develop their knowledge due to the absence of dedicated experts.

These skill gaps affect the capacity of both institutions to implement digital literacy initiatives effectively. Limited ICT proficiency among educators may reduce their confidence in using digital tools, while the absence of specialized expertise in public libraries constrains their ability to provide structured training. As a result, stronger coordination and joint training initiatives between public libraries and education authorities may be necessary to strengthen digital information literacy implementation.

Access to ICT tools and internet connectivity was identified as another factor influencing the implementation of digital information literacy initiatives. Respondents from both SPL and SSTP emphasized that adequate equipment, such as computers, projectors, and reliable internet access, is necessary for teachers and students to engage effectively with digital resources. However, respondents also highlighted limitations such as restricted smartphone use in schools and inconsistent internet connectivity, particularly in rural areas. These challenges suggest that cooperation between public libraries and schools can play an important role in addressing resource gaps. By sharing facilities, equipment, and digital resources, both institutions can enhance students' access to information and support digital literacy development

5.4.3 Virtual Learning and Shared Commitment to Digital Literacy

The shift toward virtual learning environments during the COVID-19 pandemic further reinforced the importance of digital information literacy for both educators and students. Respondents indicated that digital platforms enabled teachers to access and share learning materials more efficiently while encouraging students to evaluate and use information critically

5.5 Cross-Cutting Factors Supporting Sustainable Collaboration

The findings indicate that sustainable collaboration between state public libraries and school resource centers is shaped by several interrelated factors. Rather than functioning independently, these factors interact to influence the implementation of digital information literacy initiatives. The analysis identifies three key cross-cutting dimensions, which are institutional capacity and expertise, resource support and infrastructure, and human capital development and professional support

5.5.1 Institutional Capacity and Expertise

One of the key issues that emerged from the findings of this study was the limited availability of specific expertise in digital information literacy among librarians and school resource centre staff. Several respondents acknowledged that while they had general knowledge of information management, many did not consider themselves experts in digital information literacy.

This situation reflects the evolving nature of literacy competencies in the digital age. Traditionally, librarians and media teachers have focused primarily on information literacy and media literacy. However, the increasing reliance on digital technology has broadened the scope of these competencies to include digital information literacy skills such as evaluating online information, navigating digital platforms and understanding the ethical use of information. Respondents indicated that adapting to these new competencies requires ongoing learning and professional development.

Library staff generally appear to be more adaptable to these changes due to their academic backgrounds in library and information science, which often include training in information organisation and retrieval. In contrast, library and media teachers often face greater challenges when integrating digital information literacy into their responsibilities, particularly when they lack formal training in library management or digital information practices. Some respondents also noted that factors such as age, technology familiarity, and distance to retirement may influence the willingness or ability of certain educators to adopt new digital competencies.

These findings suggest that strengthening institutional expertise is an important aspect of sustaining digital information literacy initiatives. Ongoing training opportunities and knowledge-sharing mechanisms can support library and media

teachers and library staff in adapting to the changing needs of digital literacy. Previous studies (Frandsen et al. 2017; Mutong, 2021) have also emphasized the importance of professional development in enhancing teachers' and librarians' capacity to effectively implement digital literacy initiatives.

5.5.2 Resource Support and Infrastructure

Financial resources represent another important factor influencing the sustainability of digital information literacy programs. Findings indicate that state public libraries receive operating funding through grants from both state and federal governments. This funding supports a range of library services, including the purchase of reading materials, reading promotion activities, staff training, and operating expenses.

However, respondents indicated that digital information literacy programs do not typically receive specific financial allocations. Instead, digital information literacy-related activities are typically integrated into broader reading promotion programs organized by libraries. As one respondent explained:

> *"We integrate information literacy programs into the Reading Promotion Program. This means that our budget includes the allocations provided by the National Library of Malaysia for awareness programs and similar initiatives."*
> *(SPL 12)*

While this funding arrangement allows libraries to continue implementing digital information literacy activities, the absence of specific allocations may limit the sustainability and expansion of these programs in the long term. Without specific funding, digital information literacy initiatives may compete with other program priorities in the existing budget.

However, the integration of digital literacy activities into reading promotion programs also reflects the adaptive strategies used by libraries to ensure that such initiatives remain operational despite financial constraints. This approach demonstrates the flexibility of public library institutions in incorporating digital information literacy elements into existing community engagement activities.

These findings highlight the importance of stable financial support in sustaining digital information literacy initiatives. Adequate funding not only enables program

implementation but also supports training activities, technology upgrades, and collaborative initiatives between libraries and educational institutions.

5.5.3 Digital Infrastructure Availability

The availability of digital infrastructure in state public libraries is also an important driving factor in supporting digital information literacy initiatives. Respondents reported that state public libraries have a variety of technological facilities that enable users to access digital resources and develop their digital information literacy skills.

Several respondents reported the availability of facilities such as computer labs, tablets, internet access, multimedia equipment, and digital library services. For example, one respondent explained that the library provides free Wi-Fi, tablets, and digital collections that can be accessed by users for information search and learning purposes (SPL 1). Other respondents also mentioned the presence of digital reading devices, multimedia workshops, and online library services that allow users to explore various digital resources.

The existence of these facilities indicates that state public libraries are increasingly expanding their role beyond traditional information repositories to become digital learning environments that support community access to technology and information. In this context, public libraries serve as important access points for digital resources, especially for individuals who may not have adequate technological facilities elsewhere.

However, respondents from SSTP also indicated that the availability of digital infrastructure varies by educational institution. Some schools may not have sufficient technology resources or internet access to fully support digital literacy activities in classroom settings. This situation highlights the complementary role that state public libraries can play in supporting school resource centers. Through collaborative initiatives, libraries can provide access to technology facilities and digital resources that may not be readily available in schools.

These findings are consistent with previous research (Bello & Adepegba, 2023; Prihatin et al., 2024; Wang & Si, 2024) that shows that public libraries play a critical role in promoting digital inclusion by providing access to digital infrastructure and technology resources for communities. By offering such facilities, libraries contribute

to the development of digital literacy skills among students, educators, and community members.

5.5.4 Organizational Commitment and Motivation

Another factor that supports the implementation of digital information literacy initiatives is the level of organizational commitment and motivation among library staff. During the interviews, many respondents showed high enthusiasm when discussing their experiences in organizing digital literacy activities and helping users access digital information.

Although they acknowledged certain limitations, such as a lack of specific expertise or financial constraints, respondents expressed a willingness to continue to improve their knowledge through workshops, professional development activities, and self-study. One respondent explained as stated below.

> *"We may not have specific expertise, but our staff has knowledge that allows them to share digital information literacy skills. They acquire information through reading, workshops, and online resources."*
>
> *(SPL 1)*

Such responses indicate that intrinsic motivation and professional commitment among library staff play an important role in sustaining digital literacy initiatives. Library staff who are motivated to learn and share knowledge are more likely to actively participate in training opportunities and contribute to collaborative programs between libraries and schools.

This motivation is particularly important in environments where institutional resources may be limited. In such a context, staff commitment can compensate for certain structural limitations by encouraging proactive learning and program development. Previous studies have also emphasized that professional dedication and a positive attitude towards the use of technology are important factors in the successful implementation of digital literacy initiatives in educational and library environments.

In conclusion, the study findings indicate that sustainable collaboration between state public libraries and school resource centers in implementing digital information literacy initiatives is shaped by several interrelated factors. Institutional expertise, financial support, digital infrastructure, and staff motivation collectively influence the

capacity of institutions to design and sustain digital literacy programs. Understanding these cross-cutting factors provides valuable insight into the conditions that support effective collaboration and highlights the important role of public libraries in promoting digital information literacy in the educational community.

5.6 Cross-case Analysis

A cross-case analysis compares findings from state public libraries and the Educational Resources and Technology Sector to identify unique characteristics, similarities, and variations in implementing digital information literacy initiatives in school resource centers. By examining these two cases together, the analysis reveals how different organizational contexts, capacities, and stakeholder perspectives can shape collaborative processes.

5.6.1 Unique Features from the Interview

This section presents key findings from a cross-case analysis of two institutional actors involved in digital information literacy initiatives: the state public library and the Educational Resources and Technology Sector. The analysis highlights each institution's strengths, operational challenges, and perspectives on the implementation of digital information literacy. While the state public libraries demonstrate strong infrastructural capacity and adaptive program delivery, the SSTP plays a key role in overseeing curriculum and aligning with educational policy. Examining both perspectives provides insights into the complementary roles played by these institutions, as well as the structural constraints that influence the implementation of digital literacy programs in schools.

Table 5.2 below shows the unique features from the interview. Despite the distinct roles and unique features of both the state public libraries and the school resource centers, several common insights emerged from the interviews. Both institutions acknowledged that collaboration plays a crucial role in addressing structural limitations and bridging existing resource gaps. The findings also suggest that shared motivation among stakeholders, supported by coordinated planning, contributes significantly to the effective implementation of digital literacy programs. Nevertheless, ICT disparities remain a persistent challenge. Unequal access to digital tools and

reliable internet connectivity continues to affect the sustainability and broader reach of these initiatives.

5.6.2 Emerging Themes

The cross-case also revealed the new themes, which were previously not captured in the preliminary frameworks. These new themes are now being integrated into the initial framework. This will enhance its ability to represent the dynamic interactions between human, technological, and organizational factors in sustaining digital information literacy initiatives. The themes are as follows: -

(a) Adaptability in Resource-Limited Contexts - the situation where creative strategies are used to optimize resources, merge activities, and modify existing modules according to the organization's preferences

(b) Digital infrastructure and competence- the synergy between ICT tools and staff skills, emphasizing that access alone is not enough without competence.

(c) Motivational drivers - intrinsic motivation among staff enables sustained engagement and program innovation.

(d) Bridging institutional gaps – the process of navigating structural and policy differences between state public libraries and schools to facilitate collaboration.

Table 5.2
Unique Features from the Interview

Institution	Unique Features	Description
SPL	Infrastructure strength	State public libraries possess advanced digital resources such as tablets, computer labs, and e-library collections, which can be shared with schools to address ICT disparities.
	Motivated and adaptive staff	SPL officers displayed high intrinsic motivation, often engaging in workshops, self-directed learning, and community outreach despite limited formal training in digital information literacy
	Creativity in resource-limited contexts	SPL officers demonstrated adaptability in program design, including merging activities with reading promotions and modifying national modules to fit local needs.
SSTP	Curriculum development and support	SSTP officers highlighted the need for structured curricula for library and media teachers, emphasizing critical digital competencies.
	ICT skill gaps among teachers	Interviews revealed that many teachers struggle with digital literacy due to a lack of training, attitudinal barriers, or approaching retirement.
	Regulatory and policy constraints	Classroom ICT policies, such as bans on mobile devices, limit how digital literacy can be implemented directly in schools.

The analysis reveals that state public libraries and the SSTP each bring their own unique flavors to the table. While both have specific hurdles to clear, their institutional differences actually create a perfect opportunity for a partnership. The biggest strength of the SPL is its physical presence. With modern computer labs, tablets, and e-library tools, these libraries act as vital bridges for students from under-resourced schools who might otherwise be left behind. Beyond just having the right gear, the staff at SPL are the real driving force. Even without formal digital information literacy training, these individuals show incredible personal drive, often teaching themselves or attending workshops to better serve their communities. This "can-do" attitude is especially visible in low-resource settings, where staff creatively weave digital skills into standard reading events, ensuring that no one is excluded.

On the other side, the SSTP excels at the "big picture." They focus on methodical curriculum design and making sure digital literacy aligns with national standards. However, they face a human challenge: many teachers struggle with “technology anxiety” due to a lack of professional development or a simple reluctance to change old habits. These human barriers, combined with strict classroom rules like mobile device bans, can make it difficult to actually get technology into the hands of students. By working together, these two entities can solve each other’s problems. The SPL

provides the flexible, hands-on space that schools often lack, while the SSTP provides the academic roadmap that helps libraries formalize their efforts. This kind of teamwork is essential for creating digital literacy programs that actually last. Research shows that when libraries invest in infrastructure and cross-sector partnerships, they significantly boost both staff confidence and user engagement (Adewojo, 2026). Hence, these shared efforts, ranging from formal workshops to simple resource sharing, are the key to closing the gap in teacher training and creating a more inclusive digital world (Adewojo, 2026; Derder et al., 2023).

5.6.3 Proposal of the Digital Information Literacy Index Framework (DILIF)

Based on the cross-case findings, this study proposed the Digital Information Literacy Framework (DILIF) as the final contribution. The DILIF conceptualizes sustainable digital information literacy implementation based on four indices, which are human capital, digital infrastructure, collaborative processes, and contextual adaptation, as presented in Table 5.3.

Table 5.3
DILIF Index

Index	Component
Human Capital	Staff expertise, motivation, and continuous professional development
Digital Infrastructure	Availability and accessibility of ICT tools, internet connectivity, and digital resources
Collaborative Processes	Communication, coordination, cooperation, shared motivation, and the principle of engagement
Contextual Adaptation	Structural differences, resource limitations, and policy constraints

5.7 Organization of Chapter

This chapter presents a detailed examination of the findings obtained from state public libraries and the SSTP regarding collaborative initiatives aimed at promoting digital information literacy within school resource centers. The analysis highlights that sustainable collaboration between these institutions is not a singular or static process, but rather one that is shaped by a set of interrelated and dynamic elements. Among these, communication, coordination, collaborative practices, the principle of

engagement, and shared motivations emerge as critical components. These elements function as essential channels that enable effective interaction, mutual understanding, and the successful implementation of joint programmes between state public libraries and educational authorities.

The findings further indicate that the success of such collaborative efforts is highly dependent on the degree to which institutional motivations are aligned. Both state public libraries and school-based entities must share common goals and a mutual commitment to advancing digital information literacy. At the same time, the ability of these institutions to navigate structural differences, such as variations in roles, responsibilities, administrative frameworks, and operational priorities, plays a crucial role in determining the effectiveness of collaboration. Without careful alignment and negotiation, these differences may create barriers that hinder coordinated action.

In particular, the study reveals complementary strengths between the collaborating institutions. State public libraries are often better equipped with digital infrastructure, technological resources, and expertise in information management, positioning them as key providers of technical support and knowledge. On the other hand, school resource centers and their associated educational bodies contribute significantly by offering direct access to students, as well as an established teaching and learning environment that facilitates the practical application of digital information literacy skills. This complementary relationship underscores the potential value of collaboration when both parties effectively leverage their respective strengths.

However, the findings also point to several challenges that may affect the sustainability of these initiatives. Notably, disparities in ICT skills and uneven access to technological resources across institutions can create tensions within the collaborative process. Such gaps may limit participation, reduce the effectiveness of programme delivery, and ultimately impact the long-term sustainability of digital information literacy initiatives. These challenges highlight the importance of addressing both technological and human capacity issues within collaborative frameworks.

Therefore, the study demonstrates that achieving sustainable collaboration requires more than a shared vision or commitment. It necessitates continuous and deliberate efforts to bridge existing gaps in technology, skills, and institutional capacity. This includes investing in infrastructure, enhancing digital competencies, and fostering a culture of ongoing cooperation and mutual support between institutions.

The insights generated from this chapter provide a strong empirical foundation for the development of the proposed Digital Information Literacy (DIL) Index Framework. The identified dynamics, challenges, and enabling factors inform the conceptualization of the framework, which is further elaborated and discussed in the following chapter.

CHAPTER 6
INDEX FRAMEWORK DEVELOPMENT

6.1 Introduction

Chapter 6 presents the development of a new conceptual framework for sustainable collaborative digital information literacy, titled the Digital Information Literacy (DIL) Conceptual Framework Towards Sustainable Collaboration Between Malaysian State Public Libraries and School Resource Centers, in alignment with Research Objective 5 (RO5): to construct a Digital Information Literacy (DIL) Conceptual Framework for sustainable collaboration between Malaysian state public libraries and school resource centers. Reflecting on the findings of this study, the researcher proposed this framework to assess the current state of digital information literacy and to guide sustainable collaborative practices. A comprehensive review of the literature was conducted to identify existing frameworks that could serve as a foundation for evaluating practices related to digital information literacy.

This chapter provides a detailed discussion of the developed conceptual framework, including its structure, components, and rationale. Recommendations are offered for how state public libraries and school resource centers can implement the framework in practice. The framework is designed to be comprehensive and practical, aiming to enhance digital information literacy practices while providing benefits to teachers, students, state public libraries, and other relevant stakeholders.

The focus of this framework is to establish a structured approach for fostering collaboration between state public libraries and school resource centers, thereby improving access to digital information resources and supporting sustainable initiatives in the Malaysian education context.

6.2 Description of the Framework

The Digital Information Literacy (DIL) Index Framework was developed to support sustainable collaboration between the state public libraries and the school resource centres. The framework is structured around two interrelated dimensions, namely Collaborative Dynamic Factors and DIL Implementation Factors, which

collectively influence the effectiveness and sustainability of digital information literacy initiatives.

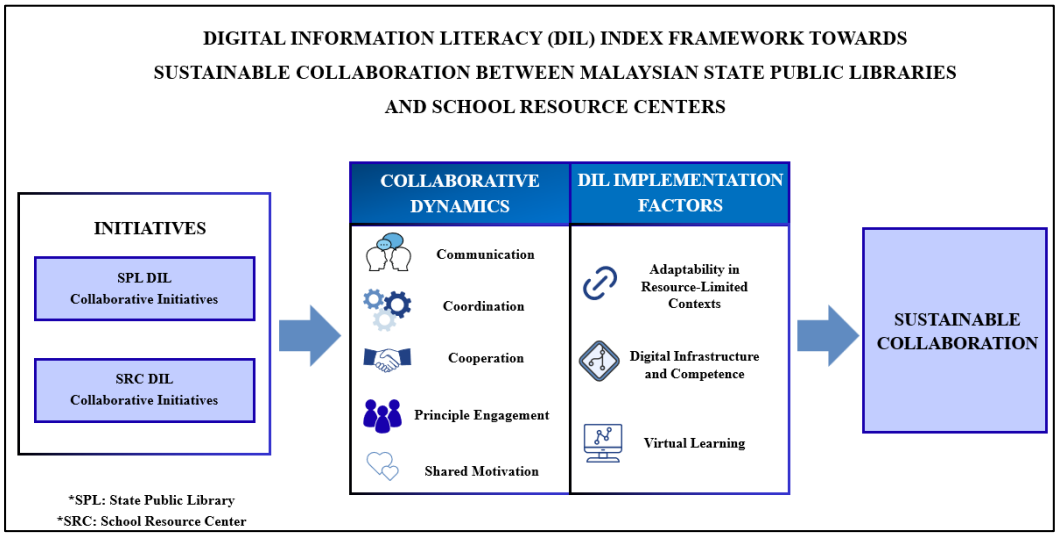

Figure 6.1 Digital Information Literacy (DIL) Index Framework Towards Sustainable Collaboration Between Malaysian State Public Libraries and School Resource Center

The framework begins with collaborative initiatives undertaken by both SPL and SRC, which serve as the entry point for engagement. These initiatives activate the collaborative dynamic factors, which in turn interact with the implementation factors to support the execution of digital information literacy programmes. The integration of these dimensions ultimately leads to the outcome of sustainable collaboration, where both institutions continuously work together to enhance digital information literacy.

The first dimension, Collaborative Dynamic Factors, refers to the relational and process-oriented elements that facilitate interaction and cooperation between the state public library and the school resource center. These include communication, coordination, cooperation, principal engagement, and shared motivation. These factors represent the human and organisational processes that drive collaboration, ensuring that both institutions are aligned in their goals, actively engaged, and committed to implementing digital information literacy programmes. Effective collaboration is dependent on clear communication channels, coordinated planning, cooperation, leadership support, and sustained motivation among stakeholders (Bennet & Gadlin, 2012; Haas & Mortensen, 2016; Love et al., 2022)

The second dimension, DIL Implementation Factors, refers to the structural and capacity-related conditions that enable the execution of digital information literacy initiatives. This includes adaptability in resource-limited contexts, digital infrastructure

and competence, and virtual learning capabilities. These factors represent the operational enablers that determine whether programmes can be implemented effectively. Adequate infrastructure, skilled personnel, and the ability to adapt to contextual constraints are essential to ensure successful programme delivery.

This proposed conceptual framework provides a comprehensive structure for understanding and enhancing sustainable collaborative initiatives in digital information literacy between Malaysian state public libraries and school resource centers. It emphasizes the importance of aligning resources, coordinated actions, and institutional contributions with overarching principles to achieve effective and sustainable outcomes.

6.3 Component of Digital Information Literacy (DIL) Index Framework Towards Sustainable Collaboration Between Malaysian State Public Libraries and School Resource Center

The purpose of the framework is to provide a structured conceptual tool for use by the state public libraries and the school resource centers in promoting digital information literacy and facilitating sustainable collaboration between the two institutions. The inclusion of these elements in the framework is further supported by insights obtained from interview sessions with public library officers and representatives from the SSTP. The elements incorporated within this framework are deemed appropriate for practical application by both state public libraries and school resource centers. These elements are subsequently outlined and discussed in detail.

Through this study, it is assured that digital information literacy would lead to the teaching and learning process becoming better, along with the latest technological advances; at the same time, it ensures the sustainability of the collaboration. Children are exposed to the latest technology every day. It should be emphasized that this facility should not be misused, used for the right situation, and managed properly. It is the responsibility of the state public library, as well as the school resource center to be a guiding partner in this situation. This perspective is consistent with the recommendation of Suwarto et al. (2022), who recommends schools combine ICT learning, information literacy, and media literacy with a more comprehensive pedagogy, with school libraries serving as the focus. Within the framework, this aligns with the emphasis on standardized digital information literacy modules and innovative learning activities.

At the same time, the principal of the school should encourage library and media teachers to work with computer and classroom teachers to improve inclusive digital literacy curricula. The use of Technology well and assistance with proper guidance will help students master and use the latest technology.

6.3.1 Collaborative Dynamics

The analysis in Chapter 5 indicates that communication, coordination, and collaboration, shared motivation, and the principle of joining action are among the essential elements in the collaborative initiatives between state public libraries and school resource centers. Therefore, these five elements serve as an action plan to drive digital information literacy for sustainable collaboration between state public libraries and school resource centers in Malaysia. Starting with communication will lead to coordination for implementing collaborative initiatives and, subsequently, foster cooperation between the two institutions, supported by shared motivation and guided by principles of engagement, as Mathews (2020) stated, inter-organizational alliances rely heavily on collaboration as a crucial element.

6.3.1.1 Communication

In this proposed framework, communication emerges as a fundamental mechanism based on the empirical findings presented in Chapters 4 and 5. In particular, respondents consistently emphasized that effective communication between state public libraries and schools is essential to ensure smooth coordination and successful program implementation. For example, the respondents stated that:

> *"So far, collaboration with school teachers has been positive, because when we share information, they become more interested in learning more."*
> *SPL 7*

> *"...we, the School Resource Center, and they, the State Public Library, maintain mutual communication in all activities."*
> *SSTP 12*

It emphasizes the practical importance of structured interactions. These findings suggest that communication not only supports but also serves as a core operational

element in fostering collaboration and sustaining educational initiatives. Furthermore, the findings reveal that communication-related activities such as managing correspondence, coordinating meetings, and maintaining consistent engagement are essential in building strong institutional partnerships. Thus, communication serves as an enabler and sustaining force in the framework.

This empirical view is further supported by the existing literature. Communication aims to promote mutual understanding, facilitate the exchange of views, and support collaborative action (Kurowicka, 2020). In line with this, the Maryland Department of Labor (2021) identifies communication as one of the core competencies of digitally literate individuals, highlighting the ability to effectively communicate ideas across diverse audiences while adhering to digital communication norms. Similarly, Belshaw (2014) emphasizes that communication in digital environments involves understanding platform-specific goals, norms, and concepts such as identity, trust, and influence. In addition, Ferrar et al. (2019) also outline the role of communication and collaboration in digital contexts, particularly in applying appropriate conventions, defining roles, and evaluating group interactions. In addition, Crown (2018) includes communication as a critical skill for life and work, encompassing collaboration and information sharing.

In a nutshell, both empirical findings and supporting literature strongly justify the inclusion of communication as a core element in the framework. Importantly, communication is not only essential at the initial stages of a program but also plays a critical role in ensuring its long-term continuity and sustainability.

6.3.1.2 Coordination

Within this study, coordination emerges as a critical element in the proposed framework based on the findings presented in Chapters 4 and 5. Specifically, respondents emphasized the importance of aligning activities, schedules, and responsibilities between state public libraries and school resource centres to ensure the smooth implementation of collaborative programs. For example, one respondent noted that

> *"...and when discussing with headmasters, principals, and school resource centre teachers, a conclusion can be drawn that...."*
> *SPL 10*

This response indicates that continuous coordination is necessary to manage joint activities effectively. This suggests that coordination is not only operational but also relational, requiring ongoing alignment between both institutions.

Effective implementation of digital information literacy programs requires more than just planning on paper; practical steps are essential. The findings show that the respondent mentioned that,

> *"We have to start with the first step. This cannot be done on paper only; it needs workshops, practical, and so on."*
> *SPL 1*

The statement emphasizes the need for coordination, highlighting that improving digital information literacy requires a structured, step-by-step approach with practical workshops and hands-on activities rather than relying solely on theoretical planning. Furthermore, the findings indicate that proper coordination helps minimize duplication of efforts and ensures that available resources are utilized efficiently. Respondents highlighted that clear task distribution and structured planning contribute to more organized and impactful program delivery. Therefore, coordination functions as a key mechanism that supports the successful execution and sustainability of collaborative initiatives within the framework.

These empirical findings are supported by existing literature. This issue has been the subject of discussion for many years, as Malone & Crowston (1994) define coordination as the management of dependencies between activities, emphasizing its role in organizing interrelated tasks. In line with this, the proposed framework conceptualizes coordination as the alignment of activities, schedules, and responsibilities between libraries and school resource centres. Further add, Schuh et al. (2014) identify coordination as one of the three key dimensions of collaborative practice, alongside cooperation and communication. Within this dimension, resource pooling and goal congruence are highlighted as central components. Resource pooling involves the allocation of information, equipment, and personnel, as well as task assignment and time management, while goal congruence refers to a shared understanding of objectives among collaborating parties. Within that, coordination is a managerial function that enables harmonious collaboration among multiple departments and teams within an organization (Xinyu, 2023).

Taken together, both the empirical evidence and supporting literature justify the inclusion of coordination as a core element in the framework. It plays a crucial role in facilitating collaborative actions, ensuring efficient resource use, and aligning institutional goals toward the successful implementation of digital information literacy initiatives.

6.3.1.3 Cooperation

Based on the findings from Chapters 4 and 5, expanding national and state-level cooperation is crucial to ensure that students across Malaysia have equitable access to resources and support to develop their digital information literacy skills. Respondents emphasized that state public libraries actively coordinate with school resource centers through joint programs and workshops. For example, one respondent stated,

> *"Cooperation continues. As an example, short workshop costs for participants*
>
> *SPL 12*

This statement illustrates the ongoing nature of collaborative activities. Another explained,

> *"As I said before, we do workshops or classes in the mobile library as well as weeks of school time."*
>
> *SPL 8*

This statement highlights the practical implementation of these initiatives. The data reveal that state public libraries organize various workshops and programs, including Microsoft Sheet workshops, Information Ethics talks, u-Pustaka talks, and makerspace activities. These sessions enable both students and teachers to access e-learning resources, learn to use digital tools ethically, and develop practical digital skills. One respondent noted,

> *"Either the teacher or we will conduct classes for the students. For example, this week the class is about building a website, so we'll teach the students how to create one. Or if this week's class is about databases, then we'll explain what kinds of databases can help support the students in their studies.". SPL 13*

Similarly, workshops targeting teachers and library staff, such as training on Google Forms, Canva, and online applications, demonstrate the effort to build institutional capacity for digital information literacy programs.

Furthermore, respondents emphasized that collaboration fosters networking and the sharing of expertise between institutions. For instance, one respondent stated,

> *"Indeed, at the state level, it is very encouraging. Schools have networks or relationships with other agencies, especially public libraries, and rural libraries, so that they make connections and beneficial networks together." SSTP 10*

Another comment underscores the mutual support and long-term sustainability of collaborative efforts.

> *"Yes, the public library and school resource center must have a good relationship and help each other in managing the resource center." SSTP 11*

These empirical findings align with existing literature on cooperation and collaboration in educational and digital contexts. In this regard, Florentim et al. (2025 highlighted that cooperation facilitates the optimal use of available resources and improves the response to the needs, and in a complementary perspective, Holubčík et al. (2023) stated that strategic collaboration between organizations can play a crucial role in promoting long-term business sustainability. Previously, Emerson et al. (2012) described cooperation as the mechanism through which key organizations enable multi-party collaboration, emphasizing both static factors and dynamic mechanisms. Crown (2018) similarly highlights that communication, collaboration, and sharing are interrelated competencies essential for life and work, while Schuh et al. (2014) and Ferrar et al. (2019) underline the importance of cooperation in the development of workshops, curricula, and educational programs.

In conclusion, the findings indicate that structured cooperation between state public libraries and school resource centers facilitates not only the delivery of digital

information literacy initiatives but also the development of expertise among students, teachers, and library staff. Respondents' insights confirm that consistent collaboration, supported by formal programs and workshops, strengthens networks, promotes the sharing of resources, and ensures the sustainability and impact of digital literacy programs across diverse educational contexts.

6.3.1.4 Principle of Engagement

The findings from this study indicate that engagement is a key principle in fostering effective collaboration between state public libraries and school resource centers. Respondents highlighted that active participation, willingness to contribute, and a commitment to shared goals are central to sustaining collaborative digital information literacy (DIL) initiatives. For example, one respondent reflected on their role in supporting schools despite limited expertise, stating,

> *"No experts, we are not. (We) For reference only. Enough to support the school. Because we have the facilities, the database to help, we have the skills, we have the modules, and we have the staff."*
> *SPL 2*

Another respondent emphasized the mutual benefits of active engagement:

> *"I strongly agree with this cooperation for the future, for the common good between both parties. Good collaboration between the two parties, the public library and SSTP in developing together, increasing the use of digital information literacy among school residents, so that both parties get the best benefit."*
> *SSTP 9*

These responses demonstrate that engagement goes beyond mere participation; it involves commitment, mutual respect, and a willingness to contribute resources and expertise toward shared objectives. Respondents perceive that even in the absence of formal specialists, active involvement and principled engagement enable the collaboration to achieve meaningful outcomes for both institutions and the students they serve.

These findings align with the literature. Rezal et al. (2020) note that principled engagement among collaborative partners fosters a shared understanding of objectives

and a mutual recognition of joint actions necessary to achieve established goals. In addition, engagement in this context also reinforces trust, encourages inclusiveness, and cultivates a sense of ownership among participants, all of which contribute to the successful implementation of digital information literacy programs. as discussed long ago by Gravenkemper (2007) presents six key principles that help organizations build and strengthen community, include: (a) sharing a clear and inspiring message, (b) forming a supportive leadership team, (c) using value-based rather than rule-based guidelines, (d) spotting early signs of engagement, (e) providing ongoing opportunities for dialogue, and (f) planning ways to integrate new members and leaders smoothly.

Hence, the study confirms that engagement is a foundational element in the framework, enabling partners to actively contribute, coordinate efforts, and sustain collaborative initiatives, thereby ensuring that both schools and state public libraries maximize the benefits of digital information literacy programs.

6.3.1.5 Shared Motivation

The findings from this study indicate that shared motivation is another factor in fostering sustainable collaboration between state public libraries and school resource centers. Respondents highlighted that a common goal of enhancing digital information literacy among students will serve as a driving force, aligning their actions and strengthening cooperative efforts. For instance, one respondent stated,

> *"If we collaborate with schools from the beginning, I think one day we can create a literate society, which can choose and use information accurately, and more people use information or resources digitally."*
> *SPL 2*

Another emphasized the importance of aligning initiatives with the needs of teachers and students, noting:

> *"The expectation is that it will work. We already have that relationship; we need to have a relationship with the need to meet the needs of teachers and pupils. Teachers are supplied with modules for teaching. For the students, with the activities carried out with the PSS, library, and PNM, with u-library, it will be an excellent relationship to make DIL a success with the state public library."*
> *SSTP 7*

Supporting school resource centers in digital information literacy requires not only capability but also responsiveness to the schools' needs. SPL 13 mentioned that the public library is able to help the school resource center.

> *"Yes, able to help the school resource center in digital information literacy. Currently, there is indeed assistance in digital information literacy to school resource centers based on demand."*
> *SPL 13*

This statement demonstrates shared motivation and responsiveness, demonstrating that support is provided according to the needs of the school. It reflects the state public library's willingness to assist and commitment to improving digital information literacy in schools, emphasizing the purpose and intent behind the assistance rather than the act of coordinating tasks or collaborating directly.

These responses reveal that shared motivation is grounded in a collective desire to achieve mutual benefits, particularly the long-term goal of creating a digitally literate society. Respondents perceive that when individuals and institutions share a vision, mission, and values, it not only harmonizes individual capabilities but also strengthens a sense of association and collaboration.

This finding is supported by existing literature. For example, Hidalgo et al. (2022) note that among self-directed learners, shared objectives such as gaining knowledge through practice and sharing progress with peers' act as a significant motivational factor. In the same vein, the concept of shared motivation in organizational and educational contexts emphasizes that a unified purpose fosters commitment, aligns actions, and sustains collaborative initiatives over time. Consequently, shared motivation is key to successful collaboration. Therefore, to tackle complex problems and enhance teamwork, organizations should align their policies and cultivate a culture that encourages knowledge-sharing (Development of Intraorganizational Post-Merger Collaboration Plan: An Evaluation Study, 2022). Moreover, the statement highlights that shared motivation is strengthened through participatory leadership, well-defined roles, and a supportive organizational culture. Together, these elements boost team members' ownership, trust, and dedication to achieving shared organizational goals (Silaen & Silaen, 2025). Furthermore, shared motivation in collaboration is nurtured through open communication, collective decision-making, and fair distribution of roles. As a result, these practices foster members' sense of belonging, ownership, and active

contribution, ultimately strengthening volunteer motivation within the organization (Ayu et al., 2025).

In conclusion, the study confirms that shared motivation is a foundational element in the framework, as it encourages coordinated action, reinforces commitment to digital information literacy goals, and contributes to the sustainability of collaborative efforts between the schools and the state public libraries.

6.3.2 Implementation Factors

This section highlights three key elements, which are adaptability in resource-limited contexts, digital infrastructure and competence, and virtual learning. The elements of digital infrastructure refer to the technical resources and competencies essential for achieving digital literacy. In contrast, adaptability in resource-limited contexts and virtual learning underscore the innovative approaches and educational aspects that enrich digital information literacy. Together, these factors illustrate a comprehensive view of the components necessary for effective implementation of digital information literacy initiatives, emphasizing the interplay between technical proficiency and creative educational practices.

6.3.2.1 Adaptability in Resource-Limited Contexts

Adaptability in resource-limited contexts emerges as a key implementation factor based on the study's findings. Respondents highlighted that despite limitations in staffing, time, and resources, they are still able to support digital information literacy initiatives by maximizing what is available. As one respondent noted,

> *We do not have expertise in information literacy, but we are sufficient to support the school resource center."*
> *SPL 3*

This reflects how practitioners rely on existing capacities to sustain program implementation. In addition, respondents emphasized the importance of practical and flexible approaches in delivering activities. For example, one respondent stated,

> *"...in alignment with the needs to meet the expectations of both teachers and students. Teachers are provided with modules for teaching, while students are engaged through activities carried out in collaboration with the school resource center."*
> *SSTP 7*

This indicates that adaptability is not only about resource management but also about adjusting implementation strategies to ensure effectiveness. The findings further show that respondents demonstrate creativity by developing new modules, modifying existing ones, and organizing programs tailored to different user groups while managing workforce constraints. This adaptability enables them to maintain program continuity and respond to varying needs across school resource centers. It also encourages innovative thinking, as officers and teachers are required to explore alternative solutions, adjust roles, and optimize available materials and time. For example, this respondent mentioned that:

> *"Fasih Dewey Digital (App). At present, we are still in the trial phase. Version 2 may be introduced next year. For now, schools can use the module…*
> *SSTP 12*

These findings are supported by existing literature, which defines creativity as the ability to generate original ideas and solutions (American Psychological Association, 2024). Similarly, Gabora (2013) highlights creativity as a human capacity to reimagine possibilities and produce innovative outcomes. In this context, creativity and adaptability function together as critical enablers for sustaining digital information literacy initiatives, particularly in resource-constrained environments.

6.3.2.2 Digital Infrastructure and Competence

The issues identified during the interview sessions with respondents highlighted two primary concerns: ICT skills and ICT tools. Both factors may serve as significant barriers to the effective implementation of digital information literacy and to ensuring its long-term sustainability in the state public libraries and the school resource center.

First, the availability of various ICT tools, such as software applications, online resources, and interactive platforms, plays a critical role in enhancing digital information literacy. Respondents emphasized that access to such equipment is essential

for implementing digital information literacy programs effectively in both schools and state public libraries. As one respondent noted:

> *"Yes, I agree that having complete equipment plays an important role in the success of digital information literacy."*
> *SSTP 5*

Another added:

> *"In my opinion, for someone literate in digital information literacy, the tools they use don't need to be very sophisticated; what's important is that they have internet access. If someone is in a rural area, we don't accept this excuse. We have many ways. Of course, we can't follow 100 types of resources in the city. Even with basic equipment, as long as there are downloadable materials, we can access them, except for social media…"*
> *SSTP 13*

These insights indicate that ICT tools serve as an enabling factor for both teachers and library staff, allowing them to deliver digital information literacy programs despite variations in resource availability. Respondents noted that many schools and resource centers face limitations in hardware, which constrains access to digital resources. As one respondent explained:

> *"…because most schools and resource centers face limitations in terms of hardware. "*
> *SPL 3*

This underscores the importance of providing ICT resources such as computers, tablets, and internet-enabled devices, which support collaboration, communication, and access to digital information. Even basic equipment, when used effectively, enables teachers and library staff to deliver digital information literacy programs and allows students to develop essential digital skills. As Wood (2003) argues, the use of wireless technology in education can help bridge the digital divide, particularly in developing regions. Mobile devices such as phones and PDAs are more affordable than desktop computers, facilitating communication, collaboration, and information sharing among students and teachers.

The study findings support the inclusion of ICT equipment as a key implementation factor in the digital information literacy index framework toward

sustainable collaboration between state public libraries and school resource centres. By providing computers, tablets, iPads, and other devices, SPLs enable schools to integrate technology into learning effectively. This aligns with the principle that selecting appropriate ICT tools should match learning objectives and accommodate diverse learning styles, ensuring that digital information literacy initiatives are both practical and sustainable.

Second, the study findings indicate that ICT skills among both state public library officers and school library and media teachers are uneven, affecting the implementation of digital information literacy programs. Respondents highlighted that not all staff possess the necessary competencies to effectively support digital information literacy initiatives. One respondent noted,

> *"I disagree because not all staff in libraries have the skills or expertise in digital information literacy."*
>
> *SSTP 5*

While another emphasized the gap in teaching practice,

> *"In some schools, teachers stick to outdated methods. When they enter the resource center, it's just about reading books…there's no emphasis on how we provide access or activities that guide students in obtaining information."*
>
> *SSTP 12*

Similarly, a library officer explained,

> *"We lack expertise; we only have staff with knowledge who can share insights on digital information literacy skills."*
>
> *SPL 1*

These findings reveal that even when ICT tools are available, their effectiveness is limited by the users' skills and proficiency. This aligns with the literature showing that teachers' and staff's computer competencies significantly influence the application of ICT innovations in teaching and learning (Saharia et al., 2021). Moreover, digital readiness studies indicate that while younger generations, such as Generation Z, may be proficient in collaborative technology and creative design, gaps remain in areas such as cybersecurity and programming (Hermawan et al., 2023). Therefore, ICT skills are not only complementary to ICT tools but are a critical implementation factor for

sustaining collaboration between the state public libraries and the school resource centers. Ensuring that both library staff and teachers possess the necessary competencies will enable the tools to be effectively utilized in developing students' digital literacy.

6.3.2.3 Virtual Learning

The study findings show that virtual learning has become an essential tool in supporting digital information literacy (DIL) programs. Respondents emphasized that online platforms allow students and teachers to access resources beyond the physical limitations of the library or classroom. The respondents explained,

> *"We show it to them, we hope they will use it. If it's the learning portal, we hope they study and make use of it. Hopefully, it will be effective."*
>
> *SPL 11*

> *"So, once they've been given some exposure, they learn how to use the portal."*
>
> *SPL 4*

These findings suggest that virtual learning serves as a practical implementation factor in the framework, as it enables both teachers and students to engage with digital information regardless of geographical or resource constraints. The use of virtual learning is closely linked to ICT skills and ICT tools; without the ability to navigate online platforms and access digital content, the effectiveness of these programs would be limited. Additionally, the creativity of librarians and library and media teachers in designing online activities, combined with collaborative programs between SPLs and school resource centers (SRCs), supports the sustainability of DIL initiatives.

These empirical observations are supported by the literature. Azmi, Khan, and Azmi (2022) note that virtual learning platforms provide access to a wide range of digital resources, meeting diverse learning needs and eliminating geographical barriers. Similarly, post-pandemic studies highlight the growing adoption of virtual learning as a medium for education, reinforcing its role in teaching and learning digital literacy (Mohamad Idham, 2020; Bing & Khairul, 2021; Zhaffar et al., 2021; Ealangov & Jamaludin, 2022).

The above points (6.3) discuss the elements incorporated into this framework, namely the dynamic factors of digital information literacy, supported by the implementation factors of digital information literacy in state public libraries and school resource centers. All these elements are ultimately combined to create a digital information literacy index framework toward sustainable collaboration in state public libraries and school resource centers in Malaysia. This all-encompassing strategy encourages community involvement and efficient resource sharing in addition to improving digital information literacy abilities in libraries and educational environments. Virtual learning is also an important element, according to this study.

6.4 How to Use the Framework

Effective use of the Digital Information Literacy Index (DIL) Framework involves using it as a guide to assess, plan, implement, and evaluate digital information literacy collaborations between state public libraries and school resource centers. The following outlines a structured, clear step-by-step approach to using the framework. The researcher conceptualizes the implementation of digital information literacy through six distinct phases: Phase 1 (Preparation and Alignment), Phase 2 (Program Design), Phase 3 (Resource and Capacity Setup), Phase 4 (Implementation), and Phase 5 (Evaluation and Improvement).

Each phase is essential to ensure that the program's effectiveness can be assessed at the end of the cycle. Furthermore, the phased structure ensures that no critical step is overlooked, and provides a mechanism for framework users to revisit and realign earlier stages should challenges arise.

6.4.1 Phase 1 (Preparation and Alignment)

The first step involves the establishment of a digital information literacy working group between both organizations. At this stage, key stakeholders include library officers, library and media teachers, additional teachers (if required as support), and school administrators. These individuals collectively serve as the backbone of the programme. Each of these individuals contributes a different expertise and perspective; for example, library officers provide knowledge of information resources and user services, teachers contribute pedagogical insights, and administrators offer institutional

support and decision-making authority. These individuals form the backbone of program operations, ensuring that strategic direction and practical implementation are addressed and digital information literacy initiatives are implemented effectively.

Actions:

a) Appoint a Digital Information Literacy Coordinator. This individual plays a key role in overseeing the planning and implementation of digital information literacy initiatives between state public libraries and school resource centers. The coordinator acts as the primary point of contact between the institutions, facilitating communication between stakeholders and ensuring that program objectives are consistently aligned with program goals. Effective leadership at this level is essential to maintain momentum and accountability throughout the collaboration and to ensure that digital information literacy is implemented as planned.

b) Clearly define the roles and responsibilities of each member, including the designation of leadership and supporting positions. Clearly defining roles and responsibilities for all members of a work group is important. This includes establishing leadership roles as well as support functions. Clearly defined responsibilities help prevent role ambiguity, reduce duplication of effort, and increase overall efficiency. When each member understands their specific contributions and expectations, they function more cohesively and respond more effectively to challenges.

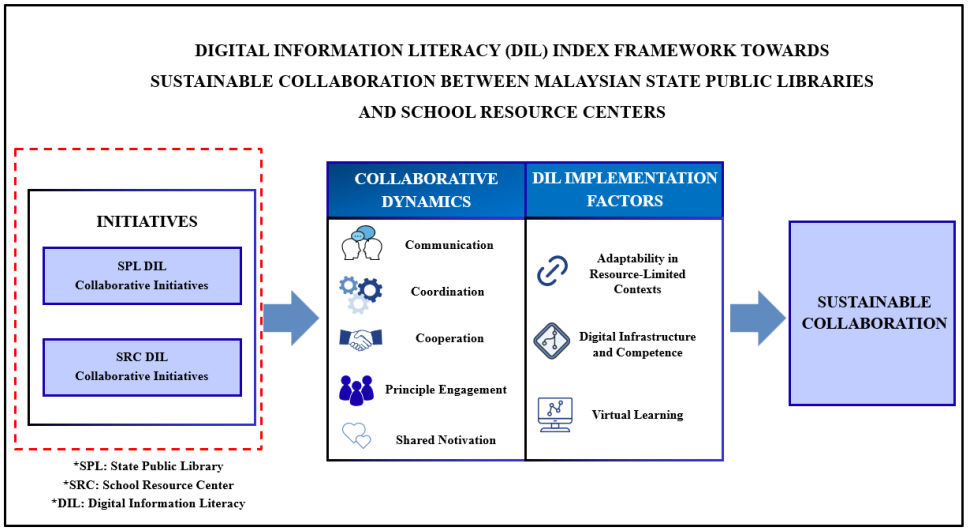

Figure 6.2 Phase 1 (Preparation and Alignment)

The second step is to conduct a needs assessment session. The purpose of this assessment is to evaluate the current level of digital information literacy and identify existing barriers. The assessment begins with identifying and aligning collaborative initiatives between the state public library and the school resource center. Each organization contributes relevant activities, such as digital information literacy workshops, research skills training, and access to digital content workshops. These activities form the foundation for further collaboration and require a structured collaboration plan to ensure shared goals and coordinated efforts.

Additionally, a survey on digital information literacy can be administered among teachers and students. Areas of assessment may include activities, internet usage, availability of equipment, staff/teacher competencies, and ethical practices. The findings from this survey serve as baseline data for subsequent planning.

6.4.2 Phase 2 (Program Design)

The third step involves designing program activities based on findings related to existing initiatives and the competencies of teachers, library officers, and students. Both organizations collaboratively propose activities by integrating their respective expertise and resources, for instance, the state public library's access to resources, databases, and outreach programs, and the school resource center's strength in student engagement. Proposed activities may include online safety training, project-based learning activities, and others, subject to mutual agreement. It is also important to map overlapping goals between the organizations, such as improving students' ethical use of the internet. This alignment can not only reduce fragmentation but also strengthen the overall impact of the initiative by reinforcing the same outcomes across multiple settings.

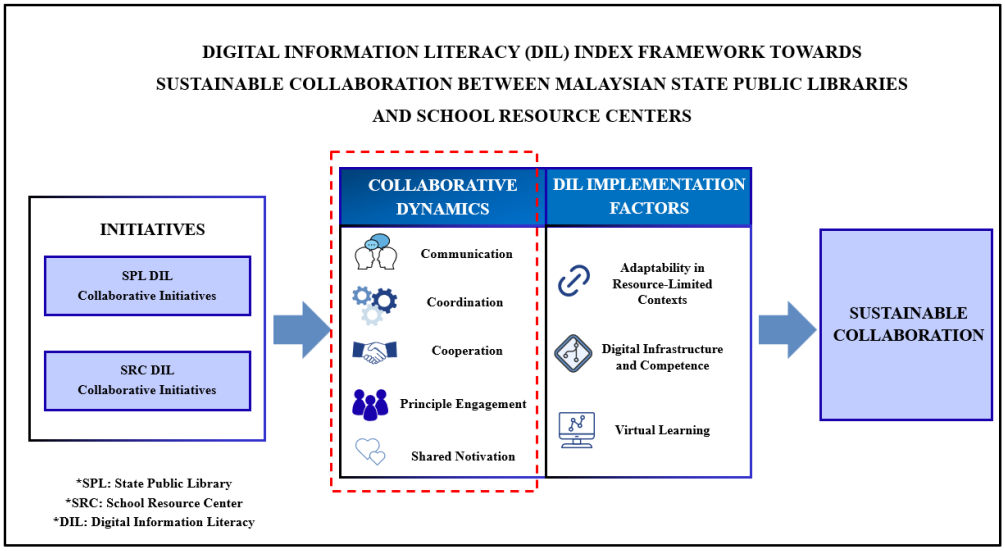

Figure 6.3 Phase 2 (Program Design)

The fourth step is to align these plans with collaborative dynamics, including:

a) Communication – Regular meetings and two-way communication regarding activities (e.g., correspondence, email, phone calls, online meetings).

b) Coordination – Clear division of roles and responsibilities, activity sharing, and task allocation.

c) Cooperation – Joint implementation of activities, including preparation of materials.

d) Principal Engagement – Securing formal approval and support from library directors and school leaders, including scheduling support.

e) Shared Motivation – Agreement on common outcomes, shared vision, and intended impacts (e.g., student and community impact).

6.4.3 Phase 3 (Resource and Capacity Setup)

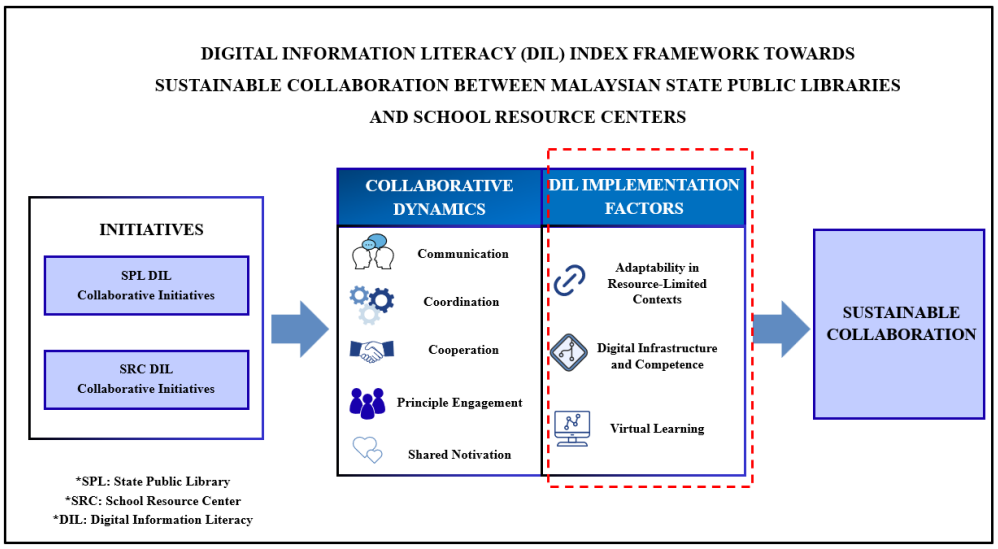

Figure 6.4 Phase 3 (Resource and Capacity Setup)

The fifth step emphasizes ensuring infrastructure availability by assessing equipment such as computers, tablets, internet connectivity, and access to digital platforms. Where such resources are limited, alternative strategies, such as offline resources and shared equipment, should be implemented. Training for staff and teachers is also essential to ensure the smooth execution of activities and preparedness for contingencies.

Furthermore, digital platforms that support diverse users across multiple schools and libraries should be utilized as shared repositories. These may include learning modules, tutorials, worksheets, quizzes, and other materials accessible at any time. Platforms such as Google Drive or Dropbox may serve as temporary repositories, while Google Classroom or Canva can function as digital hubs for delivering digital information literacy content.

The DIL Implementation Factors serve as a framework for balancing key considerations:

a) Adaptability in Resource-Limited Contexts – Modifying activities based on constraints such as budget, equipment availability, internet connectivity, and urban–rural differences.

b) Digital Infrastructure and Competence – Ensuring access to devices and the internet while assessing the skills of staff and students.

c) Virtual Learning – Utilizing online platforms for training, webinars, and resource sharing.

6.4.4 Phase 4 (Implementation)

The sixth step involves executing the agreed-upon activities. Interactive methods may be employed to enhance student engagement. Activities can be conducted using a blended approach, combining face-to-face and virtual modes. A typical session flow may include:

(1) introduction of the topic,

(2) demonstration,

(3) student practice, and

(4) discussion/reflection.

The session begins with an introduction of the topic, where facilitators outline the objectives, relevance, and expected outcomes of the session. This phase is crucial for setting the context and capturing students' interest. It also provides an opportunity to connect the topic to students' prior knowledge and real-life digital experiences, thereby enhancing engagement and readiness to learn.

The second phase involves a demonstration, during which facilitators, either library officers or teachers, model the targeted digital skills or concepts. This may include navigating online databases, evaluating the credibility of digital sources, or practicing safe online behavior. Demonstrations serve as guided examples, allowing students to observe correct procedures and strategies before attempting tasks independently.

Following this, the session transitions into student practice, which emphasizes hands-on learning. Students are given the opportunity to apply what they have learned through guided activities such as searching for information, completing digital tasks, or engaging in project-based exercises. This phase is critical for reinforcing learning outcomes, building confidence, and developing practical competencies in digital information literacy.

The final phase consists of discussion and reflection, where students and facilitators engage in dialogue about the learning experience. This may involve sharing challenges encountered during activities, reflecting on new knowledge gained, and

discussing how the skills learned can be applied in other contexts. Reflection not only deepens understanding but also encourages critical thinking and self-assessment.

At this stage, collaboration should be actively maintained to ensure the framework remains dynamic. This includes regular status updates (communication), adjustments to schedules and implementation (coordination), sharing of materials, resources, and feedback (cooperation), involvement of leadership (principal engagement), and celebration of achievements and reflective practices (shared motivation). This four-phase session structure promotes a balanced approach to teaching and learning by combining instruction, observation, practice, and reflection. It ensures that digital information literacy sessions are interactive, and the learning process is engaging, practical, and learner-centered

6.4.5 Phase 5 (Evaluation and Improvement)

The outcomes of Steps 1 through 6 culminate in this phase, which focuses on achieving long-term, self-sustaining partnerships. This phase involves measuring both the outcomes of digital information literacy implementation and the quality of collaboration between the two organizations.

It is also a stage for reviewing and refining the implementation process with all stakeholders. The Strengths of each organization that contributed to the program's success can be identified, alongside challenges encountered before, during, and after implementation. These insights inform future improvements.

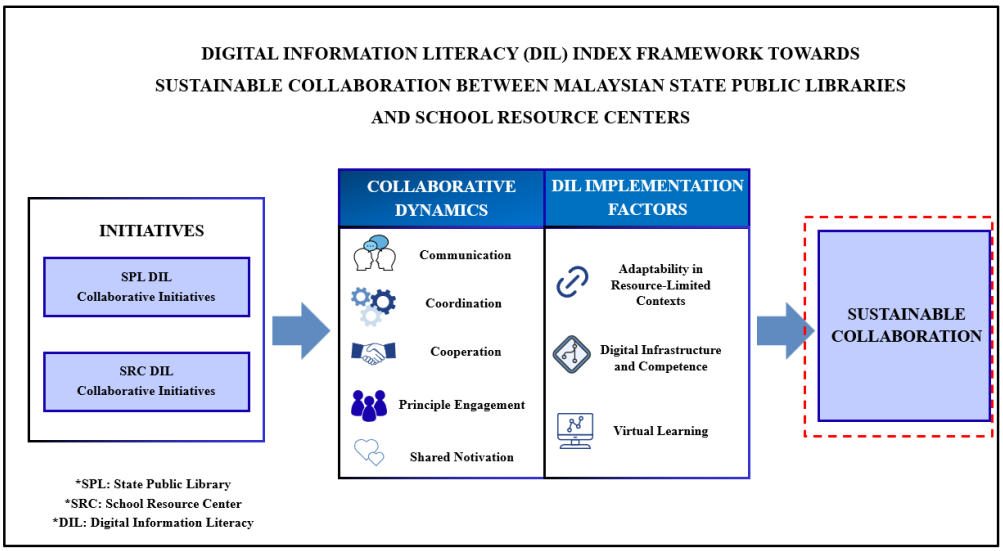

Figure 6.5 Phase 5 (Evaluation and Improvement)

To ensure the sustainability of the activities, the program should be implemented on a continuous and periodic basis. Furthermore, as an initial approach, it is advisable to begin on a smaller scale before expanding its scope. If successful, the initial implementation can be scaled to other schools. Digital information literacy initiatives may also be proposed for integration into the curriculum, and the partnership between the state public library and school resource centers can be formalized for sustained collaboration.

6.4.6 Indicative Measure

To ensure effective implementation and evaluation, this framework should operate based on the following structured steps:

a. Self-Assessment of Components – the state public libraries and the school resource centres should conduct a comprehensive self-assessment of all framework components. Indicative measures may include the existence of formal policies and guidelines, the level of staff digital competency, the frequency and quality of communication initiatives, the availability of digital literacy programmes, as well as user participation and engagement rates. The findings from this assessment serve as baseline data for subsequent planning.

b. Identification of Gaps and Weaknesses - based on the assessment findings, both organisations should identify underperforming areas that require immediate attention. Indicative measures may include low programme attendance, unsatisfactory customer feedback, and limited collaborative activities between organisations.

c. Development of Targeted Action Plans- both organisations should design evidence-based action plans that address the identified gaps, with clearly defined objectives, timelines, and responsible parties. This can be measured through the number of improvement initiatives implemented, the allocation of resources for training and programme execution, alignment with national agendas, and the establishment of new programmes or partnerships.

d. Monitoring and Continuous Improvement - regular monitoring and evaluation should be carried out to track progress and continuously refine strategies. Indicative measures may include annual performance achievements, increased participation rates in activities, improvements in digital information literacy skills, and the sustained implementation of programmes.

These steps are essential to ensure that the framework is effectively operationalised, supports the sustainability of digital information literacy programmes between state public libraries and school resource centres, and enables continuous and appropriate improvements.

6.5 Shared Factors in Collaborative Implementation of Digital Information Literacy: Expertise, Resources, and Motivation

This section presents the state public library and school resource center with respective elements. These elements reflect the particular responsibilities and resources provided by each state public library and the school resource center on shared factors in collaborative implementation of digital information literacy.

6.5.1 Expertise (State Public Libraries and School Resource Centres)

In this study, expertise is conceptualised as a shared and critical factor influencing the successful implementation of digital information literacy initiatives across both the state public libraries and the school resource centres. Experts are personnel who can design, manage, and facilitate digital information literacy programmes.

While many state public library officers may not yet demonstrate advanced expertise in digital information literacy, their experience organising programmes and participation in courses and workshops contribute significantly to programme effectiveness. Their roles extend beyond traditional librarianship to include functions in education, customer service, content creation, and resource acquisition, as highlighted by Aemaebasir (2022).

Given this, the state public libraries play an important role in strengthening the national pool of expertise by acting as reference centres and consultants for the school resource centres and other institutions. At the same time, the school resource centers' personnel, including library and media teachers, must also be included in capacity-building efforts to ensure a balanced and sustainable development of expertise across both institutions.

6.5.2 Activities (Collaborative Programme Implementation)

Activities represent a central mechanism through which digital information literacy is operationalised. Within this study, programmes are not viewed as belonging exclusively to the state public libraries or the school resource centers, but rather as collaborative initiatives jointly planned and implemented.

Empirical findings indicate that many activities are already conducted through partnerships, whether hosted at libraries or schools. These include digital literacy programmes, information literacy workshops, and reading promotion initiatives. Such efforts align with the National Reading Promotion Policy (PNM, 2013), which emphasises strategic collaboration among government agencies, educational institutions, and other stakeholders.

> *"For instance, whenever we hold events at the library, the Education Department will support us. Some of these activities include Night at the Library, information literacy programs, digital literacy, and programs focusing on cultural basics."*
>
> *SPL 10*

These collaborative activities function as a practical bridge, translating shared expertise and resources into measurable outcomes. Therefore, activities should be positioned as a key component that integrates institutional strengths rather than reinforcing organisational boundaries.

6.5.3 Resources: Financial Allocation (Budgets)

Resources, particularly financial allocation, constitute a fundamental enabler in this study. Budgets for digital information literacy are typically embedded within broader reading promotion or literacy initiatives managed by the state public libraries.

> *Okay, regarding the budget, I would say they will allocate funds for activities like promoting at schools or inviting teachers to come to the library for workshops or classes. These activities will be supported through the UGL budget, which is the Unit Gerakan Literasi."*
>
> *SPL 3*

Although there is often no dedicated funding specifically for digital information literacy, existing allocations are flexibly utilised to support related programmes, including training, workshops, and outreach activities. This reflects an activity-based budgeting approach, where financial resources are aligned with strategic objectives and programme needs (Wanto & Negzih, 2022).

Importantly, the findings suggest that resource sharing between the state public libraries or the school resource centers does not pose a significant constraint. Instead, the key challenge lies in optimising available resources to ensure programme continuity and impact. Thus, financial resources should be viewed as a shared factor that supports joint implementation rather than an institution-specific element.

6.5.4 Human Capital Development (SRC Context within Shared Expertise)

Human capital development, particularly among the school resource center personnel, remains a critical concern. Findings indicate that many library and media

teachers lack formal qualifications in library science and may have limited proficiency in digital information literacy. This observation is consistent with previous studies highlighting competency gaps in this group.

However, contrasting evidence suggests that teachers perceive themselves as possessing relatively high levels of digital information literacy, particularly when supported by appropriate policies and training (Mohammad et al., 2022). This discrepancy may stem from differences in self-assessment and external evaluation, as well as variations in the conceptual scope between digital literacy and digital information literacy.

To address this, this study emphasises continuous professional development through structured training, strategic partnerships, for example, with national and higher education institutions, and the establishment of support mechanisms such as cadre positions. These initiatives are essential to strengthen expertise across both the state public libraries and the school resource centers in a balanced manner.

6.5.5 Infrastructure (Shared Resource Capacity)

Infrastructure is a critical shared resource that underpins the effective implementation of digital information literacy. Adequate facilities, including reliable internet access, hardware, and software, are essential to support teaching, learning, and programme delivery.

Findings indicate that while infrastructure is important, its effectiveness is closely tied to user capability and willingness to utilise available technologies. Studies have shown that inadequate infrastructure and limited skills are key barriers to the adoption of digital tools, while successful implementation depends on alignment between infrastructure investment and user readiness (Mashiyane et al., 2020; Lomos et al., 2023).

Accordingly, infrastructure should not be treated as a standalone element but as part of a broader ecosystem that integrates resources, expertise, and user engagement.

6.5.6 Motivation (Individual and Organisational Readiness)

Motivation is a crucial factor influencing the commitment of both the state public libraries officers and the school resource centers personnel in implementing

digital information literacy. It encompasses willingness to learn, adapt, and actively participate in collaborative initiatives.

Despite some challenges, such as limited expertise, many teachers demonstrate a strong willingness to enhance their knowledge through training and collaboration. This reflects a positive motivational climate that can be leveraged to strengthen programme implementation. From a collaborative perspective, motivation also involves cognitive and behavioural dimensions, including awareness, communication, coordination, accountability, and active engagement (Shayganfar et al., 2016). These elements are essential for an effective partnership between the state public libraries and the school resource centers. Within this study, motivation serves as a driving force that sustains continuous learning, encourages innovation, and fosters a supportive environment for both educators and learners.

6.6 Future Framework

Based on these considerations, several future frameworks can be developed to achieve a deeper impact and enhance scalability. These extensions would transform the current framework from a focus on implementation toward optimization, intelligence, and policy integration. The proposed frameworks include:

a) Digital Information Literacy (DIL) Measurement Framework - this framework serves as a critical instrument for introducing measurable indicators across key indices, including communication effectiveness, digital competence, and student outcomes. A scoring system can be developed to assess the maturity of collaboration between state public libraries and school resource centers, thereby enabling cross-state benchmarking and facilitating continuous improvement over time.

b) Policy and Governance Framework for Digital Information Literacy - this framework aims to establish a more formal and sustainable structure from the perspective of stakeholders. It is intended to function as a national guideline to support funding acquisition and formalize collaborative agreements. Rather than relying solely on individual initiatives, the

framework extends its scope to institutional and governmental systems, ensuring greater stability and long-term implementation.

c) A Community-Centered Digital Information Literacy (DIL) Ecosystem Framework - may also be developed to expand collaboration beyond state public libraries and school resource centers. In this context, “community” encompasses parents, non-governmental organizations, and community centers, all of which contribute to the broader digital information literacy ecosystem. These stakeholders may assume roles as subject-matter experts, contributors, or strategic program partners. Such an approach represents a shift from institution-based collaboration toward community-driven partnerships that promote inclusivity and lifelong

d) Library Digital Information Literacy Activity Framework - this framework is designed for users beyond school resource centers, encompassing individuals and groups such as higher education students, researchers, public library users, senior citizens, and other community members. It emphasizes a comprehensive cycle of activities related to digital information literacy, providing a structured approach to user engagement and skill development. Libraries embrace all user groups, and every individual has the opportunity to enhance their personal value by developing digital information literacy, not limited solely to school students.

e) Digital Information Literacy Sustainable Impact Framework - this framework is proposed to evaluate long-term outcomes. It not only examines digital information literacy skills but also considers behavioral change, digital inclusion, and educational equity. Furthermore, it ensures that collaborative initiatives remain relevant and effective over time.

Future framework proposals for this initiative will enable its extension into a more comprehensive ecosystem integrating measurement, governance, community engagement, and sustainability. This allows improvements to be made to any missing elements and to adapt to current circumstances or situations.

6.7 Potential Development

Implementing digital information literacy programs through collaboration between State Public Libraries and School Resource Centers presents both opportunities and challenges. Understanding the potential for developing such initiatives is essential to maximizing their impact, as well as identifying key issues that help address barriers that may hinder program sustainability. This section outlines how this research can contribute to increased collaboration, increased digital information literacy, evidence-based planning, and the establishment of a sustainable framework. It also highlights challenges, including resource constraints that must be considered to ensure the effectiveness and longevity of digital information literacy initiatives.

First and foremost, any research should contribute to the good of society, and therefore:

a. This research has the potential to contribute to several areas of development in digital information literacy initiatives. It can strengthen systematic collaboration between state public libraries and school resource centers, leading to more coordinated digital information literacy programs.

b. Students and teachers in schools can gain better access to digital information resources, which can improve their skills in finding, evaluating, and using information effectively. Library staff can also improve their digital information literacy skills,

c. These findings can also guide state public libraries and school resource centers in designing targeted interventions, workshops, and modules based on actual needs and assessment results.

d. The Digital Information Literacy Index Framework itself can be refined into a sustainable tool for ongoing monitoring, planning, and evaluation of digital information literacy initiatives.

Second, we need to be prepared for several key challenges that must be addressed to ensure successful implementation. This is to ensure that we are prepared

for all eventualities so that any problems can be identified and resolved immediately. The following is a list of challenges to consider.

(a) Lack of or no allocation to run the program is one challenge. This slightly affects the smooth implementation of digital information literacy. For example, for implementation in rural areas, internet strength, equipment, and so on are required. Attention to the imperative of implementing digital information literacy is essential to ensure that programs and activities are executed in a systematic and efficient manner. Inadequate preparation of facilities, equipment, or internet connectivity may result in delays or interruptions, thereby impeding the overall progress and effectiveness of the program.

(b) Some school resource centers may lack sufficient facilities, staff, or technical expertise to fully implement digital information literacy programs, and coordinating schedules, roles, and responsibilities between state public libraries and various school resource centers can be complicated. This matter warrants careful consideration to enable state public libraries to develop appropriate measures and propose viable solutions that ensure the effective and proper implementation of digital information literacy sessions.

(c) Accommodating retired staff who are less interested in learning new knowledge is also a challenge in times of staff shortages to conduct digital information literacy sessions. This situation may lead to a shortage of trained or qualified personnel, thereby undermining the effectiveness and efficiency of the program. Accordingly, it is necessary to implement targeted measures aimed at enhancing motivation and engagement within this group.

(d) Teachers or students may hesitate to adopt new digital practices without ongoing support, and differences in basic digital information literacy between teachers and students may require a tailored approach. This consideration should account for existing gaps and varying levels of competence through more systematic planning and preparation, thereby ensuring that the diverse needs of all stakeholders are effectively addressed

(e) Ensuring consistent and meaningful evaluation of program outcomes can be challenging without standardized monitoring and evaluation metrics. This is to allow for corrective measures to be implemented appropriately.

Therefore, implementing a digital information literacy initiative through collaboration between State Public Libraries and School Resource Centers offers a significant opportunity to enhance collaboration, improve digital literacy, and support evidence-based planning. The Digital Information Literacy Index Framework provides a structured and sustainable approach to monitoring, planning, and evaluating this initiative. However, successful implementation depends on addressing the key challenges outlined above. In addition, by identifying both the potential and challenges, stakeholders can take targeted actions to ensure the sustainability and effectiveness of the digital information literacy program between the two organizations. This is to allow for corrective measures to be implemented appropriately.

The proposed framework is developed as a comprehensive diagnostic and planning tool for assessing and enhancing collaboration between Malaysian state public libraries and school resource centers. It is specifically designed to evaluate the current state of collaboration, identify key leverage points for improvement, and provide structured guidance for the planning and implementation of digital information literacy initiatives. By offering a systematic approach, the framework enables institutions to better understand their collaborative strengths and weaknesses while supporting strategic decision-making. Importantly, it is designed to be adaptable to the specific operational contexts of both state public libraries and school resource centers, thereby facilitating the effective development and long-term sustainability of digital information literacy practices within these environments.

In advancing research within this field, it is essential for researchers to engage critically with the conceptual framework underpinning this study. Such engagement contributes to enhancing the overall rigor, coherence, and quality of research related to digital information literacy and institutional collaboration. Particular attention should be directed toward the formulation of clearly defined research objectives, as well as the careful selection and alignment of appropriate data collection instruments. These methodological considerations are vital in ensuring that future studies produce reliable, valid, and meaningful findings.

The findings of this study play a significant role in informing the development of a strategic and context-sensitive approach to the design and implementation of the Digital Information Literacy (DIL) framework. This framework is intended to be practically oriented, with the flexibility to be adapted according to local needs, institutional capacities, and operational realities. In addition, the implementation process is expected to be supported by systematic evaluation mechanisms aimed at assessing the framework's effectiveness, relevance, and operational efficiency. Such evaluation ensures that the framework remains responsive and capable of continuous improvement over time. Methodologically, this study adopts a qualitative research approach, specifically utilizing a phenomenological design. This approach is particularly suited to exploring the lived experiences and perspectives of participants involved in collaborative initiatives. It allows for an in-depth examination of existing partnerships between state public libraries and school resource centers, as well as a nuanced understanding of the dynamic and implementation factors that contribute to the sustainability of digital information literacy practices within these collaborative contexts.

The study identifies two broad categories of factors that underpin sustainable collaboration. The first category, dynamic factors, includes communication, coordination, cooperation, principles of engagement, and shared motivation. These elements are relational and process-oriented, serving as the foundation for effective interaction, mutual understanding, and collaborative engagement between institutions. The second category, Digital Information Literacy (DIL) implementation factors, encompasses adaptability in resource-limited contexts, digital infrastructure and competence, and virtual learning environments. These factors relate to the structural, technological, and capacity-based conditions necessary for the successful execution of digital information literacy initiatives. The integration of these dynamic and implementation factors is critical in fostering sustainable and effective collaboration.

Furthermore, the study underscores the importance of critically examining both the opportunities and challenges associated with implementing such a framework. Key considerations include its contribution to the broader academic and professional field, the accessibility and adequacy of supporting infrastructure, the need for targeted and context-specific interventions, and issues related to resource allocation and management. Attention is also drawn to the importance of developing digital information literacy competencies among stakeholders, alongside establishing

systematic processes for evaluation and observation to monitor the effectiveness of implemented initiatives.

In line with these considerations, the researcher emphasizes that validating the proposed framework represents a crucial next step. Engaging with experts, practitioners, and relevant stakeholders is strongly encouraged in order to obtain constructive feedback, refine the framework, and enhance its practical applicability. Such collaborative validation efforts will not only strengthen the robustness of the framework but also ensure that it is responsive to real-world needs and challenges. Therefore, through iterative refinement and stakeholder engagement, the framework has the potential to serve as a comprehensive, practical, and sustainable tool for supporting collaborative digital information literacy initiatives. The following chapter presents the overall conclusions of the study, along with key recommendations and directions for future research.

CHAPTER 7
CONCLUSION AND RECOMMENDATION

7.1 Introduction

This chapter provides a comprehensive analysis of the study's findings, culminating in conclusions and recommendations that address the research objectives and contribute to the broader discourse on the topic. Building on the findings, this chapter outlines several key recommendations for relevant stakeholders, aiming to enhance future digital information literacy initiatives. The study highlights respondents' suggestions that can be implemented at both school and ministry levels, emphasizing that successful project execution depends on securing adequate funding. With sufficient resources, digital information literacy practices could expand beyond primary schools to include secondary schools, thereby promoting the long-term sustainability of digital information literacy programs and activities. Overall, this study seeks to develop a digital information literacy conceptual framework that encourages sustained collaboration between Malaysian state public libraries and school resource centers, directly supporting the study's key research objectives.

The study's primary objectives, as detailed in Chapter 4, are fivefold. First, to analyze current collaborative digital information literacy initiatives within Malaysian state public libraries, highlighting significant data on these efforts. Second, to investigate existing collaborative digital information literacy initiatives in Malaysian public school resource centers, providing an overview of the current state of these initiatives. Third, to explore the factors influencing digital information literacy implementation in sustainable collaborations between state public libraries and school resource centers, with key factors identified as creativity, ICT skills, ICT tools, and virtual learning.

Concurrently, the fourth objective of this study has demonstrated that communication, coordination, cooperation, the engagement principle, and shared motivation are the collaborative dynamic factors that support sustainable digital information literacy initiatives between state public libraries and school resource centers in Malaysia, as discussed in Chapter 5. Finally, the fifth objective is to develop

a Digital Information Literacy (DIL) Conceptual Framework aimed at fostering long-term partnerships between Malaysian state public libraries and school resource centers. Based on the study's findings, Chapter 6 proposes this conceptual framework to facilitate sustained collaboration between these entities.

The following section presents recommendations derived from the overall research findings, aimed at further strengthening collaborative efforts in digital information literacy initiatives.

7.2 Recommendations

Supporting the need for structured strategies to enhance digital information literacy, Khatun et al. (2015) propose several methods, including the development of online training modules, mapping staff competencies, assessing staff needs, offering advanced and customized training programs, establishing long-term strategies, and implementing decentralized initiatives It is suggested that implementing these recommendations could significantly enhance the user experience in digital information literacy, leading to greater user satisfaction with Digital Information Literacy (DIL) initiatives and fostering increased engagement with digital resources.

The significance of continuous improvement is underscored, with an emphasis on incorporating user feedback to ensure that recommendations remain accurate and relevant. Based on interviews with library officers, SSTP officials, five key recommendations have been identified that warrant the attention of the ministries of state public libraries. These recommendations aim to empower primary school students to become knowledgeable, responsible, and skilled digital citizens, equipping them with essential skills for their academic and personal development in a digital society. Furthermore, the study's recommendations also provide a framework for enhancing teacher competence and implementing collaborative digital literacy programs and activities in partnership with the school resource center. The following recommendations are derived from this study's findings.

7.2.1 Recommendation 1: Establishing Standardized Digital Information Literacy Modules

The findings of this study highlight the critical need for digital information literacy modules that use clear, simple, and accessible language, suitable for teachers, students, and library officers across diverse contexts, including rural areas and users with limited exposure to academic or technological terminology. Respondents, including Education Resources and Technology Sector officers and state public library officers, emphasized that overly complex or "bombastic" language hinders comprehension and repeated use of modules, particularly among students, the elderly, and individuals facing language barriers.

While users are generally familiar with digital information literacy concepts, they often lack knowledge of the correct terminology, making concise, user-friendly content essential. International examples, such as South Korea, demonstrate the effectiveness of providing structured, accessible curricula combined with trained library and media professionals to deliver digital literacy education. In the Malaysian context, collaboration between the Ministry of Education and the National Library of Malaysia, aligned with the 2023 National Information Literacy Agenda (NILA), can ensure the development of modules that are situationally adaptable, culturally appropriate, and linguistically accessible, thereby fostering sustainable learning and a broader digital information literacy community.

7.2.2 Recommendation 2: Innovative Approaches to Digital Information Literacy Activities

This study discovered that the activities carried out in schools include workshops and classes in mobile libraries, exhibitions, resource centre management training, and other activities. According to the findings of this study, the majority of the programs are related to physical activities and are not aimed at information literacy or digital information literacy.

Understanding digital information literacy is crucial, as it encompasses an individual's capacity to effectively utilize information and communication technologies for the purposes of finding, evaluating, creating, and communicating information. This competency necessitates a combination of cognitive and technical skills, as outlined by

the American Library Association (ALA, 2013). To address this gap, the following activities are proposed for developing students' digital information literacy.

7.2.2.1 Source Evaluation

The issue of searching for information on the internet has long been discussed. As stated by Walraven (2009), when addressing information problems, students devoted most of their time to searching and scanning, spending relatively little time on processing and organizing the information. This observation is further supported by Eastin et al. (2006) who found that children showed challenges in assessing the credibility of online information, especially when encountering multiple sources and distracting elements such as advertisements. To address this gap, one fundamental activity designed to empower digital information literacy involves training students to evaluate online information sources. In this context, students learn how to identify reliable and credible sources while also gaining awareness of predatory sources that pose risks to children. This activity emphasizes the importance of understanding the criteria used in the evaluation process. According to Silvhiany et al. (2021), effective assessment activities that can be conducted with students include evaluating claims made on social media, assessing the credibility of information presented on platforms such as YouTube, distinguishing between advertisements and opinion articles, comparing and evaluating different websites, and analyzing visual evidence. Moreover, research by Yu Tong et al. (2025) highlights that children's epistemic trust in online information is influenced by the history of inaccuracy of the internet source.

7.2.2.2 Research Skills

Secondly, research skills. Bapanova et al. (2025) stated that developing these skills not only enhances students' academic learning but also equips them with the ability to address real-world problems across various situations. This activity involves teaching students how to conduct effective digital research by using advanced search techniques, database usage, and keyword selection. This perspective was highlighted by Chu (2001); to promote students' growth in research skills, our findings indicate that general studies teachers should assume a supportive role, acting as facilitators, advisors, and guides throughout the students' inquiry-based learning process. Research skills also

include searching, evaluating sources, and combining information to answer a given question or address a topic. In addition, research skills will also provide an understanding of how to navigate the various places of information storage, such as libraries, databases, and online sources, and critically assess the credibility and relevance of the information obtained (Trixa & Kaspar, 2024). A part from that, Toivola (2023) states that good research skills will enable individuals to gather, analyse, and use information meaningfully and effectively for any need.

7.2.2.3 Ethical Use

Thirdly, activity designed to empower digital information literacy involves developing student's ethicality use of information. Ethical use of information focuses on copyright, plagiarism, and proper citation of digital sources. In this regard, knowledge and skills related to internet ethics are one of the competencies of digital information literacy (Ahyati et al., 2023).

According to Masrom et al. (2012), the PAPA (Privacy, Accuracy, Property, and Accessibility) model is the most influential on ICT ethics introduced by Mason (1986). The PAPA model discusses privacy, accuracy, property, and accessibility. Privacy is about what information an individual or organization should reveal to others, in what situation or the safety or information, and what information one should keep for oneself and not be forced to reveal to others. Accuracy concerns on responsibility of the authenticity, fidelity, and accuracy of information; additionally, who will be responsible for errors in the information used, and how affected parties are affected by the information. Property relates to ownership of information, including rights, pricing, and control over information channels. Accessibility, on the other hand, refers to the right or privilege obtained by individuals or organizations to access information, under what conditions and safeguards.

This model can be used as a guide in carrying out activities related to the ethical use of information, other than the use of online applications to check plagiarism, prepare bibliographies or citations, and also learn about the act, especially related to the Copyright Act.

7.2.2.4 Cybersecurity

Fourthly, an activity designed to empower digital information literacy involves creating students' cybersecurity awareness and knowledge. This activity will improve the children's knowledge, as children need to be taught how to be safe, and online activities require closer and more frequent monitoring (Zahidah Zulkifli et al., 2020). Yunos Zahri (2007) and Zahidah Zulkifli et al. (2020) said that young Malaysians are well-versed in using the Internet from an early age, with gadget ownership beginning as early as age seven. Basic internet skills suitable for introducing to computer protection, personal computer security, the use of firewalls, and the use of filtering software, how to make friends over the internet to avoid scammers, and so on. Cybersecurity awareness's main concern is to educate students about the various threats present in the digital space and also to promote safe and secure online practices.

7.2.2.5 Social Media

Lastly, social media literacy engagement skills. According to Muftiana et al. (2025), it underscores the need to incorporate a well-rounded media literacy education that combines technical skills, critical thinking, ethical understanding, and intercultural competence. This type of education is essential for equipping students to become informed digital citizens and future media professionals who can engage responsibly in the information society. With the emergence of social media in today's diverse society, such as Facebook, Twitter, Instagram, and TikTok, Digital information literacy activities could start by teaching students how to identify misinformation, understand the impact of algorithms, and use social media responsibly via posting and sharing of information. Activities like this will expose students to responsible posting and sharing, emphasizing the impact of shared content on others and the consequences of sharing false or misleading information on social media. In line with this, Samala et al. (2024) emphasize the significance of responsible digital use, digital literacy, and parental supervision in mitigating risks such as addiction, privacy violations, identity theft, exposure to inappropriate content, and cyberbullying.

In conclusion, the proposed digital information literacy activities can be effectively implemented through collaboration among school resource centers, state public libraries, and external stakeholders such as technology companies, internet

service providers, and cybersecurity firms. This integrated approach ensures that students, particularly those in rural areas with limited access to information and communication technology (ICT) resources, receive meaningful and equitable learning experiences. Beyond enhancing student engagement, the implementation of these activities provides library staff and media teachers with opportunities to develop professional insights and competencies. It is therefore essential for library staff and media teachers to actively engage in research and evaluation of the activities, as this process will both expand their professional knowledge and contribute to the enrichment of the school's information resources.

7.2.3 Recommendation 3: Building an Expert Community in Digital Information Literacy

The findings of this study indicate a strong consensus among library officers regarding their competency, with many expressing confidences in their expertise within the field of digital information literacy. Truesdell (2019) highlighted the growing need to develop digital literacy through a community partnership approach. Drawing on international examples, Kazanskaia (2025) has developed a comprehensive digital literacy curriculum designed to equip community members with the essential competencies required to effectively navigate and utilize digital technologies. Building on this model, the presence of academic institutions such as *Universiti Teknologi Mara* (UiTM) and other higher learning institutions, with their faculty of information science and library science programs, plays a pivotal role in fostering a community of experts. By facilitating Training of Trainers (ToT) programs, these higher learning institutions can effectively equip library officers with the advanced skills and knowledge necessary for enhancing digital information literacy practices. This initiative reflects the respondents' eagerness to acquire new insights and improve their professional capacities, thereby promoting a culture of continuous learning and development within the library community.

Furthermore, the National Library of Malaysia serves as a vital platform for knowledge exchange, contributing to the formation of a robust digital information literacy community (Hassan, 2020). By providing opportunities for collaboration and resource sharing, it can help bridge the gap between experienced practitioners and those still developing their expertise. The study's analysis reveals that while many library staff

acknowledge their current limitations, there is a strong desire to evolve into specialists in the field. Establishing dedicated specialist groups among library personnel and library and media teachers is crucial for cultivating a dynamic digital information literacy environment. Such groups can facilitate ongoing professional development, enabling members to share best practices, engage in collective problem-solving, and drive the successful implementation of digital information literacy initiatives across various educational settings and technologies. This aligned with Abdullahi (2024), who emphasized that the effectiveness of library services depends largely on the competence of library staff; consequently, providing comprehensive training for 21st-century librarians should be considered a top priority

7.2.4 Recommendation 4: Specialized Training and Short Courses for Library and Media Teachers

The Systematic Literature Review (SLR) in Chapter 2 examines the qualifications necessary for becoming a library and media teacher; however, it notes that the guidelines may not be entirely applicable to those holding a degree in library science or its equivalent. This section offers relevant recommendations that can be considered for prospective library and media teachers, as well as for enhancing the competencies of current practitioners in the field.

This study found that it is necessary to provide training sessions for the library staff and media teacher group in an effort to learn more about digital information literacy. This issue has long been discussed; according to Kamal & Normah (2012), library and media teachers need to receive adequate training and be provided with the necessary support to perform their roles effectively. This is because most library and media teachers are senior teachers and need more training, especially in dealing with new technologies, including equipment. The motivation of teachers should also be considered, as it is quite difficult for senior teachers to learn new knowledge, which is considered a difficulty for them. Through this study, it can be stated that the training on the use of digital information literacy for teachers can be carried out in good cooperation between the school resource center and the state public library, the National Library of Malaysia or the Faculty of Information Management, *Universiti Teknologi MARA (UiTM)* which can share expertise with library and media teacher for the development

of knowledge and skills of digital information literacy as well as other higher institution locally or abroad.

It is genuine to propose that every appointed library and media teacher should possess a specialized certificate accredited by the National Library of Malaysia or another relevant authority. Chapter 2 discusses this in the context of a comparison between the qualifications of teacher librarians or school librarians across various countries, where a diploma in library and information science is typically required before appointment. This underscores the need for dedicated discussions among policymakers regarding these qualifications. Furthermore, it is essential to cultivate the motivation of library and media teachers to pursue additional certifications in library and information science while balancing their current teaching and library responsibilities. Conversely, individuals holding a diploma or master's degree in library and information science should also obtain a diploma in education to qualify for teaching roles. Alternatively, the National Library of Malaysia could implement a cadre appointment system for the position of school librarian within the school resource center, allowing teachers to concentrate solely on teaching while the appointed librarian manages the resource center.

Another alternative recommendation is to conduct training sessions or short courses lasting at least 10 days, enabling library and media teachers to obtain a certification. A notable example is the Librarian Assistant Certificate Program (PSPP), organized by the Malaysian Librarians Association and the National Library of Malaysia since 2015. The PSPP aims to introduce participants to the principles and roles of information in society, develop awareness and skills in utilizing various resources, and provide effective reference and information services (*Persatuan Pustakawan Malaysia,* 2025). It also focuses on contemporary technologies applicable to information systems and services while enhancing foundational and advanced competencies among assistant librarians. Within this certification program, participants must complete Modules 1 to 4 and achieve a passing score of at least 50 in Modules 1 to 3 to qualify for certification. If they do not meet the passing criteria for any module, they will receive only a certificate of participation issued by the Malaysian Librarians Association. The assessment for each module consists of 70% examination and 30% continuous assessment. This program could be beneficial for library and media teachers, particularly new appointees, by equipping them with effective and well-structured methods for managing digital information literacy activities.

In conclusion, training for library staff also needs to be implemented, especially in relation to information technology, with the emergence of various new applications and tools in the world of the latest technology, for example, artificial intelligence, which is often talked about now. The International Federation of Library Associations and Institutions (2025) addresses the unique challenges and opportunities of digital learning environments in its updated guidelines for library workers in the digital age.

This aligns with the findings presented in Chapter 5, which indicate that some library staff are not yet proficient in this area. Therefore, continuous classes are important to ensure that library staff can work together with library teachers and the media to spread digital information literacy in schools and state public libraries. Furthermore, according to a *Berita RTM* report dated 12 March 2024, the Malaysian Qualifications Agency (MQA) has recommended that institutions of higher learning offer short courses to give employees the opportunity to improve their skills (Berita RTM, 2024). The proposed initiative is the offering of micro-credentials, which are short courses or learning packages that recognize the increase in expertise and specific competencies of individuals in various fields as required by employers, within a brief time frame. The MQA also recommends that institutions of higher learning collaborate closely with industry to get the most recent information on what employers require. This is an initiative that is suitable for both library and media teacher in the school resource center or library staff in the state public library to improve their skills and expertise in the field of digital information literacy. It is hoped that some of the suggestions above can be applied to improve the competence of library and media teachers in Malaysia to be comparable to those abroad and can become benchmarking models in the future. In the meantime, this training can also provide state public library staff who are trained as well as experts in digital information literacy.

7.2.5 Recommendation 5: Skill Credentials for Library and Media Teacher

Globally, the role of school librarians and teacher librarians typically requires dual qualifications: professional teaching credentials alongside formal education in library and information science, often at the bachelor's or master's level. Countries such as the United States, Canada, Australia, New Zealand, Singapore, the United Kingdom, and the Philippines emphasize this combination, with additional requirements including licensure, accreditation by professional bodies, and continuing professional

development (CPD) to ensure competencies in digital information literacy, library management, and instructional support. In contrast, Malaysian library and media teachers are often appointed without formal training in library science, managing school resource centers while also fulfilling teaching duties. Digital information literacy and library management skills vary widely, and there is no standardized national credentialing framework.

Table 7.1

Proposed Table of Qualifications

Level	Qualification	Accreditation	CPD Requirement	Core Competencies
Entry	Bachelor's Degree in Education / Diploma in Information Studies + foundational modules	MQA & MOE recognition	Encouraged	Basic digital information literacy, resource management
Professional	Bachelor's Degree in LIS / MLIS	MQA	Mandatory (SPLKPM / in-service training)	Digital information literacy, library management, and instructional support
Advanced	Specialization + leadership	NLM/PPM	Mandatory (continuous CPD)	Strategic management, advanced digital services, innovation

To address this gap and to strengthen the professional capacity and effectiveness of school library and media personnel in Malaysia, this study recommends that a structured qualifications framework be implemented for library and media teachers as presented in Table 7.1 below. Under this framework, entry-level personnel may hold a diploma in Library and Information Studies or a bachelor's degree in education supplemented with foundational library and media modules, with CPD encouraged to develop basic digital information literacy and resource management skills. Professional recognition should require a Bachelor's degree in Library and Information Science or a Master of Library and Information Science (MLIS) certification, accredited by the Malaysian Qualifications Agency (MQA), with mandatory continuous professional development through *Sistem Pengurusan Latihan KPM* (SPLKPM) or other MOE-approved in-service programs. At the advanced level, postgraduate specialization

combined with leadership training, accredited by MQA and recognised by NLM/PPM, should be required, focusing on strategic management, advanced digital services, and innovation. Implementing this framework will ensure that all school library personnel are equipped with the necessary competencies to enhance digital information literacy, resource centre management, instructional support, and strategic leadership in Malaysian schools.

7.2.6 Recommendation 6: Information Management Officers (IMO)

To address the current gap in qualifications among Library and Media Teachers, who often lack formal training in library science, it is strongly recommended that each school appoint an Information Management Officer (IMO) responsible for overseeing information and digital resource management. The IMO would ensure that information is collected, organized, stored, and disseminated efficiently, securely, and accessibly, thereby supporting the development of students' digital information literacy and enhancing overall school information management practices. Key responsibilities would include developing and implementing standardized procedures for information management, maintaining the accuracy and currency of resources, providing technical support for information systems, and conducting training for staff on best practices in digital information handling.

It is recommended that the appointment of the Information Management Officer is among the graduates of Information Management from *Universiti Teknologi MARA (UiTM)* or other higher learning institutions within the country and abroad. For example, *Majlis Amanah Rakyat* (MARA) has appointed UiTM's Information Management graduate as their library and media teacher at MARA Junior Science Colleges (MRSM). UiTM vice-chancellor, Prof. Datuk Dr. Roziah Mohd Janor in her speech at the Closing Ceremony of the *Selangkah Ke UiTM Expo* (ESKU) at Dewan Agung Tuanku Canselor (DATC), UiTM Shah Alam, on June 11, 2023, said that the university, through the program, was targeting a total intake of 65,000 prospective students in the 2023/2024 admission session. With so many students, this is a career opportunity for them after they graduate (Roziah, 2023)

Where individual school appointments are not feasible, a government policy could designate an IMO at each Center of Excellence (COE) to provide centralized support. It is recommended that IMOs be recruited from graduates of Information

Management or library and information science programs from institutions such as Universiti Teknologi MARA (UiTM) or other recognized universities. While this appointment primarily strengthens school information management and DIL initiatives, it also provides graduates with meaningful employment opportunities in their field, addressing the underutilization of professional expertise in library and information management. Establishing the IMO role will therefore ensure that schools are better equipped to manage digital resources, improve information literacy among students, and optimize the utilization of trained information management professionals within the educational ecosystem.

Creating this position not only expands career opportunities for graduates of library and information science programs but also addresses the growing issue of job displacement among professionals in this field. By offering alternative career paths within information management, the IMO role can help mitigate the trend of graduates being compelled to transition to unrelated fields due to a lack of available positions in traditional librarianship. This strategic enhancement of the educational ecosystem will ensure that expertise in information management is utilized effectively, thereby improving overall information literacy and resource management within schools. Malaysian Employers ' Federation (2016), says more graduates are currently working in sectors unrelated to their field of study. The Department of Statistics Malaysia reported that in the first quarter of 2019, the country recorded a total of 516,600 unemployed. At the same time, a total of 238,286 unemployed, including 174,327 graduates, registered as active job seekers with JobsMalaysia under the Jabatan Tenaga Kerja. (Berita Harian, 2019).

Hence, several suggested directions for future research can further enhance our understanding of collaborative digital information literacy initiatives. First, studies could explore the long-term impacts of such collaborations on students' academic performance and digital competencies, particularly in rural areas where access to resources is limited. Additionally, research could investigate the effectiveness of specific ICT tools and platforms used in these initiatives, assessing their impact on student engagement and learning outcomes. Another avenue for exploration could be the professional development needs of library staff and media teachers involved in these collaborations. Understanding their training requirements can lead to more targeted support and resource allocation. Furthermore, qualitative studies could be conducted to gather insights from students and educators regarding their experiences and perceptions

of digital information literacy programs, providing valuable feedback for program improvement.

Finally, it would be beneficial to examine cross-sector collaborations that involve community organizations and technology providers, as these partnerships may offer additional resources and support for students. By addressing these areas in future research, we can better understand the dynamics of effective collaboration and create more impactful digital information literacy programs that cater to diverse student needs.

7.3 The State Public Library and the School Resource Center: Way Forward

Based on the recommendations listed in sub-chapter 7.2, this is a way forward that focuses on efforts to strengthen cooperation between state public libraries and school resource centers, increase the potential of professional competencies, and utilize digital technology facilities to create a more inclusive, interactive, and sustainable learning environment in line with SDG 4 (Quality Education).

Collaboration between state public libraries and school resource centers is increasingly recognized as essential in supporting the educational and informational needs of the younger generation. The state public libraries provide broad access to diverse resources, digital technologies, and community-based learning opportunities, while school resource centers are closely aligned with curricular goals and student learning outcomes. When these institutions work together, they can enhance students' information literacy, reading engagement, and research skills, which are critical competencies in the information society. Such partnerships also help address inequalities in access to information by extending resources beyond the school environment. As noted by Arua et al. (2018), information literacy has become a fundamental competency since its emergence in 1989, underscoring the importance of collaborative efforts in equipping young learners with the skills needed to navigate and evaluate information effectively. Therefore, strengthening collaboration between public libraries and school resource centers represents a strategic way forward in fostering lifelong learning among students.

At the same time, it is imperative to ensure that the collaboration between these two organizations is sustainable so that the new generation benefits and experiences digital information literacy. As the technology continues, there may already be an addition to the new features of technology, but still within the context of digital

information literacy. Therefore, the recommendations put forward through this study will ensure that collaboration between state public libraries and school resource centers can be implemented effectively and efficiently. This is important to ensure that the new generation is always equipped with the knowledge to face the challenges of the future, especially threats from technology.

7.4 Future Research

Future research plays a crucial role in enhancing the findings of this study and expanding the understanding of digital information literacy within the educational landscape. Building upon the insights gained, subsequent investigations should consider broadening the scope to include secondary schools, along with the active involvement of school administrators and students as respondents. This comprehensive approach will facilitate a more thorough assessment of the educational ecosystem, enabling researchers to evaluate the reach and effectiveness of digital information literacy programs across various educational levels. By including a diverse range of participants, future studies can yield more nuanced insights into the unique challenges and opportunities that exist within different school environments, thereby informing strategies for more effective program implementation.

The newly developed framework, titled the Digital Information Literacy (DIL) Index Framework Towards Sustainable Collaboration Between Malaysian State Public Libraries and School Resource Centers, offers a guideline for future researchers aiming to implement digital information literacy programs or courses involving library officers, teachers, and students. The research highlights that while library and media teachers may engage in practices aligned with digital information literacy in the classroom, they may not fully recognize these activities as such. This lack of awareness could stem from insufficient exposure to technological terminology or the use of language that does not resonate with the understanding of library and media teachers. Future researchers are encouraged to utilize the four elements of this framework to identify potential challenges or limitations related to its implementation and explore how these factors may influence the overall research process, thereby fostering meaningful discussions.

Furthermore, this new framework has the potential to inform future initiatives in the field of digital information literacy, adopting different approaches. For instance, researchers might explore the application of digital information literacy in the

development of teaching aids for school teachers or its integration among special education teachers or other relevant professions. While the respondents may differ, this framework can be adapted to fit varying contexts, ensuring its relevance and applicability across diverse educational environments.

Also, the findings from this research are anticipated to provide valuable input to policymakers and educational authorities regarding the planning and provision of necessary facilities and infrastructure to support the integration of digital information literacy in schools and state public libraries. Emphasizing competency development among educators and library staff is paramount, as these professionals serve as the foundation for ensuring the success of digital information literacy initiatives and fostering student engagement in co-curricular activities. By investing in the training and development of these key stakeholders, educational institutions can create a more supportive and effective environment for the implementation of digital information literacy programs, ultimately contributing to the academic and personal growth of students in an increasingly digital world.

7.5 Concluding Remarks

This chapter presents the overall conclusions and recommendations of the study, synthesizing the key findings and their broader implications. The results demonstrate that meaningful and effective interdepartmental collaboration between schools and state public libraries is both achievable and sustainable when supported by practical, low-burden strategies. However, such collaboration is highly dependent on strong institutional backing from relevant authorities. This support is crucial not only for legitimizing proposed initiatives but also for ensuring their successful implementation and long-term continuity. Ultimately, these efforts are directed toward benefiting key stakeholders, particularly students, who represent the nation's future and stand to gain significantly from enhanced digital information literacy competencies.

A central outcome of this research is the development of the proposed Digital Information Literacy (DIL) Index Framework, which serves as a strategic reference point for policymakers, state public libraries, and school resource centers. The framework provides a structured and systematic approach for assessing, guiding, and improving digital information literacy initiatives across both educational and library contexts. By promoting consistency, accountability, and measurable impact, it enables

institutions to align their efforts more effectively. Furthermore, when integrated with existing models and practices, the framework supports enhanced coordination, continuous improvement, and ongoing evaluation. The results generated through its application can be used for reporting to stakeholders, informing policy decisions, and providing a foundation for scaling and expanding future research in this domain.

To facilitate the practical implementation of this framework, several targeted recommendations are proposed. First, the establishment of standardized digital information literacy modules is essential to ensure consistency in learning outcomes across institutions. Second, the adoption of innovative and engaging approaches to digital information literacy activities can help increase participation and improve learning effectiveness. Third, the creation of an expert community is recommended to foster knowledge sharing, collaboration, and the exchange of best practices among professionals. Fourth, the development of formal skill credentials for library and media teachers would provide recognition of their expertise and encourage professional growth. Fifth, the provision of specialized training programs and short courses is necessary to continuously enhance the skills and competencies of practitioners. Finally, the introduction of Information Management Officers (IMO) is proposed to strengthen institutional coordination, improve information governance, and support the effective management of digital initiatives. Collectively, these recommendations offer a comprehensive and actionable roadmap for strengthening digital information literacy practices in Malaysia.

In a broader sense, equipping students with strong digital information literacy skills is essential in today's information-rich environment. Such competencies enable individuals to access, evaluate, and use information critically, ethically, and effectively. This, in turn, contributes to the development of a more informed, knowledgeable, and high-quality society capable of navigating complex digital landscapes. Moreover, this study serves as a valuable foundation and catalyst for future research. It encourages the adoption of more inclusive and holistic research approaches, as well as greater collaboration among researchers, practitioners, and institutions. Expanding this line of inquiry to include international perspectives would enable meaningful cross-country comparisons and contribute to a deeper, more comprehensive global understanding of digital information literacy practices.

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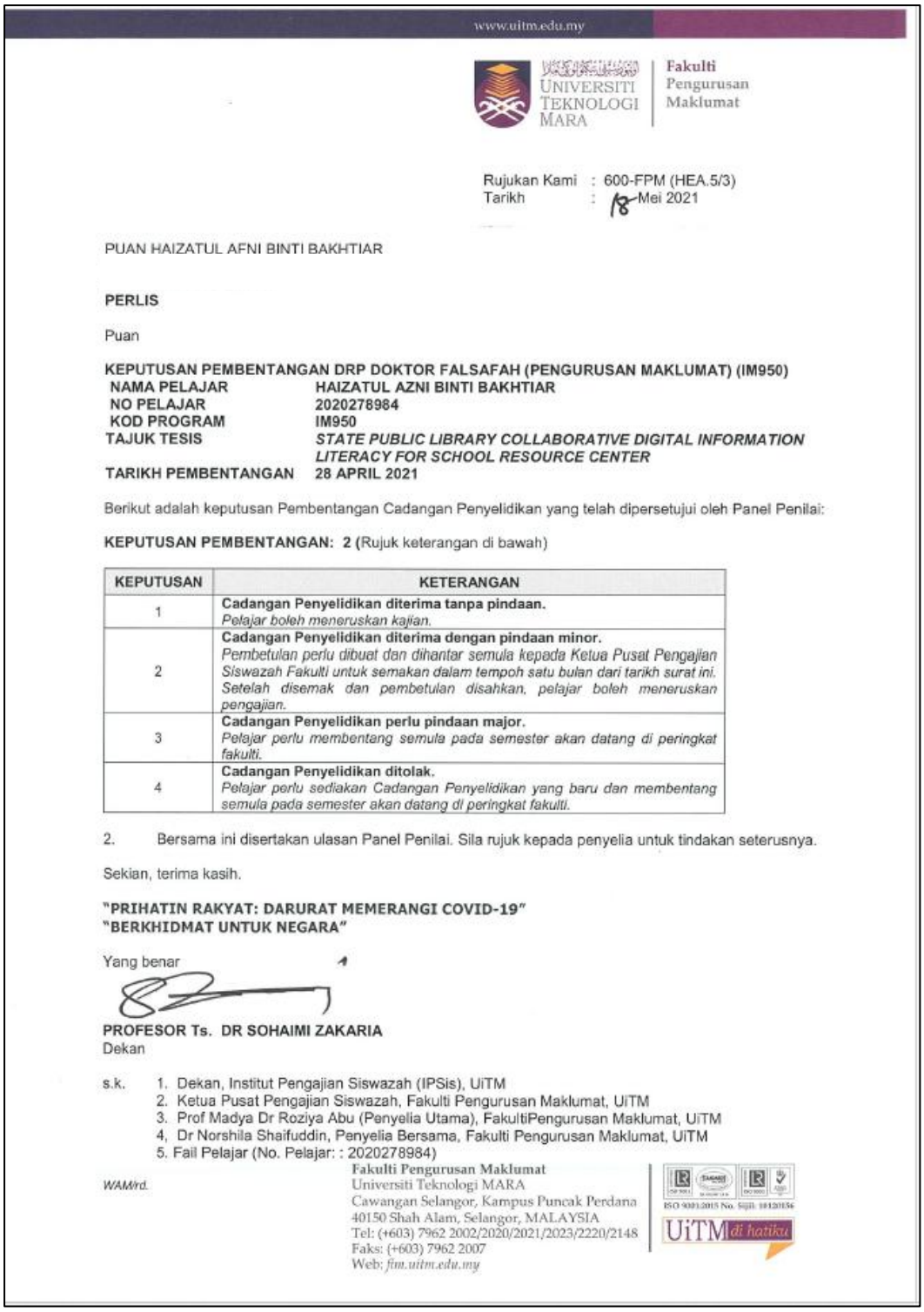
APPENDICES

APPENDIX 1
Defence of Research Proposal (DRP)



www.uitm.edu.my

UNIVERSITI TEKNOLOGI MARA | Fakulti Pengurusan Maklumat

Rujukan Kami : 600-FPM (HEA.5/3)
Tarikh : 18 Mei 2021

PUAN HAIZATUL AFNI BINTI BAKHTIAR

PERLIS

Puan

KEPUTUSAN PEMBENTANGAN DRP DOKTOR FALSAFAH (PENGURUSAN MAKLUMAT) (IM950)

NAMA PELAJAR	**HAIZATUL AZNI BINTI BAKHTIAR**
NO PELAJAR	**2020278984**
KOD PROGRAM	**IM950**
TAJUK TESIS	***STATE PUBLIC LIBRARY COLLABORATIVE DIGITAL INFORMATION LITERACY FOR SCHOOL RESOURCE CENTER***
TARIKH PEMBENTANGAN	**28 APRIL 2021**

Berikut adalah keputusan Pembentangan Cadangan Penyelidikan yang telah dipersetujui oleh Panel Penilai:

KEPUTUSAN PEMBENTANGAN: 2 (Rujuk keterangan di bawah)

KEPUTUSAN	KETERANGAN
1	**Cadangan Penyelidikan diterima tanpa pindaan.** *Pelajar boleh meneruskan kajian.*
2	**Cadangan Penyelidikan diterima dengan pindaan minor.** *Pembetulan perlu dibuat dan dihantar semula kepada Ketua Pusat Pengajian Siswazah Fakulti untuk semakan dalam tempoh satu bulan dari tarikh surat ini. Setelah disemak dan pembetulan disahkan, pelajar boleh meneruskan pengajian.*
3	**Cadangan Penyelidikan perlu pindaan major.** *Pelajar perlu membentang semula pada semester akan datang di peringkat fakulti.*
4	**Cadangan Penyelidikan ditolak.** *Pelajar perlu sediakan Cadangan Penyelidikan yang baru dan membentang semula pada semester akan datang di peringkat fakulti.*

2. Bersama ini disertakan ulasan Panel Penilai. Sila rujuk kepada penyelia untuk tindakan seterusnya.

Sekian, terima kasih.

"PRIHATIN RAKYAT: DARURAT MEMERANGI COVID-19"
"BERKHIDMAT UNTUK NEGARA"

Yang benar

PROFESOR Ts. DR SOHAIMI ZAKARIA
Dekan

s.k. 1. Dekan, Institut Pengajian Siswazah (IPSis), UiTM
2. Ketua Pusat Pengajian Siswazah, Fakulti Pengurusan Maklumat, UiTM
3. Prof Madya Dr Roziya Abu (Penyelia Utama), FakultiPengurusan Maklumat, UiTM
4. Dr Norshila Shaifuddin, Penyelia Bersama, Fakulti Pengurusan Maklumat, UiTM
5. Fail Pelajar (No. Pelajar: : 2020278984)

WAM/rd.

Fakulti Pengurusan Maklumat
Universiti Teknologi MARA
Cawangan Selangor, Kampus Puncak Perdana
40150 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 7962 2002/2020/2021/2023/2220/2148
Faks: (+603) 7962 2007
Web: *fim.uitm.edu.my*

ISO 9001:2015 No. Sijil: 10120156
UiTM di hatiku

APPENDIX 2
Research Ethics (REC) Result

www.uitm.edu.my

UNIVERSITI TEKNOLOGI MARA

Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : 600-TNCPI(5/1/6)
Our reference : REC/12/2021 (MR/1067)
Date : 4th February 2022

Assoc. Prof. Dr Roziya binti Abu
(Haizatul Afni binti Bakhtiar - 2020278984)
Faculty of Information Management
Universiti Teknologi MARA
Puncak Perdana Campus
Seksyen U10
40150 Shah Alam
SELANGOR

Dear Assoc. Prof. Dr Roziya,

APPROVAL LETTER - UiTM RESEARCH ETHICS COMMITTEE

Thank you for submitting your research proposal to Research Ethics Committee (REC). After considering your application, the Committee approved your proposal entitled "State Public Library Collaborative Digital Information Literacy for School Resource Center" at state public libraries and Educational Resources and Technology Sector (SSTP) in Malaysia.

Details of the approval are as follows:

Ref. number:	REC/12/2021 (MR/1067)
Approval Period:	4th February 2022 until 30th September 2022
Authorised personnel:	1. Assoc. Prof. Dr Roziya binti Abu 2. Dr Norshila binti Shaifuddin 3. Haizatul Afni binti Bakhtiar

The UiTM Research Ethics Committee operates in accordance to the ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

We draw to your attention the requirement that a report on this research, must be submitted every 12 months from the date of the approval or on the completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to REC for approval.

If you require further information, please contact REC Secretariat at 03-55448069/03-55442794 or email at recsecretariat@uitm.edu.my.

Yours sincerely,

PROFESSOR DATO' DR ABU BAKAR ABDUL MAJEED
Chairman
UiTM Research Ethics Committee

c.c.: Dean, Faculty of Accountancy, UiTM

Universiti Teknologi MARA
Aras 3, Bangunan Wawasan
40450 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 5544 2004/2255
Faks: (+603) 5544 2070

ISO 9001:2015 No. Sijil: 10120156

UiTM di hatiku

APPENDIX 3
Student Verification Letter from Supervisor

www.uitm.edu.my

UNIVERSITI TEKNOLOGI MARA
Fakulti Pengurusan Maklumat

Rujukan Kami : 600-FPM(HEA 5/3)
Tarikh : 17 Januari 2023

KEPADA SESIAPA YANG BERKENAAN

YBhg. Dato'/Tuan/Puan

MEMOHON KEBENARAN UNTUK MENJALANKAN PENYELIDIKAN

Dengan hormatnya perkara di atas adalah dirujuk.

2. Adalah dimaklumkan pelajar berikut dari Program Doktor Falsafah (Pengurusan Maklumat), Fakulti Pengurusan Maklumat, UiTM Kampus Puncak Perdana, Shah Alam memohon kebenaran untuk menjalankan penyelidikan secara atas talian. Tajuk kajian ialah *State Public Library Collaborative Digital Information Literacy for School Resource Center*.

3. Nama pelajar yang terlibat dalam penyelidikan ini:-

NAMA	NO. PELAJAR	NO. TEL.	E-MEL
Haizatul Afni binti Bakhtiar	2020278984		haizatul.afni1906@gmail.com

4. Adalah diharapkan pihak tuan/puan dapat memberikan peluang kepada pelajar berkenaan di dalam projek penyelidikan/ilmiah ini. Segala maklumat peribadi dan sulit tidak akan dinyatakan di dalam laporan pelajar itu nanti.

Kerjasama dan sokongan yang diberikan oleh pihak tuan/puan di dalam perkara ini amatlah dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian.

"WAWASAN KEMAKMURAN BERSAMA 2030"
"BERKHIDMAT UNTUK NEGARA"

Yang benar

PROF. MADYA TS DR.ROZIYA ABU
PENSYARAH KANAN/PENYELIA
b.p:Dekan

Fakulti Pengurusan Maklumat
Universiti Teknologi MARA
Cawangan Selangor, Kampus Puncak Perdana
40150 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 7962 2002/2020/2021/2023/2220/2148
Faks: (+603) 7962 2007
Web: *fim.uitm.edu.my*

ISO 9001:2015 No. Sijil: 10120156
UiTM di hatiku

APPENDIX 4
Approval Letter from Ministry of Education

KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
ARAS 1-4, BLOK E8
KOMPLEKS KERAJAAN PARCEL E
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62604 PUTRAJAYA

TEL : 0388846591
FAKS : 0388846579

Ruj. Kami : KPM.600-3/2/3-eras(12155)
Tarikh : 15 Mac 2022

HAIZATUL AFNI BINTI BAKHTIAR
NO. KP :

PERLIS

Tuan,

KELULUSAN BERSYARAT UNTUK MENJALANKAN KAJIAN :
STATE PUBLIC LIBRARY COLLABORATIVE DIGITAL INFORMATION LITERACY FOR SCHOOL RESOURCE CENTER

Perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa permohonan tuan untuk menjalankan kajian seperti di bawah telah diluluskan dengan syarat :

" KELULUSAN INI BERGANTUNG KEPADA KEBENARAN PENGARAH JPN DAN PERTIMBANGAN PENTADBIR SEKOLAH. KELULUSAN INI BERGANTUNG KEPADA PERTIMBANGAN PENGARAH BAHAGIAN SUMBER DAN TEKNOLOGI PENDIDIKAN. "

3. Kelulusan adalah berdasarkan kepada kertas cadangan penyelidikan dan instrumen kajian yang dikemukakan oleh tuan kepada bahagian ini. Walau bagaimanapun kelulusan ini bergantung kepada kebenaran Jabatan Pendidikan Negeri dan Pengetua / Guru Besar yang berkenaan.

4. Surat kelulusan ini sah digunakan bermula dari **1 April 2022** hingga **21 September 2022**

5. Tuan dikehendaki menyerahkan senaskhah laporan akhir kajian dalam bentuk *hardcopy* bersama salinan *softcopy* berformat pdf dalam CD kepada Bahagian ini.Tuan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak diterbitkan di mana-mana forum, seminar atau diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

Ketua Penolong Pengarah Kanan
Sektor Penyelidikan dan Penilaian Dasar
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia

salinan kepada:-

JABATAN PENDIDIKAN JOHOR
JABATAN PENDIDIKAN KEDAH
JABATAN PENDIDIKAN KELANTAN
JABATAN PENDIDIKAN MELAKA
JABATAN PENDIDIKAN NEGERI SEMBILAN
JABATAN PENDIDIKAN PAHANG
JABATAN PENDIDIKAN PULAU PINANG
JABATAN PENDIDIKAN PERAK

APPENDIX 5

Approval Letter from Bahagian Sumber Dan Teknologi Pendidikan, Ministry of Education

KEMENTERIAN PENDIDIKAN MALAYSIA
MINISTRY OF EDUCATION MALAYSIA
Bahagian Sumber dan Teknologi Pendidikan
Educational Resources and Technology Division
Persiaran Bukit Kiara
50604 KUALA LUMPUR
MALAYSIA

Tel : 603-2081 7777
Fax: 603-2081 7788

Ruj. Kami : KPM.600-2/2/30 (30)
Tarikh : 7 Mac 2023

Puan Haizatul Afni binti Bakhtiar
Fakulti Pengurusan Maklumat
UiTM Puncak Perdana
Jalan Pulau Indah Au10/A
Puncak Perdana
40150 Shah Alam
Selangor

Puan,

Permohonan Kebenaran Untuk Menjalankan Kajian Di Sektor Sumber Dan Teknologi Pendidikan Seluruh Malaysia

Dengan hormatnya perkara di atas dan sesi pembentangan melalui *Google Meet* bertarikh 1 Mac 2023 dirujuk.

2. Sukacita dimaklumkan bahawa Bahagian Sumber dan Teknologi Pendidikan (BSTP) tiada halangan untuk puan menjalankan kutipan data bagi kajian *State Public Library Collaborative Digital Information Literacy for School Resource Center.*

3. Pihak puan dimohon untuk mematuhi segala etika pelaksanaan kajian serta peraturan seperti yang ditetapkan oleh pihak Bahagian Perancangan dan Penyelidikan Dasar Pendidikan (BPPDP) menerusi surat kelulusan eRas bertarikh 26 Januari 2023.

Sekian, terima kasih.

"MALAYSIA MADANI"
"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(ZAINAL BIN ABAS)
Pengarah
Bahagian Sumber dan Teknologi Pendidikan
Kementerian Pendidikan Malaysia

APPENDIX 6
Application Letter for Interview

Haizatul Afni binti Bakhtiar,

Perlis

16 Mac 2022

Pengarah
Jabatan Pendidikan Negeri Pulau Pinang
Jalan Bukit Gambir,
11700 Pulau Pinang.

MOHON KEBENARAN UNTUK MENJALANKAN KAJIAN DI JABATAN PENDIDIKAN NEGERI PULAU PINANG

YBhg. Dato'/Tuan/Puan,

Assalamualaikum Warahmatullahi Wabarokatuh dan Salam Sejahtera,

Dengan segala hormatnya saya merujuk kepada perkara yang tersebut di atas.

2. Sukacita dimaklumkan, saya Haizatul Afni binti Bakhtiar sedang melanjutkan pelajaran dalam Program Doktor Falsafah (Pengurusan Maklumat), Fakulti Pengurusan Maklumat, UiTM Kampus Puncak Perdana, Shah Alam.

3. Sehubungan dengan itu, saya memohon kebenaran untuk menjalankan penyelidikan secara atas talian di jabatan YBhg. Dato'/Tuan/Puan, Tajuk kajian ialah *State Public Library Collaborative Digital Information Literacy for School Resource Center*. Bersama- sama ini dilampirkan Surat Pengesahan Pelajar dari Fakulti Pengurusan Maklumat, UiTM Puncak Perdana, Keputusan ERAS, Kertas Cadangan (*Research Proposal*), Borang Temubual dan Borang Etika untuk perhatian dan tindakan selanjutnya.

4. Saya boleh dihubungi di talian untuk maklumat lanjut tentang penyelidikan. Kerjasama dan sokongan yang diberikan oleh pihak YBhg. Dato'/Tuan/Puan, di dalam perkara ini amatlah dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian,

Yang benar,

(HAIZATUL AFNI BINTI BAKHTIAR)
Penyelidik

APPENDIX 7
Approval Letter from the State Education Department

KEMENTERIAN PENDIDIKAN MALAYSIA
Jabatan Pendidikan Negeri Perak
Jalan Tun Abdul Razak
30640 Ipoh, Perak Darul Ridzuan

Tel : 605 501 5000
Faks : 605 527 7273
Laman Web : http://jpnperak.moe.gov.my

"PENDIDIKAN BERKUALITI, SEKOLAH UNGGUL, MURID HOLISTIK"

Ruj. Kami : JPNPk.SPS.USJK.600-1 Jld.5(24)
Tarikh : 13 Jun 2022

Haizatul Afni binti Bakhtiar

Perlis

Tuan,

KELULUSAN UNTUK MENJALANKAN KAJIAN DI SEKOLAH-SEKOLAH DI NEGERI PERAK DI BAWAH JABATAN PENDIDIKAN NEGERI PERAK

Dengan segala hormatnya, perkara di atas adalah dirujuk dan surat tuan yang diterima pada 10 Jun 2022 adalah berkaitan.

2. Sehubungan dengan itu, dimaklumkan bahawa Jabatan Pendidikan Negeri Perak tiada halangan untuk membenarkan pihak tuan menjalankan kajian yang bertajuk ***"STATE PUBLIC LIBRARY COLLABORATIVE DIGITAL INFORMATION LITERACY FOR SCHOOL RESOURCE CENTER"*** seperti dinyatakan dalam surat tuan dengan syarat-syarat berikut:

2.1 Pihak tuan perlu mendapatkan kebenaran terlebih dahulu daripada Pegawai Pendidikan Daerah dan Pengetua / Guru Besar sekolah berkenaan untuk menggunakan sampel kajian;

2.2 Kajian yang dijalankan hendaklah tidak mengganggu proses pengajaran dan pembelajaran yang telah ditetapkan oleh pihak sekolah;

2.3 Pihak tuan bertanggungjawab menjaga keselamatan dan kebajikan murid dan guru yang terlibat dalam kajian ini;

2.4 Murid, guru dan warga sekolah tidak boleh dipaksa terlibat dalam kajian ini;

2.5 Pihak tuan hendaklah bertanggungjawab menanggung semua kos kajian;

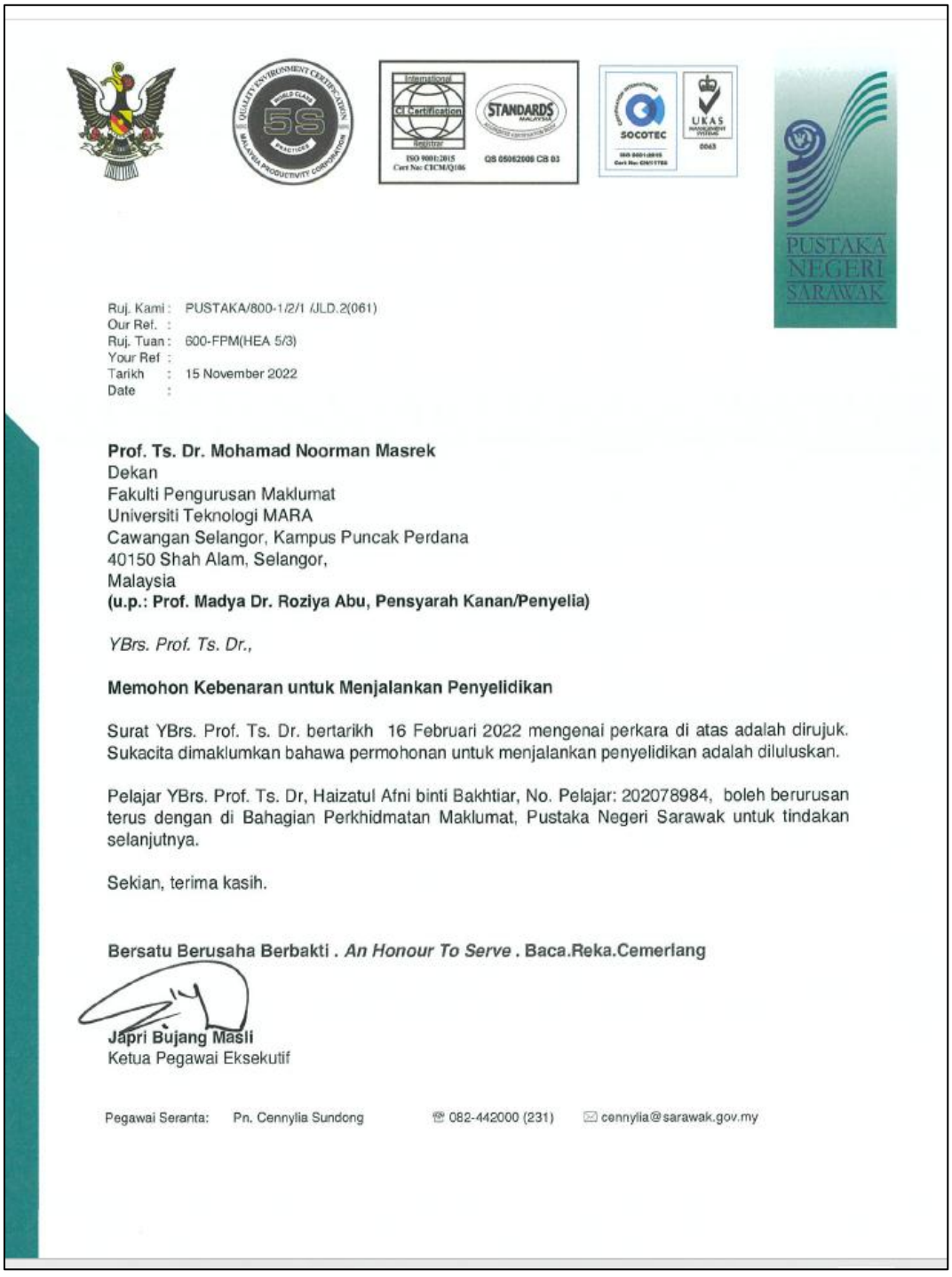
2.6 Pihak tuan dipohon agar menghantar satu (1) salinan laporan kajian dalam tempoh 30 hari ke jabatan ini selepas kajian tersebut dilaksanakan;

2.7 Tiada sebarang implikasi kewangan kepada Jabatan Pendidikan Negeri Perak, Pejabat Pendidikan Daerah dan pihak sekolah;

.../2

JABATAN PENDIDIKAN NEGERI PERAK
We Deliver
Sila catatkan rujukan Jabatan ini apabila berhubung

APPENDIX 8
Approval Letter from the State Public Library



Ruj. Kami : PUSTAKA/800-1/2/1 /JLD.2(061)
Our Ref. :
Ruj. Tuan : 600-FPM(HEA 5/3)
Your Ref :
Tarikh : 15 November 2022
Date :

Prof. Ts. Dr. Mohamad Noorman Masrek
Dekan
Fakulti Pengurusan Maklumat
Universiti Teknologi MARA
Cawangan Selangor, Kampus Puncak Perdana
40150 Shah Alam, Selangor,
Malaysia
(u.p.: Prof. Madya Dr. Roziya Abu, Pensyarah Kanan/Penyelia)

YBrs. Prof. Ts. Dr.,

Memohon Kebenaran untuk Menjalankan Penyelidikan

Surat YBrs. Prof. Ts. Dr. bertarikh 16 Februari 2022 mengenai perkara di atas adalah dirujuk. Sukacita dimaklumkan bahawa permohonan untuk menjalankan penyelidikan adalah diluluskan.

Pelajar YBrs. Prof. Ts. Dr, Haizatul Afni binti Bakhtiar, No. Pelajar: 202078984, boleh berurusan terus dengan di Bahagian Perkhidmatan Maklumat, Pustaka Negeri Sarawak untuk tindakan selanjutnya.

Sekian, terima kasih.

Bersatu Berusaha Berbakti . *An Honour To Serve* . Baca.Reka.Cemerlang

Japri Bujang Masli
Ketua Pegawai Eksekutif

Pegawai Seranta: Pn. Cennylia Sundong ☎ 082-442000 (231) ✉ cennylia@sarawak.gov.my

APPENDIX 9
Interview Questions for State Public Library Officer



KOLABORASI LITERASI MAKLUMAT DIGITAL PERPUSTAKAAN AWAM NEGERI PERLIS UNTUK PUSAT SUMBER SEKOLAH

Terima kasih atas kesudian anda ditemuduga hari ini. Dalam temu bual ini saya akan bertanyakan beberapa soalan dan dengan izin tuan, temu bual ini akan dirakam sama ada dalam talian atau pita audio serta gambar. Kandungan temu bual ini adalah peribadi dan sulit. Respons anda hanya akan digunakan atas sebab akademik dan identiti anda akan kekal tanpa nama.

Soal selidik ini bertujuan untuk mengenalpasti perkara yang boleh ditawarkan oleh perpustakaan awam kepada pusat sumber sekolah untuk menyokong pembangunan literasi maklumat digitalnya. Literasi maklumat digital adalah kajian utama. Ia akan menyiasat aspek kerjasama dalam membentuk inisiatif terbaik antara perpustakaan awam negeri dan pusat sumber sekolah. Ia akan meningkatkan kadar kemahiran literasi digital guru perpustakaan dan media serta perancangan perpustakaan negeri mengenai kemudahan literasi maklumat digital yang akan disediakan.

Set soalan akan diberikan kepada anda sebelum sesi temuduga dijalankan. Soalan temu bual adalah berdasarkan objektif kajian, yang disenaraikan di bawah .

1. Untuk menyiasat tahap penguasaan guru Perpustakaan dan Media dalam literasi maklumat digital.
2. Mencadangkan inisiatif kerjasama literasi maklumat digital antara perpustakaan awam negeri dan pusat sumber sekolah.
3. Membina rangka kerja usaha sama standard untuk perpustakaan awam negeri dan pusat sumber sekolah.

Kajian ini adalah bebas risiko dan anda boleh menghubungi penyelidik untuk sebarang pertanyaan atau maklumat lanjut

Nama penyelidik : Haizatul Afni binti Bakhtiar

Nombor telefon : (

BAHAGIAN A : MAKLUMAT UMUM

ARAHAN: SILA TANDAKAN (/) DI KOTAK YANG BERSESUAIAN

1. Jantina ☐ Lelaki ☐ Perempuan

2. Umur
   - ☐ < 25 tahun
   - ☐ 25 - 40 tahun
   - ☐ 41 – 50 tahun
   - ☐ 51 – 60 tahun

3. Pengalaman
   - ☐ < 5 tahun
   - ☐ 6 – 10 tahun
   - ☐ 11 – 20 tahun
   - ☐ 21 tahun dan ke atas

4. Pendidikan
   - ☐ Diploma
   - ☐ Ijazah Sarjana Muda
   - ☐ Ijazah Sarjana
   - ☐ PhD

5. Negeri _____

BAHAGIAN B : TAHAP KESEDARAN DAN PENGETAHUAN LITERASI MAKLUMAT DIGITAL , RESPON TERHADAP PENGGUNAAN LITERASI MAKLUMAT DIGITAL DAN KEMAHIRAN LITERASI MAKLUMAT DIGITAL

B (I) TAHAP KESEDARAN DAN PENGETAHUAN LITERASI MAKLUMAT DIGITAL

1. Bolehkah anda membezakan antara literasi maklumat dan literasi maklumat digital?
2. Adakah kakitangan perpustakaan/sekolah menyedari kewujudan literasi maklumat digital.
3. Adakah anda bersetuju literasi maklumat digital sesuai untuk semua peringkat umur.

B (II) RESPON TERHADAP PENGGUNAAN LITERASI MAKLUMAT DIGITAL

1. Perpustakaan / pusat sumber sekolah menyediakan peralatan yang mencukupi untuk menyokong proses permohonan literasi maklumat digital
2. Adakah perpustakaan awam menerapkan literasi maklumat digital dan siapakah pengguna literasi maklumat digital?
3. Adakah perpustakaan negeri/ pusat sumber sekolah mempunyai belanjawan khusus dalam mempromosikan aktiviti literasi maklumat digital?
4. Adakah anda mendapati perpustakaan negeri mampu membantu pusat sumber sekolah dalam literasi maklumat digital?
5. Pada pendapat anda, apakah halangan yang akan mengganggu proses dan kemajuan literasi maklumat digital?
6. Adakah anda menggunakan mana-mana modul dalam mengajar literasi maklumat digital?
7. Adakah modul mudah difahami dan dikendalikan?

B (III) KEMAHIRAN LITERASI MAKLUMAT DIGITAL

1. Di manakah anda akan meletakkan diri anda tentang literasi maklumat digital terutamanya dari segi pengetahuan dan kemahiran anda?
2. Adakah perpustakaan awam mempunyai pakar dalam literasi maklumat digital. Adakah ia cukup untuk menyokong pusat sumber sekolah?
3. Manakah pilihan anda antara program fizikal dan dalam talian?
4. Apakah cabaran yang anda hadapi semasa mengendalikan program secara fizikal?
5. Bagaimana pula dengan cabaran yang anda hadapi semasa menjalankan program dalam talian?
6. Adakah anda bersetuju kakitangan di perpustakaan dan pusat sumber sekolah sudah mahir dalam literasi maklumat digital

APPENDIX 10

Interview Questions for the Educational Resources and Technology (SSTP) Officer

KOLABORASI LITERASI MAKLUMAT DIGITAL PERPUSTAKAAN AWAM NEGERI UNTUK PUSAT SUMBER SEKOLAH

Terima kasih atas kesudian anda ditemuduga hari ini. Dalam temu bual ini saya akan bertanyakan beberapa soalan dan dengan izin tuan, temu bual ini akan dirakam sama ada dalam talian atau pita audio serta gambar. Kandungan temu bual ini adalah peribadi dan sulit. Respons anda hanya akan digunakan atas sebab akademik dan identiti anda akan kekal tanpa nama.

Soal selidik ini bertujuan untuk mengenalpasti perkara yang boleh ditawarkan oleh perpustakaan awam kepada pusat sumber sekolah untuk menyokong pembangunan literasi maklumat digitalnya. Literasi maklumat digital adalah kajian utama. Ia akan menyiasat aspek kerjasama dalam membentuk inisiatif terbaik antara perpustakaan awam negeri dan pusat sumber sekolah. Ia akan meningkatkan kadar kemahiran literasi digital guru perpustakaan dan media serta perancangan perpustakaan negeri mengenai kemudahan literasi maklumat digital yang akan disediakan.

Set soalan akan diberikan kepada anda sebelum sesi temuduga dijalankan. Soalan temu bual adalah berdasarkan objektif kajian, yang disenaraikan di bawah .

1. Untuk menyiasat tahap penguasaan guru Perpustakaan dan Media dalam literasi maklumat digital.
2. Mencadangkan inisiatif kerjasama literasi maklumat digital antara perpustakaan awam negeri dan pusat sumber sekolah.
3. Membina rangka kerja usaha sama standard untuk perpustakaan awam negeri dan pusat sumber sekolah.

Kajian ini adalah bebas risiko dan anda boleh menghubungi penyelidik untuk sebarang pertanyaan atau maklumat lanjut

Nama penyelidik : Haizatul Afni binti Bakhtiar

Nombor telefon :

BAHAGIAN A : MAKLUMAT UMUM

ARAHAN: SILA TANDAKAN (/) DI KOTAK YANG BERSESUAIAN

1. Jantina ☐ Lelaki ☐ Perempuan

2. Umur
   - ☐ < 25 tahun
   - ☐ 25 - 40 tahun
   - ☐ 41 – 50 tahun
   - ☐ 51 – 60 tahun

3. Pengalaman
   - ☐ < 5 tahun
   - ☐ 6 – 10 tahun
   - ☐ 11 – 20 tahun
   - ☐ 21 tahun dan ke atas

4. Pendidikan
   - ☐ Diploma_____
   - ☐ Ijazah Sarjana Muda _____
   - ☐ Ijazah Sarjana _____
   - ☐ PhD _____

5. Negeri _____

BAHAGIAN B : TAHAP KESEDARAN DAN PENGETAHUAN LITERASI MAKLUMAT DIGITAL , RESPON TERHADAP PENGGUNAAN LITERASI MAKLUMAT DIGITAL DAN KEMAHIRAN LITERASI MAKLUMAT DIGITAL

B (I) TAHAP KESEDARAN DAN PENGETAHUAN LITERASI MAKLUMAT DIGITAL

1. Adakah anda tahu apa itu literasi maklumat digital?
2. Adakah pengurusan atasan menyokong literasi maklumat digital.
3. Adakah kakitangan perpustakaan/sekolah menyedari kewujudan literasi maklumat digital.

B (II) RESPON TERHADAP PENGGUNAAN LITERASI MAKLUMAT DIGITAL

1. Literasi maklumat digital akan membantu guru dalam proses pengajaran dan pembelajaran
2. Pada pendapat anda, apakah halangan yang akan mengganggu proses dan kemajuan literasi maklumat digital?
3. Adakah anda menggunakan mana-mana modul dalam mengajar literasi maklumat digital?
4. Apakah yang anda ingin ubah atau tambah dalam modul tersebut?

B (III) KEMAHIRAN LITERASI MAKLUMAT DIGITAL

1. Apakah kepentingan kepada anda tentang literasi maklumat digital? Mengapa ia penting untuk anda?
2. Adakah anda bersetuju bahawa peralatan yang lengkap memainkan peranan penting dalam kejayaan literasi maklumat digital.
3. Adakah anda bersetuju kakitangan di perpustakaan dan pusat sumber sekolah sudah mahir dalam literasi maklumat digital

BAHAGIAN C : USAHA KOLABORATIF

1. Bagaimanakah kerjasama antara perpustakaan awam dan pusat sumber sekolah. Adakah perlu untuk mempunyai hubungan yang baik antara kedua-dua organisasi?
2. Adakah anda fikir perpustakaan negeri mempunyai sumbangan yang mencukupi ke arah pembangunan literasi maklumat digital di pusat sumber sekolah?
3. Adakah terdapat institusi lain yang perlu terlibat dalam kerjasama ini dan mengapa?
4. Adakah anda bersetuju dengan kos yang perlu ditanggung apabila melibatkan diri dalam kerjasama ini?
5. Apakah jangkaan anda dengan kerjasama ini?

Terima kasih. Kerjasama tuan/puan amatlah hargai.

AUTHOR'S PROFILE



Haizatul Afni Bakhtiar is an Assistant Librarian at the Perlis State Public Library. She has participated in numerous state public library programs and activities, including collaborations with school library and media teachers since 2007. She has represented the Perlis State Public Library at conferences in Singapore, Greece, and Korea, presenting library projects. Haizatul Afni Bakhtiar earned her Diploma in Information Management in 2006 and her BSc in Information Management (1st Class) from the Faculty of Information Management at *Universiti Teknologi MARA* (UiTM).

LIST OF PUBLICATIONS

Bakhtiar, H. A., Abu, R., & Shaifuddin, N. (2022). State public library collaborative digital information literacy for school resource center: A conceptual paper. *Jurnal PPM: Journal of Malaysian Librarians*, 16, 39–57.

Bakhtiar, H. A., Abu, R., & Shaifuddin, N. (2024). Sustainable collaboration between public libraries and school resource centers: Advancing digital information literacy in the digital age. Journal of Information and Knowledge Management, 14(2), 50–60.

Bakhtiar, H. A., Abu, R., & Shaifuddin, N. (2025). Sustainable collaborative digital information literacy index framework for state public library and school resource centre in Malaysia. International Journal of Modern Education, 7(24).

CONFERENCE/COURSE/ SEMINAR:

1. Library & Information Science Research Colloquium 2021 (Presenter)
2. The Annual Conference of Malaysia Libraries 2022 (Presenter)
3. Kursus Matlamat Pembangunan Mampan (SDG) Dalam Perpustakaan Dan Kepustakawanan – Participant
4. Sarawak Annual Librarians Colloquium 2023 (SAL.CO 2023) "Mainstreaming the Library and Information Services" – Participant
5. Taklimat Pengenalan Teknologi Kecerdasan Buatan (AI) - Participant
6. Kursus Celik Maklumat 2024 – Participant
7. The Annual Conference of Malaysia Libraries 2024 - (Presenter)
8. Kursus Literasi Maklumat: Jom Celik Maklumat 2025 - Participant