

Faculty of Cognitive Sciences and Human Development

Advancing Academic Librarians' Professional Development in Information Literacy Instruction

Dayang Norsheila Binti Abang Mohtar

Doctor of Philosophy
2025

Advancing Academic Librarians' Professional Development in Information Literacy Instruction

Dayang Norsheila Binti Abang Mohtar

A thesis submitted

In fulfillment of the requirements for the degree of Doctor of Philosophy

(Learning Sciences)

Faculty of Cognitive Sciences and Human Development
UNIVERSITI MALAYSIA SARAWAK
2025

DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



……

Signature

Name: Dayang Norsheila Binti Abang Mohtar

Matric No.: 19010156

Faculty of Cognitive Sciences and Human Development

Universiti Malaysia Sarawak

Date: 30th September 2025

ACKNOWLEDGEMENT

Firstly, I am deeply grateful to Allah S.W.T. for granting me strength, knowledge, patience and guidance throughout my PhD journey. *Alhamdulillah,* this thesis would not have been possible without His blessings.

To my dearest mother, Zahara – your unwavering prayers, unconditional love and constant encouragement have been my greatest source of strength. Thank you for believing in me even when I doubted myself. To my father, Abang Mohtar – thank you for your wisdom, patience, and support. To my siblings, Abang Hisham, Dayang Nordianna, and Abang Johari – your love and encouragement have meant the world to me.

Heartfelt thanks to my former director, the late Allahyarhamah Pn. Korina Ibrahim, whose lasting support and guidance continue to inspire me (Al-Fatihah).

To my supervisor, Professor Dr. Fitri Suraya Mohamad – thank you for your invaluable mentorship, dedication and belief in my potential. I am truly grateful for your guidance throughout this journey.

Special thanks to my cousin Nurhamizah, for both your emotional support and help with token preparation. I would also like to thank her once again, along with my friends Maisyarah and Jessica, for their roles in my MOOC videos. Your support was truly impactful. To my dear friends – Mohamad Rashidi, Nur Zarith Erma, Sabrina, Grace, Syazwani, and Junaidah – thank you for your encouragement, advice, and constant support.

I am grateful to UNIMAS for the *Hadiah Latihan Cuti Belajar* award and to the E-Learning Committee for their critical support in developing the Information Literacy MOOC. To my PeTARY family – thank you for believing in me and cheering me on every step of the way, and to all research participants – your invaluable contributions are truly appreciated.

ABSTRACT

The expansion of higher education in the digital era has increased the demand for effective Information Literacy (IL) instruction and underscored the role of academic librarians. This study employed an exploratory sequential mixed-methods design to examine how Malaysian academic librarians implement theoretical frameworks in their teaching and to assess the effectiveness of a purpose-built IL MOOC in developing student competencies. Interview data indicated that IL instruction was informed by theoretical foundations through differentiated and scaffolded methods, ethical integration, interactive pedagogy, and continuous professional development. Librarians utilized the TPACK framework by integrating digital tools with learner-centered strategies, while the ACRL Framework informed the development of structured modules, practical search and evaluation activities, reciprocal engagement, and assessment practices. Quantitative results indicated that time invested in the MOOC was the most significant predictor of course completion, while participation in activities and repeated assessments further improved outcomes. Engagement and course design had a greater impact than video duration. Competency analysis demonstrated significant differences between completers and non-completers across all six IL modules, with the largest improvements observed in *'Scholarship as Conversation'* and *'Searching as Strategic Exploration.'* These findings underscore the importance of aligning IL instruction with the TPACK and ACRL frameworks, enhancing librarians' pedagogical expertise, and utilizing MOOCs as scalable solutions for improving IL competencies.

Keywords: Information literacy competency, information literacy instruction, academic librarians, Massive Open Online Courses (MOOC), higher education

Memajukan Pembangunan Profesional Pustakawan Akademik dalam Pengajaran Literasi Maklumat

ABSTRAK

Perkembangan pesat pendidikan tinggi dalam era digital meningkatkan keperluan terhadap pengajaran Literasi Maklumat (IL) yang berkesan serta menonjolkan peranan pustakawan akademik. Kajian ini menggunakan reka bentuk kaedah campuran berurutan eksploratori bagi menilai pelaksanaan kerangka teori oleh pustakawan akademik di Malaysia serta keberkesanan IL MOOC dalam pembangunan kompetensi pelajar. Dapatan kualitatif menunjukkan pengajaran IL berasaskan teori melalui pendekatan berbeza dan berperingkat, integrasi etika, pedagogi interaktif, dan pembangunan profesional berterusan. Pustakawan mengaplikasikan kerangka TPACK dengan menggabungkan teknologi, pedagogi, dan kandungan IL, manakala kerangka ACRL dimanfaatkan dalam modul berstruktur, aktiviti amali, dan penilaian hasil pembelajaran. Analisis kuantitatif mendapati masa yang diluangkan dalam MOOC menjadi peramal signifikan bagi penyiapan kursus, dengan penyertaan dalam aktiviti dan penilaian berulang meningkatkan pencapaian. Analisis kompetensi menunjukkan perbezaan ketara antara pelajar yang menamatkan kursus dan yang tidak, khususnya pada modul Scholarship as Conversation dan Searching as Strategic Exploration. Kajian ini menegaskan keperluan menyelaraskan pengajaran IL dengan kerangka TPACK dan ACRL, memperkukuh kepakaran pedagogi pustakawan, serta memanfaatkan MOOC sebagai penyelesaian berskala bagi meningkatkan kompetensi IL.

Kata kunci: *Kompetensi literasi maklumat, pengajaran literasi maklumat, pustakawan akademik, Kursus Dalam Talian Terbuka Secara Besar-besaran (MOOC), pendidikan tinggi*

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LIST OF ABBREVIATIONS

ACK	Awareness of Content Knowledge (referring to Section E in the interview protocol)
ACRL	Association of College and Research Libraries
ADDIE	Analyse, Design, Develop, Implement, Evaluate Access (instructional model)
AI	Artificial Intelligence
AL	Academic Librarian
ANOVA	Analysis of Variance
ATK	Awareness of Technological Knowledge (referring to Section C in the interview protocol)
APK	Awareness of Pedagogical Knowledge (referring to Section D in the interview protocol)
BERU	Basic Education Research Unit
CALM	Centre for Applied Learning and Multimedia
CILIP	Chartered Institute of Library and Information Professionals
CK	Content Knowledge
CLT	Cognitive Load Theory
COVID-19	Coronavirus Disease
CSR	Corporate Social Responsibility
EBP	Evidence-based practice
FIL	Framework for Information Literacy
FYE	First-year experience

GIL	General Information Literacy (referring *Section B: General Data on Information Literacy Instruction* in the interview protocol)
GPA	Grade Point Average
HE	Higher Education
HOTS	Higher Order Thinking Skills
ICAP	Interactive, Constructive, Active, and Passive (framework)
ICT	Information and Communication Technology
IDEA	Identify, Design, Execute, Access (instructional model)
IL	Information Literacy
ILI	Information Literacy Instruction
IL MOOC	Information Literacy Massive Open Online Courses
IR 4.0	Industrial Revolution 4.0
IT	Information Technology
KM	Knowledge Management
KPIs	Key Performance Indicators
LIS	Library and Information Science
LMS	Learning Management Systems
MIMOS	Malaysian Institute of Microelectronic Systems
MOOC	Massive Open Online Courses
NITA	National IT Agenda
NITC	The National IT Council
ODL	Open and Distance Learning
OPAC	Online Public Access Catalog
PeTARY	Perpustakaan Tun Abdul Rahman Ya'kub
PK	Pedagogical Knowledge

PSM	Projek Sarjana Muda
SAMR	Substitution, Augmentation, Modification, Redefinition (model)
SDGs	Sustainable Development Goals
SDL	Self-directed learning
SDT	Self-Determination Theory
SLS-OLE	Student Learning and Satisfaction in Online Learning Environments
SPSS	Statistical Package for the Social Sciences
TK	Technological Knowledge
TPACK	Technological Pedagogical Content Knowledge
TPACK-COPR	Technological Pedagogical Content Knowledge-Comprehension, Observation, Practice, Reflection
TPACK-IDDIRR	Technological Pedagogical Content Knowledge- Introduce, Demonstrate, Develop, Implement, Revise, Reflect
UiTM	Universiti Teknologi MARA
UMD	University of Maryland
UNI	University
UNIMAS	Universiti Malaysia Sarawak
ZPD	Zone of Proximal Development

CHAPTER 1

INTRODUCTION

1.1 Introduction

Information literacy has become increasingly essential for students in higher education, particularly in fostering critical thinking and problem-solving skills (Sanches et al., 2022). Today's 21st-century learners are born into an era that demands the development of skills supporting self-directed growth and technological adaptability (Garrison, 1997). Immersed in an environment rich with multimedia resources and interactive technologies, students are continually exposed to opportunities that enhance their competency in key 21st-century skills (Thornbill-Miller et al., 2023). There is increasing interest among educators in improving instructional quality to better support the development of 21st-century skills (Care et al., 2018). Learners must be equipped with these essential skills and actively participate in lessons that incorporate effective teaching approaches aimed at building their competencies to address contemporary challenges (Organisation for Economic Co-operation and Development, 2025). Achieving success in the 21st century requires mastery of critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, flexibility, leadership, initiative, productivity, and social skills thinkers (Applied Educational Systems, 2019). These competencies enable learners to adapt and excel in the workplace, become discerning consumers of information, and grow into independent, critical thinkers (Applied Educational Systems, 2019). In line with this, the rapid expansion of information in the 21st century has empowered students to become more independent learners, as information is now readily available and presented in increasingly engaging formats (Association of College & Research Libraries, 2016; Lackmann et al.,

2021; Shao et al., 2022; Hua et al., 2024). The swift growth of information has underscored the critical importance of developing strong information literacy (IL) skills (Trixa & Kaspar, 2024). Learners must be able to effectively seek, access, locate, and evaluate the information they need, ensuring that it is drawn from appropriate and reliable sources (Association of College & Research Libraries, 2016). Without proficiency in these skills, students risk becoming overwhelmed by the sheer volume of information available across various platforms, including websites, blogs, magazines, books, newspapers, documentaries, organizational publications, and databases (Arnold, et al., 2023; Shahrzadi et al., 2024).

Many students today have become heavily reliant on search engines such as Google (Alotaibi et al., 2023). While these platforms offer the convenience of instant access to a vast array of information, they often lead students to overlook the valuable academic resources provided through library subscriptions (Alotaibi et al., 2023). Within the context of higher education, libraries serve as essential support systems, where knowledge is systematically collected, organized, and disseminated to the academic community (Fitzgerald & Eustis, 2023). Higher education institutions have a crucial responsibility to produce graduates who can actively contribute to the knowledge-based economy, where information serves as both a commodity and a source of power (AlQhtani, 2025). As a result, information literacy (IL) skills are increasingly being integrated into the curriculum of higher education institutions, with the aim of producing information-literate graduates who can contribute effectively to the workforce (Patil, 2019). This growing recognition of IL's importance has prompted many institutions to develop dedicated IL modules, often delivered through university libraries. These modules play a central role in the process of knowledge construction, equipping students with the competencies needed to actively engage in learning aligned with the demands of 21st-century education (Wray & Mulvihill, 2018).

The evolving landscape of academic classrooms also calls for academic librarians to adopt 21st-century teaching skills and strategies in order to remain relevant in supporting students' pursuit of knowledge (Corrall & Jolly, 2019). This shift has expanded the role of librarians beyond simply guiding students in locating physical or electronic resources (Corrall & Jolly, 2019). Librarians are now facilitators of the entire information process, encouraging active participation in identifying, locating, evaluating, applying, and acknowledging information, ultimately enabling students to construct new knowledge from the information they gather (Dahlen & Leuzinger, 2020).

However, it is concerning for the library profession that librarians are not yet adequately prepared to take on the role of informed educators (Montgomery, 2015). Several discussions and debates regarding the concept of teaching librarians have emerged in earlier literature. Wilson (1979) stated that although librarians are occasionally required to teach, teaching has traditionally not been considered a core component of their professional role. Peele (1984) on the other hand argued that although librarians are actively involved in educating learners, they are often positioned secondary to college instructors in the academic hierarchy. It was also argued that while teachers are expected to possess specialized knowledge in a particular discipline, librarians are required to develop a broad understanding across multiple fields of study (Weightman et al., 2017). The argument was further strengthened by describing librarians as agents who respond to the organization of knowledge rather than its actual content. Nevertheless, the provision of information literacy (IL) education has now become a well-established and highly valued role within university libraries (Weightman et al., 2017). The evolving information environments, tools, and technologies have made Information Literacy (IL) an essential competency for librarians and information professionals (Campello & Abreu, 2005; Elmborg, 2006; Johnston & Webber,

2004; Andreatta as cited in Virkus, 2003). Librarians play a central role in promoting information literacy (IL) activities, while also recognizing the importance of IL as a concept, understanding its impact on contemporary society, and appreciating the key principles involved in teaching IL (Hebrang Grgic & Spiranec, 2013).

Academic librarians continue to play a vital role in information literacy instruction, making it essential for future librarians to be well-prepared to take on this responsibility. Part of this preparation involves developing a strong understanding of the practices employed by information literacy instructors (Dzulkipli et al., 2024). Numerous studies (Mullins, & Boyd-Byrnes, 2024; Artemchik et al., 2024; DeFrain et al., 2025; Peacock, 2025; Adle, 2023; Lund et al., 2023; Bradley-Ridout et al., 2024) have examined both instructional practices and the preparation of librarians for teaching roles, often highlighting the need for further improvement in both areas to enhance the effectiveness of information literacy education. Understanding instructional practices in today's academic libraries must start with the foundational document designed to guide them, the Framework for Information Literacy for Higher Education (Latham et al., 2019).

Librarians are primarily responsible for equipping students with information literacy competencies in Malaysian universities (Edzan, 2008). The growing body of research on the complex landscape of the Fourth Industrial Revolution (IR 4.0) has increasingly drawn the attention of both librarians and library science educators to the importance of information literacy. Stakeholders have also prioritized information literacy by placing it on the Malaysian Education System agenda (Edzan, 2008; Maria et al., 2018; Selamat et al., 2017). The inclusion of information literacy (IL) instruction within the educational curriculum helps students become more effective information seekers, readers, users, researchers, and writers,

while also making a significant contribution to the development of Higher Order Thinking Skills (HOTS) and broader information literacy competencies (Yu et al., 2018).

1.2 Background of the Study

The background of this study explores the evolving roles of academic librarians in delivering Information Literacy (IL) instruction within Malaysian public universities. Traditionally, IL instruction has involved librarians teaching students essential skills such as navigating online databases, searching for relevant information, and evaluating retrieved sources to meet academic tasks assigned by their lecturers (Robinson & Jones-Edman, 2021). IL becomes increasingly vital in higher education, academic librarians are now expected to move beyond these traditional practices (Association of College & Research Libraries (2016). With ongoing changes in higher education curricula, librarians are required to develop the ability to teach IL using appropriate instructional methods that can enhance student engagement and improve learning outcomes (Cook, 2022; Brooks, 2014; Erlinger, 2018).

Additionally, the study's background highlights the importance of academic librarians' understanding of learning theories, as their level of knowledge in this area influences the instructional strategies they adopt when teaching IL.

1.2.1 The Evolving Roles of Academic Librarians

The evolving roles of academic librarians mirror a shift from their conventional roles towards more expanded roles driven by digital transformation, open access, and institutional demands (Hoving, 2025). Libraries have adapted technological shift, from technological revolution and COVID-19-driven remote access to today's implementation of AI by

broadening into areas like research integrity, open science, data visualisation, digital humanities, and user experience (Hoving, 2025). These need challenging new skills, continuous training, as well as the ability to integrate teaching, research, and commercial aspects of the information ecosystem (Hoving, 2025).

Librarians have long played a prominent role in education. Conventionally, they were primarily responsible for organising information within the library. Their duties included building and managing library collections, conducting orientation sessions, particularly for new users and assisting users in locating the information resources they needed (Eke et al., 2010). However, the current technology changes have enabled virtually stored and retrieved information to become easily accessible to users. Therefore, this has informed librarians' roles as information providers or 'keepers of knowledge' as obsolete (Eke et al., 2010).

Librarians were traditionally seen as professionals working within the library, performing tasks such as assisting readers in locating information, as well as acquiring, organizing, and preserving printed materials within the library's collection (Rubin, 2016). However, this traditional role began to change rapidly towards the end of the 20th century, driven by advancements in computer and communication technologies, whereby complete records of library collections were digitised and stored in bibliographic databases, such as the Online Public Access Catalog (OPAC), reducing the need for students to physically visit the library to access information (Rao & Babu, 2001). To be parallel with the 21st century technological developments, librarians need to obtain the 21st century skills and they are needed to attend relevant trainings or acquire skills for better services in the 21st century (Eke et al., 2010).

The evolving roles of libraries and librarians have become a topic of ongoing discussion within society, largely driven by the rapid growth of information on the internet

(Dezuanni & Osman, 2024) and the integration of information and communication technologies (ICTs) into library operations, in which these technological advancements have compelled librarians to adapt their traditional practices across all areas of librarianship, particularly within academic institutions (Association of College & Research Libraries Planning and Review Committee, 2025). Additionally, librarians now face new challenges arising from the widespread use of learning management systems, changes in research communication methods, and transformations in scientific publishing. In response to these shifts, librarians and information technologists must collaborate to design new services that meet the demands of the IT-driven environment (Association of College & Research Libraries Planning and Review Committee, 2025).

There is a necessity for librarians to deliver trainings as both academics and students often have insufficient information skills, in which they tend to nearly trust unreliable sources. These librarian-led trainings would be an advantage for curriculum-integrated IL instruction, leading to research building, critical thinking, and lifelong learning skills (Bajo, 2009). Librarians are highlighted as well-suited for information literacy instruction, deliver fundamental training to faculties and having a collaboration with the academics as subject matter experts other than facilitating teaching in classroom settings (Mullins & Boyd-Byrnes, 2024). It is vital for librarians to be confident in their skills in delivering training and pedagogical support to the faculty, sustained by enhanced pedagogical coursework and professional growth opportunities, to ensure the achievement of faculty development in information literacy (Hammons, 2024).

1.2.2 The Development of Information Literacy in Malaysia

In 1996, the National IT Council (NITC) launched the National IT Agenda (NITA), providing the foundation and framework for leveraging information and communication technology (ICT) to support Malaysia's transformation into a developed nation (Edzan, 2008). Through the implementation of ICT, Malaysia aims to evolve first into an information society, then into a knowledge society, and ultimately into a values-based knowledge society (Edzan, 2008). Karelse (1996), as cited in Edzan (2008), mentioned that the discussions about IL in Malaysia focused more on IT literacy and not much on IL itself. In 1997, Tengku Mohd Azman Shariffadeen, President and Chief Executive Officer of the Malaysian Institute of Microelectronic Systems (MIMOS), proposed a definition of an information-literate society within the Malaysian context. He emphasized that 'an IT-literate society must attain a higher level of information literacy, enabling individuals to identify, use, and manipulate information effectively (Edzan, 2008). An independent consultant with Teja Information Services in Malaysia, also observed that most IT training programs lacked the integration of information literacy (IL) skills, that consistently emphasised the importance of strengthening both IT and IL competencies, and suggested that librarians should take on the roles of end-user trainers and technology coordinators (Edzan, 2008).

Similarly, university graduates are expected to be IT literate, aligning with the government's efforts to strengthen the Malaysian workforce through IT training initiatives. In this context, the role of IT is to support literacy development, fostering the creation of information-literate individuals and knowledge workers empowered by technology (Edzan, 2008). Literacy today extends beyond basic reading and writing, encompassing the ability to develop new skills and knowledge (PIAAC Literacy Expert Group, 2009). The processes of

gathering, synthesizing, and applying information are becoming just as important as the traditional mechanics of literacy (Dahlen, 2022). In the digital age, information technology and information literacy skills are essential, enabling learners to become effective information seekers and users (Kim 1998).

1.2.3 Information Literacy in Malaysian Higher Education

Information literacy has been integrated into the Malaysian education system for some time. At the primary and secondary school levels, information skills are taught by teachers, while at the undergraduate and postgraduate levels, academic librarians take on the role of developing students' information literacy competencies (Edzan, 2008). The discussion around Information Literacy (IL) began as early as 1974 and has remained a central focus within the field of librarianship. The importance of IL and its role in society was formally acknowledged in the Prague Declaration of 2003. Since then, there has been a significant increase in the development of IL programs across educational institutions worldwide, accompanied by a growing body of related literature (Edzan & Mohd Saad, 2005).

The concept of Information Literacy (IL) in Malaysia was first introduced by Kim Phaik Lim at the 2nd Asia Regional Literacy Forum held in New Delhi in 1998, based on her exploration of IL concepts and their role in literacy education (Edzan & Mohd Saad, 2005). The InfoLit-Telelearning programme, introduced in 1996 by the Basic Education Research Unit (BERU) of Universiti Sains Malaysia, was designed to deliver information literacy (IL) skills through telelearning (Edzan & Mohd Saad, 2005). Academic libraries began developing their own information literacy (IL) programs to educate users on effective

information use through various library and information skills initiatives. However, at that time, there was still little mention of these efforts in the literature (Bahrens, 1994).

Various strategies for implementing information literacy (IL) have been discussed in the literature (Corrall, 2008). IL programs are typically planned and delivered by librarians themselves (Association of College & Research Libraries, 2012). In Malaysian universities, librarians have developed four main types of IL initiatives: orientation programs for all new undergraduate and postgraduate students, namely optional information skills workshops aimed particularly at final-year undergraduates, specialized sessions focusing on skills such as database use and internet searching, and in some cases, credit-bearing courses that are either made compulsory or offered as elective options for students (Edzan & Mohd Saad, 2005).

1.2.4 MOOCs as a Platform for Information Literacy Instruction

Academic librarians are adapting massive open online courses (MOOCs) to deliver and *assess* information literacy (IL) at scale by mapping ACRL-aligned outcomes to short multimedia lessons, embedded practice or quizzes, and authentic performance tasks on university-endorsed platforms (Dreisiebner, 2019; Dreisiebner et al., 2021; Libbrecht et al., 2021). In Malaysia, this shift is enabled by a national MOOC infrastructure (Malaysia MOOCs or OpenLearning) and policy commitments in the Malaysia Education Blueprint (Higher Education) that normalise blended learning and MOOCs across universities (Ministry of Education Malaysia, 2015; Jabatan Pendidikan Tinggi, 2023). Evaluations of IL-focused MOOCs report measurable gains when courses are well-scaffolded and culturally/multilingually designed, and their analytics provide systematic evidence of IL competency for continuous improvement (Dreisiebner, 2019; Dreisiebner et al., 2021;

Libbrecht et al., 2021). Malaysian studies also indicate learners' readiness for MOOC-based study, supporting library-led IL instruction and large-cohort assessment in local contexts (Subramaniam et al., 2019).

1.2.5 Integrating Pedagogy, Content, and Technology in IL Teaching through TPACK

Academic librarians can use the Technological Pedagogical Content Knowledge (TPACK) framework to plan and deliver information literacy (IL) instruction by intentionally aligning content (e.g., ACRL IL frames), pedagogy (active, inquiry, and assessment strategies), and technology (LMS, discovery tools, tutorials, analytics) to specific learning outcomes (Mishra & Koehler, 2006; Koehler & Mishra, 2009; Association of College & Research Libraries, 2016). In practice, TPACK helps librarians choose and justify tools and activities that best support IL skills, specifically evaluating authority and the ethical use of information, and has been proposed for library decision-making regarding instructional technologies (Sobel & Grotti, 2013).

Recent library research also utilizes TPACK to frame digital/AI literacy instruction, addressing gaps in pedagogical and technological skills among teaching librarians and underscoring its value for IL teaching in higher education (Lo, 2024). In Malaysia, studies report that academic librarians are actively exploring TPACK for IL teaching yet still face pedagogical or technological readiness challenges, with evidence that TPACK-guided development can strengthen IL instruction for university students (Abang Mohtar & Mohamad, 2023; Aziz et al., 2022; Dzulkipli et al., 2025).

1.3 Problem Statement

1.3.1 Theoretical Gap

The Association of College and Research Libraries (ACRL) introduced the Framework for Information Literacy for Higher Education in response to significant changes in higher education, teaching practices, and students' evolving roles as information creators. The framework is built around a set of interconnected core concepts, offering flexible options for its implementation. Its primary focus is to promote conceptual understandings that bring together various information-related ideas, research practices, and scholarly activities into a coherent structure. The Framework is organized into six frames, each representing a key concept central to information literacy, along with associated knowledge practices and dispositions. The six frames include *Authority Is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration* (Association of College & Research Libraries, 2016).

However, the decision to implement the framework has sparked considerable debate. While some appreciate its flexibility and adaptability, others have criticized its application and effectiveness. Nonetheless, the introduction of the framework has brought renewed energy to discussions around academic librarians' instructional strategies, marking a significant step forward in rethinking their approaches to information literacy education (Schulte & Knapp, 2017). Each frame within the framework is linked to specific knowledge practices and dispositions. Knowledge practices refer to the ways learners can deepen their understanding of information literacy concepts, while dispositions address the affective, attitudinal, and value-based aspects of learning. Unlike prescriptive models, the framework

emphasizes conceptual understanding, allowing librarians the flexibility to design their own instructional strategies and develop assessments that best support student learning (Latham et al., 2019). Besides the Framework for Information Literacy for Higher Education by ACRL, a study by Tshuma and Chigada (2018) implemented the use of the IDEA and ADDIE models to emphasise the analysis of user needs in order to determine both their abilities and inabilities. These models somehow were able to review the IL program so that it aligned with the students' needs. It was also emphasized by Tompkins et al. (2014) that both IDEA and ADDIE models offered a strong guideline to librarians for them to develop IL modules, revising the existing ones and also integrating new technologies into library instructions.

A common issue in the literature is the difficulty of using the ACRL Framework in real teaching situations. While the Framework is seen as a step forward in understanding information literacy, implementing it has revealed some ongoing problems. Hsieh et al. (2021) found that many librarians believe the Framework is too theoretical and not practical enough, particularly since its abstract language does not align with the short time frames of one-off instructional sessions. In these cases, faculty often expect librarians to focus on showing databases or tools, rather than exploring bigger ideas. Students, especially those early in their studies, also struggle to connect with the Framework's abstract ideas. These challenges underscore the ongoing struggle to strike a balance between theory and the day-to-day needs of information literacy instruction (Hsieh et al., 2021).

Beyond the issues with the Framework itself, the literature points out that many academic librarians are not fully prepared in teaching methods (Abang Mohtar & Mohamad, 2023). Although librarians often teach information literacy, they typically have not received formal training in educational theory and instead develop their own approaches to teaching

(Abang Mohtar & Mohamad, 2023; Montgomery, 2015; Elmborg, 2012). Montgomery (2015) and Hodge (2015) note that librarians are not ready to be effective educators unless they work closely with faculty or seek out professional development on their own. Without structured training in teaching, librarians' instruction tends to be practical and surface-level, rather than based on theory. Abang Mohtar and Mohamad (2023) suggest that librarians require more than just an understanding of theory; they need organized training, opportunities to try different teaching strategies, and sufficient time to put theory into practice.

The literature also raises concerns about focusing too heavily on practical skills rather than theory in information literacy teaching. Schachter (2020) argues that when librarians lack a solid grounding in theory, their teaching can become scattered and primarily focused on tools and quick skills. This makes it more challenging for students to develop critical thinking skills and build knowledge. Focusing primarily on practical skills can also make instruction less deep and weaken the view of librarianship as an academic field (Schachter, 2020). As a result, not enough theory in teaching reduces both the impact of information literacy instruction and the professional standing of librarians (Schachter, 2020).

Collectively, these studies reveal a persistent theoretical gap in information literacy instruction. Although librarians recognize the value of conceptual frameworks, the studies taken together reveal a gap between theory and practice in information literacy teaching. Even though librarians see the value in frameworks like the ACRL Framework, their teaching often stays focused on practical skills because they lack training in teaching methods, face institutional barriers, and rely on hands-on knowledge. This ongoing gap limits the extent to which information literacy education can truly impact students' learning.

1.3.2 Empirical Gap

A recurring gap in the literature is the lack of systematic, real-world data to support theoretical claims in information literacy (IL) instruction. Erlinger's (2018) systematic review highlights that assessment practices remain fragmented, often limited to one-time studies rather than being integrated into program-level or theory-based designs. This fragmentation hinders the development of coherent assessment frameworks, leaving much of IL instruction guided by anecdotal or isolated findings. Blanchett et al. (2012), as cited in Erlinger (2018), similarly emphasize that while theoretical discussions on IL are plentiful, they are not sufficiently integrated with librarians' teaching practices, resulting in a shortage of measurable evidence to evaluate effectiveness across different contexts.

Recent studies reinforce these concerns, especially in specialized areas of IL instruction. Bradley-Ridout (2024) notes that advanced-level IL teaching, such as supporting systematic reviews, has been under-researched and mostly documented through case-based reports that lack generalizability. Similarly, the ACRL Research Agenda (2021) emphasizes the need for more robust, outcome-based evidence, pointing out the reliance on descriptive accounts at the expense of systematic, comparative studies. Cook's (2022) meta-analysis of the "one-shot" model further highlights these issues, finding that although it is widely used, its effectiveness remains uncertain due to methodological weaknesses and a lack of longitudinal or statistically rigorous evidence. Overall, these findings highlight the limitations of empirical weaknesses in both the credibility and practical application of IL theories.

Additional studies emphasize how pedagogical preparedness and assessment practices remain poorly supported by evidence, which further limits theoretical progress.

Head et al. (2019) argue that IL assessment often measures librarian expectations rather than genuine student learning outcomes, providing limited insight into real-world effectiveness. Librarians' lack of experiential learning and insufficient evidence-based training were also highlighted, besides the shortage of validated, outcome-based research linking theoretical frameworks, such as TPACK, to instructional practice in the Asia-Pacific region (Adzei-Stonnes, 2023; Abang Mohtar & Mohamad, 2023). Collectively, these studies demonstrate that, although theoretical models and frameworks continue to evolve, empirical research has not kept pace. The lack of systematic, measurable, and generalizable evidence weakens the connection between theory and practice, leaving IL instruction fragmented and its theoretical foundations underdeveloped.

Since the Framework for Information Literacy for Higher Education was introduced in 2016, numerous studies have been conducted to assess its impact, often involving academic librarians, students, faculty members, and other stakeholders as research participants. However, the findings across these studies have varied and remain inconsistent. These differences can largely be attributed to contextual factors within each study, as well as varying levels of acceptance and adoption of the framework among librarians.

A study by Schulte and Knapp (2017) focusing on health science libraries found that much of the instruction provided by health sciences librarians was delivered within the evidence-based practice (EBP) paradigm rather than through a direct emphasis on information literacy (IL). Some librarians expressed concerns that the framework might not be appropriate or relevant for their typical instructional settings or for the specific needs of the individuals they teach.

In the context of faculty perspectives, a study conducted at Stetson University highlighted that faculty members believe it is important for students to be aware of the appropriate stages at which to begin developing each of the knowledge practices outlined in the framework. Faculty members, being closely involved with student learning, have insights that librarians may not have direct access to, such as specific assignment requirements, discipline-specific conventions, and recurring challenges observed through the review of students' submitted work (Kaletski, 2017).

Kempa (2016), in her study focusing on the academic librarian context, found that many librarians expressed concerns about their current teaching methods. There was a sense of dissatisfaction, as in many cases, students were unaware that librarians were present in their classrooms to teach information literacy (IL) skills during allocated sessions. As a result, librarians involved in teaching were encouraged to reflect on the limitations of the previous standards and to prepare themselves for a shift in mindset towards embracing and understanding the Framework for Information Literacy for Higher Education.

1.3.3 Practical Gap

Higher education institutions have recently introduced 'First-Year Experience' (FYE) programs, designed to enhance student engagement, support academic achievement, and improve student retention. Academic librarians believe that information literacy (IL) instruction becomes increasingly valuable as programs continue to expand. The librarians view IL, along with information fluency and critical thinking, as essential skills for helping students succeed not only in their undergraduate studies but also in their future endeavors (Association of College & Research Libraries, 2000; Grassian & Kaplowitz, 2010). Sung

and Shumaker (2015) consequently informed that librarians applied several techniques in delivering information skills throughout FYE programmes.

Librarians must recognize the critical importance of information literacy (IL) skills for students and take proactive steps to ensure these skills are effectively taught. It is essential for librarians to continually explore and implement instructional strategies that equip students with the competencies they need. As key figures who stay informed about current instructional design methods, librarians play a central role in shaping effective IL instruction (Berkman, 2016). Existing research suggests that a more in-depth exploration of information literacy (IL) as a skill would be highly beneficial for students, particularly in helping to strengthen areas where competency levels are low (Pattah, 2014; Prasetyo et al., 2018; Sinurat et al., 2017 as cited in Chusniyah et al., 2020). Lau (2006) stated that to effectively teach information literacy (IL) skills, librarians must not only demonstrate competence but also remain attentive to the diverse learning behaviours of individual students. Additionally, they need to be well-versed in facilitating the various components of IL instruction. It needs to be supported by implementing learning theories for librarians' improved instruction and interactions with users as they are not required to attend appropriate training as teachers (Guder, 2010).

Librarians who have implemented the framework recognized that preparing for instructional sessions and developing effective assessments of learning outcomes require significant time and effort. At the same time, faculty members, although aware of the importance of information literacy for their students, often struggle to allocate sufficient time for students to attend or participate in IL classes (Latham et al., 2019). Therefore, the framework presents significant challenges for academic librarians, particularly in collaborating with individuals outside the field of librarianship, such as working closely with

faculty and students to better understand and support their curricular needs. In addition, librarians must also ensure they stay current with the latest developments in instructional design methods to effectively meet these evolving demands (Berkman, 2016).

Results of a study conducted by Detlor et al. (2012) on the other hand indicated that passive instructional approaches, as seen in current practices, have proven to be less effective in supporting students' learning outcomes. Information dissemination has traditionally been carried out through lectures and demonstrations led by librarians. However, incorporating more active instructional methods has become crucial for fostering stronger information literacy (IL) skills among students.

One major limitation in IL instruction research is the practical difficulty of translating theoretical models into effective teaching practices. Cook's (2022) meta-analysis of the "one-shot" model shows that while single sessions can yield short-term gains, their long-term effectiveness is weak, with effect sizes consistently small ($r < .2$) in authentic assessments; one-shots rarely foster transferable skills, highlighting a gap between theoretical aspirations for IL learning and what is achieved in practice (Cook, 2022). Similarly, Vossler et al. (2023) find that although students demonstrate competence in controlled classroom activities, they often fail to apply these skills independently in authentic research. These studies highlight how instructional practices grounded in theoretical ideals often fail to hold up when used in real-world contexts, revealing a persistent implementation gap.

Practical barriers are also visible in the shift to online and technology-mediated learning. Peacock (2025) demonstrates that institutional resource constraints and librarians' lack of pedagogical training hinder effective IL instruction in digital environments. Saunders (2015) echoes this concern, noting that many librarians feel underprepared for teaching

despite their theoretical grasp of IL concepts. Without structured training in instructional design, librarians struggle to apply IL theory in practice, resulting in fragmented and less impactful online instruction. These findings highlight a broader theoretical weakness: the frameworks that guide IL instruction are insufficiently adaptable to evolving teaching environments, leaving librarians unable to translate conceptual understanding into effective delivery effectively.

Further evidence of practical limitations comes from studies highlighting equity concerns and assessment misalignments. Dahlen and Camp (2025) report that librarian-led sessions show minimal measurable impact on equity gaps in learning outcomes, suggesting that single interventions may be too limited to achieve meaningful results. Head et al. (2019) add that current assessment tools often capture superficial indicators, such as recognition of formats or terminology, rather than genuine, transferable competencies. Together, these findings demonstrate that practice-based shortcomings not only constrain student learning but also reveal theoretical gaps: existing frameworks and assessment approaches fail to adequately account for the realities of how IL instruction unfolds in practice. As such, theory and practice remain misaligned, limiting the transformative potential of IL education.

1.4 Research Motivation

As outlined in the previous section, three interrelated gaps, theoretical, empirical, and practical, have been identified in the literature on information literacy (IL) instruction. The theoretical gap reflects the persistent divide between conceptual frameworks and librarians' day-to-day teaching. Although frameworks such as the ACRL Framework for Information Literacy for Higher Education (Association of College & Research Libraries, 2016) offer a flexible and conceptual basis for instruction, their implementation has been criticised as

overly abstract and misaligned with librarians' teaching contexts (Hsieh et al., 2021; Schachter, 2020). Furthermore, librarians often lack pedagogical preparation, relying heavily on procedural knowledge rather than integrating educational theory into their practice (Abang Mohtar & Mohamad, 2023; Montgomery, 2015; Elmborg, 2012). This theoretical shortfall motivates the present study to investigate how librarians can strengthen their instructional role through theory-driven approaches.

The empirical gap centres on the limited availability of systematic, measurable evidence to substantiate theoretical claims in IL instruction. While studies have emphasised the importance of aligning theory with practice, much of the evidence remains fragmented, anecdotal, or case-based, limiting its generalisability (Erlinger, 2018; Bradley-Ridout, 2024; Cook, 2022). The ACRL Research Agenda (2021) similarly calls for robust, outcome-based research to evaluate the effectiveness of IL instruction across diverse contexts. In Malaysia and the Asia-Pacific region, this shortage is particularly evident, with few validated studies linking theoretical frameworks such as TPACK to instructional outcomes (Abang Mohtar & Mohamad, 2023). This gap motivates the need for empirical research that generates rigorous, contextually relevant evidence to assess the development of IL competency.

The practical gap highlights the difficulty of translating theoretical models into consistent and impactful instructional practices. Studies indicate that "one-shot" sessions, while common, rarely foster transferable skills, with effect sizes remaining weak in authentic assessments (Cook, 2022; Vossler et al., 2023). Moreover, librarians face practical barriers such as time constraints, lack of training in instructional design, and challenges in adapting IL instruction to technology-mediated environments (Latham et al., 2019; Peacock, 2025; Saunders, 2015). These challenges motivate the exploration of alternative instructional

approaches, such as MOOCs, which may provide more flexible and scalable solutions for addressing students' IL needs.

Beyond addressing these gaps, the broader societal motivation for this research lies in the recognition that strong IL skills are essential for academic success, lifelong learning, and active participation in the information society. IL has been linked to higher academic achievement (Anandhalli, 2018; Banik & Kumar, 2019; Shao & Purpur, 2016) and plays a critical role in supporting global initiatives such as the Sustainable Development Goals (SDGs) (United Nations, Department of Economic and Social Affairs, n.d.; Unegbu et al., 2023). Libraries and librarians are uniquely positioned to advance these goals by fostering media, digital, and information literacy skills and by equipping students with the competencies necessary for academic, professional, and civic life.

In summary, the motivation for this study stems from the intersection of these theoretical, empirical, and practical gaps, as well as the urgent need to prepare students for the challenges of the 21st-century information landscape. By addressing these gaps, the study aims to provide both scholarly and practical contributions to the field of information literacy instruction.

In the 21st century, the information landscape requires students not only to use information effectively but also to create it responsibly, highlighting the critical importance of strong information literacy skills (Taylor & DiGiacomo, 2023). Access to information plays a vital role in advancing all Sustainable Development Goals (SDGs) by promoting universal literacy, including media, information, and digital literacy skills. Librarians make significant contributions to the achievement of the SDGs by preserving and providing access to global culture and heritage, supporting the development of literacy and ICT skills, and offering community spaces that foster learning and engagement (United Nations,

Department of Economic and Social Affairs, n.d.). Libraries and librarians can strengthen their services by actively engaging stakeholders through platforms that encourage sharing, collaboration, and facilitation. The strong connection users often have with their local libraries positions these institutions to effectively raise awareness and address both the opportunities and challenges associated with the implementation of the Sustainable Development Goals (SDGs) (Unegbu et al., 2023).

Given the integral role of libraries across various sectors, they are uniquely positioned to support the achievement of SDGs due to their inherent reliability and inclusiveness (Unegbu et al., 2023). Information literacy is recognized as a vital skill for interpreting information and making informed decisions, and it is essential for active participation in the information society and for supporting lifelong learning (Unegbu et al., 2023). Anandhalli (2018) emphasized that information literacy is a key predictor of academic success for students enrolled in degree programs. Similarly, the Association of College and Research Libraries (ACRL) emphasizes that information literacy forms the foundation for lifelong learning, enabling learners to master information skills and advance their education (Stellah et al., 2022).

Research by Banik and Kumar (2019) on nursing students found that higher levels of information literacy competence were associated with higher GPAs, highlighting the importance of strengthening information literacy skills to enhance academic performance. Additionally, Shao and Purpur (2016) identified a positive correlation between students' information literacy skills and their writing scores and final course grades. However, Bartol et al. (2018) observed that although students were competent in evaluating information and recognizing their information needs, they faced challenges with legal, ethical, and

application aspects. These findings highlight the need for more comprehensive information literacy education to support equitable academic success.

The motivation for this study stems from the observation that academic librarians often do not incorporate theoretical foundations into their information literacy instruction, coupled with the absence of standardized methods for assessing student competency following IL sessions. Montgomery (2015) supports this view by noting that librarians often employ effective teaching methods despite having limited training in educational theories or pedagogical practices. Through their experience teaching information literacy, many librarians come to view their instructional skills as satisfactory and well-suited for delivering content (Baer, 2021; Kirker, 2022).

A study by Abang Mohtar and Mohamad (2023) found that librarians' teaching practices were shaped by a range of factors, including students' classroom behaviour, creativity, educational level, feedback, group composition, and the librarians' own skills and experience. The study also found that librarians were actively preparing students for 21st-century skills by incorporating technology, new knowledge, interactive modules, and online classes into their instruction. However, some librarians expressed uncertainty and favoured maintaining a flexible approach. Student learning from information literacy sessions was typically evaluated through measures such as student satisfaction, academic performance, class surveys, resource usage, information searching and citation skills, and awareness of plagiarism (Abang Mohtar & Mohamad, 2023). These findings underscore the importance of librarians engaging in continuous professional development to better support students in becoming lifelong learners (Abang Mohtar & Mohamad, 2023).

1.5 Research Objectives

The primary objective of this research is to assess whether the proposed method of teaching information literacy using MOOC is appropriate and effective for today's university students. Additionally, the study aimed to evaluate whether implementing a self-directed learning approach, integrated with technology, positively influences students' IL competencies and enhances their motivation to participate in the IL MOOC course actively.

The specific objectives of the study were:

i. To explore the extent to which current information literacy instruction is grounded in theoretical concepts;
ii. To explore academic librarians' understanding of the components of the TPACK framework and how they apply them in teaching information literacy (IL);
iii. To explore the extent to which academic librarians understand the elements of the ACRL's *Framework for Information Literacy for Higher Education* and how they incorporate them into their efforts to develop information-literate students;
iv. To investigate the relationship between learner engagement and course completion rates in an information literacy (IL) MOOC; and
v. To examine the relationship between learners' information literacy skills competency and their completion rates in an information literacy (IL) MOOC.
vi. To examine student engagement with the different elements of IL MOOC.

1.6 Research Questions

The present study intended to answer the following research questions:

i. To what extent are theoretical concepts incorporated into current information literacy instruction programs?

ii. How do academic librarians understand and apply the components of the Technological Pedagogical Content Knowledge (TPACK) Framework in their information literacy instruction?

iii. To what extent do academic librarians understand the elements of the ACRL's *Framework for Information Literacy for Higher Education*, and how do they incorporate these elements into their practices to cultivate information-literate students?

iv. How does learner engagement relate to the course completion rate in an information literacy (IL) MOOC?

v. How does learner information literacy skills competency relate to the course completion rate in an information literacy (IL) MOOC?

vi. How does student engagement in different elements of IL MOOC inform students' level of information literacy (IL) skills competency?

1.7 Conceptual Framework

The proposed conceptual framework (Figure 1.1) illustrates how information literacy (IL) instructional design in this study is theoretically grounded through the integration of two complementary frameworks: the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006) and the ACRL Framework for Information Literacy for Higher Education (Association of College & Research Libraries, 2016).

Together, these frameworks provide the theoretical and pedagogical foundation for designing the IL MOOC and establish the link between instructional design, student participation, and competency outcomes.

On the left side of the framework, the TPACK model highlights three essential domains of knowledge: technological, pedagogical, and *Content Knowledge (CK)*, which guide instructional design. These dimensions reflect the expertise required of academic librarians to effectively translate theoretical models into practice by leveraging technology, adopting appropriate pedagogy, and delivering discipline-specific IL content.

On the right side, the ACRL Framework is represented through its six interconnected core concepts, such as *Authority Is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration*. These frames emphasize higher-order thinking, reflective learning, and engagement with disciplinary practices, providing the conceptual foundation for instruction in IL.

The integration of TPACK and the ACRL Framework is operationalized in this study through the IL MOOC, which incorporates both theoretical and practical elements of instructional design. Six modules were developed, each aligning with one of the ACRL frames, and structured to embed the seven Learner-Centred Principles (Huba & Freed, 2000), allowing learners to construct their own plans, coaching learners toward expert performance, encouraging multiple perspectives, situating learning in real-life activities, prompting learners to reflect on their thinking, guiding learners to think like experts, and evaluating learners' thinking processes.

Students' participation in the IL MOOC through engagement with learning activities, assessments, and reflective practices serves as the mechanism by which theory-informed

instructional design translates into measurable outcomes. Competency outcomes are categorized into three progressive levels: Developing, Proficient, and Advanced, reflecting students' mastery of IL skills.

In sum, this conceptual framework positions the study within a theory-to-practice continuum. It demonstrates how the integration of TPACK and the ACRL Framework, operationalized through a learner-centred MOOC design, supports the development of IL competencies in an online learning environment.

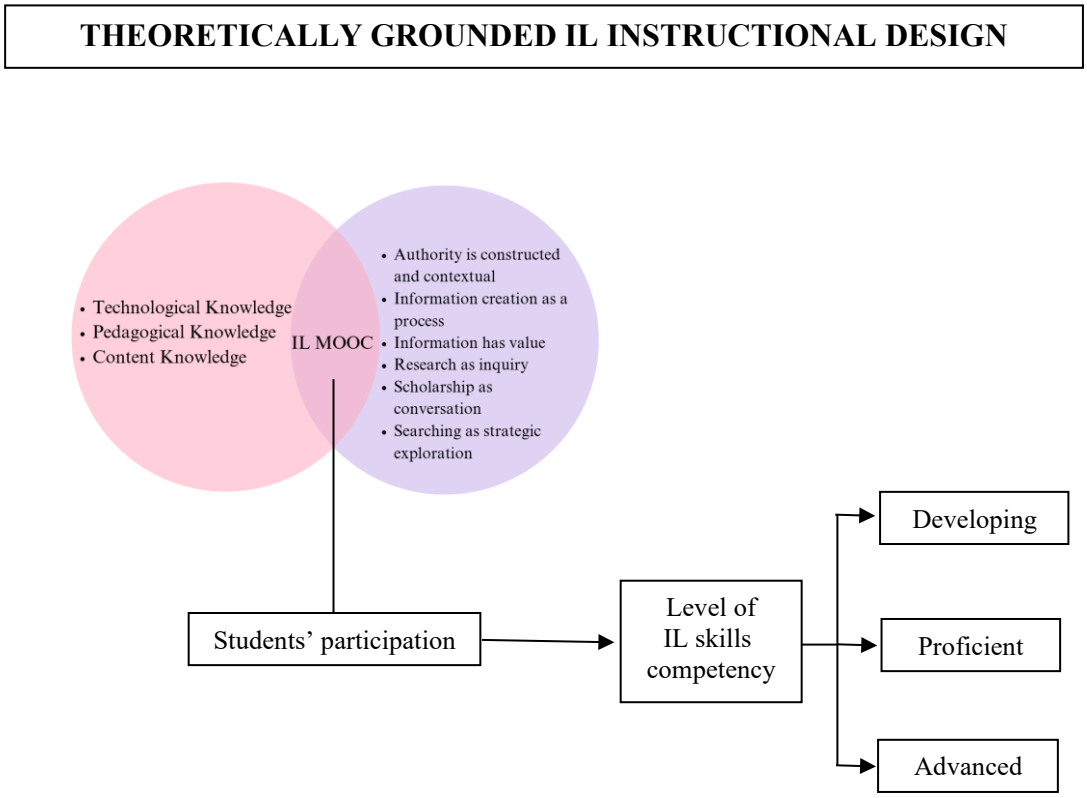


Figure 1.1: Proposed Conceptual Framework

1.8 Significance of the Study

This study is significant as it bridges the gap between theory and practice in information literacy instruction. By examining librarians' application of the TPACK (Figure 1.2) and ACRL (Figure 1.3) frameworks, it deepens understanding of how theoretical models are operationalized in teaching. Simultaneously, the study contributes empirical evidence on learner engagement, competency, and course completion within an IL MOOC, offering practical insights for improving instructional design and delivery. Collectively, these contributions strengthen both scholarly discourse and institutional practices in advancing students' information literacy.

The significance of this study can be viewed from three perspectives, namely theoretical, methodological, and practical. From a theoretical perspective, this study adapts the ACRL Framework for Information Literacy for Higher Education as the foundation for developing the new IL modules, ensuring they are designed to be more specific and in-depth for the teaching and learning of IL skills and knowledge in higher education institutions. Each new IL module is structured based on the criteria outlined in the corresponding frames of the framework.

The procedures and findings from this study support the development of academic librarians in delivering instructional practices in teaching IL to university students. Through this initiative, academic librarians are not only equipped with standardized teaching content. However, they are also trained to strengthen their theoretical understanding and enhance their instructional methods in delivering IL education to students.

From a practical perspective, the study is significant for key stakeholders, such as academic librarians, lecturers, and students. In line with the Partnerships for the Goals (Goal 17) outlined in the Sustainable Development Goals (SDGs), there is a recognized need for

librarians to embrace expanded roles, engaging in greater collaboration with professionals across various research fields to address societal challenges at both local and national levels. Igbinovia (2017) emphasizes the importance of cross-disciplinary collaboration involving health, agriculture, environment, economics, and social sectors to develop effective, real-time solutions.

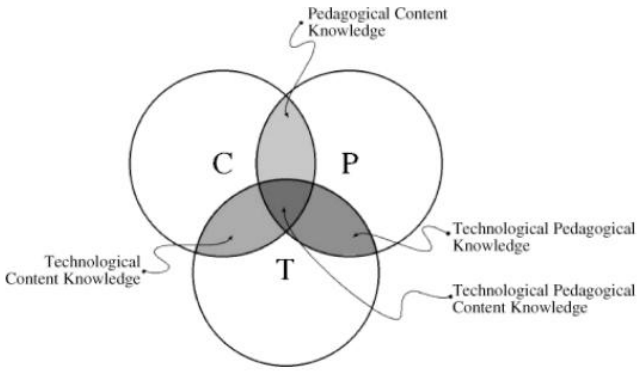


Figure 1.2: Technological Pedagogical Content Knowledge (Mishra & Koehler, 2006)

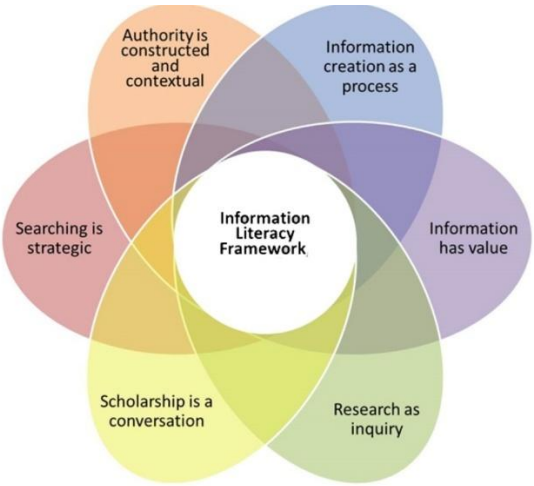


Figure 1.3: ACRL Framework for Information Literacy for Higher Education (Uzwyshyn, 2018)

1.9 Operational Definition

Operational definitions are crucial because they describe a variable as a set of specific, measurable operations or manipulations. For this study, the operational definitions of the variables are based on theory and previous research as follows:

1.9.1 Librarians' Knowledge

In this study, academic librarians' knowledge refers to the understanding required by academic librarians to effectively integrate theoretical elements into their information literacy (IL) teaching and learning process. Therefore, this knowledge is based on three main components of the Technological Pedagogical Content Knowledge (TPACK) theory, which are:

(i) *Technological Knowledge (TK)* refers to the understanding of digital technologies such as computers, hardware, smartphones, the internet, and software applications. It involves the ability to effectively manage, utilize, and adapt these digital tools to support various tasks and activities (Graham et al., 2009; Koehler & Mishra, 2009; Mishra & Koehler, 2006).

(ii) *Pedagogical Knowledge (PK)* refers to the understanding of methods and practices related to teaching and learning processes (Koehler & Mishra, 2009; Mishra & Koehler, 2006). In the context of this study, PK encompasses the broad instructional expertise of academic librarians, including their knowledge of information literacy education, the design and implementation of instructional plans, the assessment of student performance, and their familiarity with teaching strategies and methods suited for information literacy sessions.

(iii) *Content Knowledge (CK)* refers to a deep understanding of the subject matter that needs to be taught to students. Educators must have a thorough grasp of the content, including key concepts, theories, ideas, structures, explanations, evidence, and practices necessary for effective instruction (Koehler & Mishra, 2009; Mishra & Koehler, 2006). In this study, CK specifically pertains to academic librarians' knowledge of the subject matter related to information literacy sessions for university students at public universities in Malaysia.

In addition to the Technological Pedagogical Content Knowledge (TPACK) framework, the elements outlined in the ACRL's Framework for Information Literacy for Higher Education are essential for integration into the information literacy teaching and learning process, particularly when developing information literacy modules for MOOCs. This study draws upon six key elements (frames) from the ACRL Framework as the foundation for designing and structuring the new IL modules, which are:

(i) *Authority is Constructed and Contextual* refers to the idea that the credibility and trustworthiness of information resources are tied to the knowledge and expertise of their creators, and that the value of these resources is assessed based on an individual's specific information needs and how the information is used. What is considered authoritative can vary across different communities and fields, meaning that the significance of a source is shaped by its context (Association of College & Research Libraries, 2016). In the context of this study, *Authority is Constructed and Contextual* relates to students' ability to recognize different types of information resources, identify key published works, and understand how authority is established and interpreted across various disciplines and situations.

(ii) *Information Creation as a Process* emphasizes that information, regardless of its format, is created to communicate a particular message and is shared through a selected method. The processes of researching, creating, revising, and distributing information can vary widely, and these differences are often reflected in the final product (Association of College & Research Libraries, 2016). In the context of this study, *Information Creation as a Process* refers to students' understanding of how information is produced, the messages conveyed through different formats, and the methods chosen for presenting and sharing information.

(iii) *Information has Value* highlights that information carries various types of value: it can serve as a commodity to be bought and sold, a tool for learning, a means of persuasion, or a way to interpret and understand the world. The ways in which information is created and shared are influenced by legal and economic factors (Association of College & Research Libraries, 2016). In the context of this study, *Information Has Value* reflects not only the intrinsic worth of retrieved information but also emphasizes an awareness of how legal and socioeconomic factors impact information creation and dissemination, along with the importance of evaluating the accuracy and credibility of different sources.

(iv) *Research as Inquiry* describes research as an ongoing, iterative process that involves posing increasingly detailed or new questions. Each answer uncovered often leads to further questions and new areas of exploration (Association of College & Research Libraries, 2016). In the context of this study, Research as Inquiry focuses on how the research process is shaped by the questions posed, recognizes the varying amount of information retrieved depending on whether a topic is broad or specific, and

emphasizes the importance of connecting all gathered information back to the original research questions.

(v) *Scholarship as Conversation* refers to the ongoing exchange of ideas among scholars, researchers, and professionals, who continually discuss, share, and build upon new insights and discoveries. Over time, these discussions contribute to deeper understanding through the integration of diverse viewpoints and interpretations (Association of College & Research Libraries, 2016). In the context of this study, Scholarship as Conversation focuses on the ways students participate in academic discourse, engage with the research process, and conduct their own investigations while thoughtfully interpreting and building upon the work of others.

(vi) *Searching as Strategic Exploration* emphasizes that the process of finding information is rarely linear and often requires navigating through a variety of sources. It calls for flexibility, adaptability, and a willingness to explore different search strategies as new information and insights are uncovered (Association of College & Research Libraries, 2016). In the context of this study, *Searching as Strategic Exploration* highlights the importance of using strategic approaches to locate relevant information, understanding the process of information retrieval, and recognizing the range of platforms and tools available for conducting effective searches.

1.9.2 Academic Librarian

An academic librarian is a professional who serves in public higher education institutions in Malaysia, such as colleges and universities, supporting the research, teaching, and learning needs of students, faculty members, and staff (Dzulkipli et al., 2025).

1.9.3 Public Universities

Public universities in Malaysia are higher education institutions funded and managed by government entities at the national level, operating under the Ministry of Higher Education (StudyMalaysia.com, 2022.; Png, 2021). They are established with the aim of providing accessible and affordable education to a diverse student population (Norman Dunsah & Tengku Azhar, n.d.).

1.9.4 University Students

University students in Malaysia are individuals enrolled in public higher education institutions, such as colleges or universities, who are pursuing undergraduate, graduate, or professional degrees (StudyMalaysia.com, 2022; ASEM Education, 2018). They engage in academic coursework across a range of disciplines, with the goal of acquiring advanced knowledge and skills relevant to their fields of study (Chassie et al., 2023; StudyMalaysia.com, 2022).

1.9.5 Information Literacy

Information literacy refers to the set of skills and competencies that students in Malaysian public higher education institutions need to effectively locate, evaluate, and use information for academic purposes (Edzan & Mohd Saad, 2005).

1.9.6 Massive Open Online Courses (MOOCs)

A Massive Open Online Course (MOOC) is an online course designed to accommodate a large number of participants through internet-based access (Daniel, 2012; Liyanagunawardena et al., 2013). Key features of MOOCs include open enrollment,

scalability, flexible learning opportunities, diverse content delivery, interactive components, credentialing options, and the use of technology-driven methods (Daniel, 2012; Hollands & Tirthali, 2014; Gleason et al., 2021). MOOCs aim to democratize education by providing high-quality learning opportunities to individuals regardless of their geographic location, financial situation, or academic background (Daniel, 2012; Liyanagunawardena et al., 2013), and are particularly popular for continuing education, professional development, and personal enrichment (Hollands & Tirthali, 2014; Gleason et al., 2021).

1.9.7 Information Literacy MOOC

An Information Literacy MOOC (Massive Open Online Course) is an online course designed to develop essential skills and competencies in information literacy. This course are accessible to a wide audience and aim to equip learners with the ability to effectively locate, evaluate, and use information across various contexts. By building these skills, Information Literacy MOOCs help learners navigate the complex information landscape of the digital age and apply their knowledge effectively in academic, professional, and personal settings.

1.10 Chapter Summary

This chapter sets the stage by emphasizing just how crucial Information Literacy (IL) has become in today's higher education landscape. In a world overflowing with digital content, students need more than just access, they need the skills to think critically and handle information wisely. This chapter also brings attention to the changing role of academic librarians in Malaysian public universities. Once seen mainly as information providers, librarians are now stepping into teaching roles, often without formal training in educational theory. This shift presents challenges and has led to gaps in how IL is currently taught.

Driven by the broader goal of promoting lifelong learning and supporting global efforts like the Sustainable Development Goals (SDGs), the study looks at whether today's IL teaching practices are really hitting the mark. It explores how self-directed learning, especially through MOOCs, might boost students' IL skills and motivation. At the same time, it examines how well librarians understand and apply two important teaching frameworks: TPACK and the ACRL Framework for Information Literacy.

To guide this effort, the study introduces a conceptual framework that combines both models into six IL modules designed to be learner-centred and technology-supported. These modules aim to benefit not only students but also help librarians grow in their teaching roles. The chapter wraps up by highlighting the study's relevance from theoretical, methodological, and practical angles, while also clarifying key terms that shape the research ahead.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter offers a critical examination of existing research on information literacy (IL) instruction and highlights its growing importance within the context of higher education (HE). It first lays out the key theoretical foundations that inform IL teaching practices, drawing on frameworks such as Constructivist Learning Theory, Self-Directed Learning Theory, and Cognitive Load Theory. The chapter then explores the instructional methods commonly employed by academic librarians and assesses their effectiveness in fostering students' information literacy (IL) competencies. A key focus of the chapter is the integration of technology into IL instruction, with particular attention to how the TPACK Framework and the ACRL Framework for Information Literacy for Higher Education are applied in teaching practices. It also examines the extent to which these pedagogical models are embedded in instructional approaches. The chapter also examines Information Literacy (IL) MOOCs as an alternative learning approach, exploring how self-directed learning influences student engagement and course completion. The discussion further explores the impact of learner engagement on success in an IL MOOC, as well as the relationship between course completion rates and levels of information literacy (IL) competency. Finally, the chapter identifies key areas for future research, with a particular emphasis on enhancing IL instruction through the use of technology and deepening the understanding of how self-directed learning influences the development of information literacy (IL) skills.

2.2 History and Overview of Information Literacy

Learning could not be separated from libraries ever since libraries started to exist. The library has experienced numerous changes throughout the different library development paradigms, namely the reader-centred, book-centred, and learner-centred paradigms (Bennett, 2009). The first two paradigms engaged indefinitely together in the 20th century, and as time goes by, the comprehensive shifts brought by information technology had informed the learning-focused paradigm (Bennett, 2009). During the reader-centred paradigm, books were highly valuable and scarce, and libraries were primarily designed to serve the needs of readers (Bennett, 2009). The book-centred paradigm emerged during the era of paper-based publications, a time when libraries focused largely on building and preserving extensive collections of reading materials (Bennett, 2009). As information technology advanced, it fuelled an unprecedented growth of information. This shift led many to believe that shelving books would no longer be the central focus of libraries. Instead, libraries began to be reimagined as dynamic spaces designed to attract and engage visitors (Bennett, 2009). The emphasis moved toward creating environments that fostered learning and collaboration, rather than solely catering to readers. This marked the beginning of the learner-centred paradigm (Bennett, 2009). Furthermore, the rapid advancement of technology has brought significant changes to the operations of academic libraries, and these developments have also reshaped the roles of academic librarians in delivering services to their users (Wheeler et al., 2022; Deja et al., 2021; Cox, 2023).

2.3 Theoretical Foundations of Information Literacy Instruction

Libraries, particularly academic libraries, play a central role in supporting teaching and learning within higher education institutions (Corrall & Jolly, 2019; Kuh & Gonyea,

2003; Hammons, 2024). For a long time, academic libraries have been regarded as the "heart of the university (Oakleaf, 2010). Every academic library primarily supports its parent institution via its mission, vision and objectives (Jain, 2013). According to Raja et al. (2009), academic libraries support their parent institutions by contributing to knowledge production, equipping individuals to serve society, and advancing the overall well-being of human (as cited in Jain, 2013).

Information literacy (IL) instruction in academic libraries is typically conducted by librarians themselves (Mullins & Boyd-Byrnes, 2024). However, concepts such as learning theories or educational theories are not widely familiar within the field of librarianship (Abang Mohtar & Mohamad, 2023; Kogut, 2021). As noted in the library literature, the theoretical foundations underpinning library practices are often limited, and many librarians demonstrate a lack of critical awareness in their pedagogical approaches (Radomski, 2000; Bruce & Candy, 2015; Downey, 2016). As a result, IL instruction has often been carried out based on librarians' personal judgments about the best methods or strategies to help students become information literate (Davis et al., 2011; Wilson, 2016). Montgomery (2015) pointed out that instructional librarians often implement their teaching practices with minimal, or in some cases no, formal training in educational theories or pedagogical methods.

Montgomery (2015) stated that it is regrettable that the librarian profession has not placed greater emphasis on preparing librarians to become well-informed educators. This opinion was supported by Elmborg (2012) by mentioning that librarians at his workplace tended to prioritize practical methods for completing their tasks efficiently, often minimizing the emphasis on theoretical foundations. However, while librarians are generally required to participate in all library-related courses, training in pedagogy is often elective or, in some cases, not commonly available (Hodge, 2015) and that librarians who maintain strong

relationships with faculty members are often better positioned to engage effectively in information literacy (IL) instruction, including the application of new theoretical approaches in their teaching practices (Drewes & Hoffman, 2010; Hooper & Scharf, 2017).

In today's fast-changing digital environment, information literacy (IL) has emerged as a crucial skill for students, empowering them to critically evaluate, manage, and ethically utilize information (Bamgbose et al., 2024; Trixa & Kaspar, 2024). To be truly effective, IL instruction must go beyond simply teaching students how to locate and cite sources; it should be informed by robust learning theories that support more profound understanding, foster engagement, and promote the retention of knowledge over the long term (Bamgbose et al., 2024; Hossain & Sormunen, 2025). By incorporating established learning theories such as constructivism, cognitive load theory, and self-directed learning principles, educators and librarians can develop instruction that is not only more effective but also more meaningful and impactful for learners (Hostetler & Luo, 2021; Association of College & Research Libraries, 2016; Li et al., 2023).

Constructivist approaches highlight the importance of active learning and student-centred strategies, enabling learners to build on their existing knowledge and apply their skills to real-world problem-solving (Do et al., 2023; Vong, 2016; Denke at al., 2020). Cognitive load theory guides the design of instructional materials in ways that optimize information processing, helping to prevent cognitive overload and support better knowledge retention (Skulmowski & Xu, 2022). At the same time, self-directed learning principles encourage students to take greater ownership of their educational journey, nurturing intrinsic motivation and fostering the development of lifelong information literacy skills (Li et al., 2023; Morris & Rohs, 2021). When thoughtfully applied, these learning theories offer a valuable framework for designing IL instruction that supports diverse learners, fosters

critical thinking, and encourages the practical application of information literacy competencies beyond the classroom setting (Li et al., 2023; Skulmowski & Xu, 2022). As academic environments increasingly adopt digital and hybrid learning models, grounding IL instruction in established learning theories will be essential for equipping students with the skills they need to thrive in an information-rich world (Okoli et al., 2025; Essa, 2023).

2.3.1 Constructivist Learning Theory

The Information Literacy (IL) MOOC developed in this study is based on Constructivist Learning Theory (CLT), which posits that learners construct knowledge through interaction, reflection, and engagement with authentic tasks rather than through passive information reception (McLeod, 2024; Vygotsky, 1978). This theoretical framework offers a strong basis for designing IL instruction in digital environments, promoting student ownership of learning and the application of concepts in relevant contexts.

The constructivist focus on active and self-directed learning is evident in the MOOC's structure, which enables learners to progress at their own pace and participate in interactive activities and assessments (McLeod, 2024). Instead of emphasizing only procedural skills, the MOOC encourages students to critically evaluate, synthesize, and apply information in accordance with the ACRL Framework for Information Literacy for Higher Education (Association of College & Research Libraries, 2016).

CLT also highlights the importance of social interaction in knowledge construction, where meaning is developed through dialogue and collaboration with peers or instructors (Vygotsky, 1978; Chaiklin, 2003). Reflecting this principle, the IL includes opportunities for peer engagement via discussion forums and collaborative tasks, allowing learners to negotiate meaning, share perspectives, and deepen their understanding of IL concepts.

Constructivism further emphasizes the value of situated and contextualized learning, asserting that knowledge is most meaningful when embedded in authentic, real-life tasks (Brown et al., 1989). In response, the MOOC embeds IL instruction within academic scenarios such as evaluating source credibility, practicing ethical citation, and conducting inquiry-based research (Brown et al., 1989).

The MOOC design integrates scaffolding principles, whereby early modules provide guided instruction and examples, while subsequent modules require greater independence and critical application. This gradual release of responsibility reflects Vygotsky's (1978) concept of the zone of proximal development (ZPD) and Bruner's notion of scaffolding as a means of supporting learners in achieving mastery (McLeod, 2024).

CLT also identifies reflection and metacognition as essential components of deep learning. To support this, the IL MOOC includes reflective exercises, self-assessment quizzes with feedback, and end-of-unit reflections. These activities prompt students to evaluate their learning strategies and develop advanced IL competencies (McLeod, 2024; Vygotsky, 1978).

In applying constructivist principles, learners take an active role in managing their own learning, constructing knowledge through their experiences, while educators serve as facilitators or mentors who guide and support the process (Chuang, 2021). This approach places emphasis on the learners' perspectives and experiences, helping them develop new insights and build greater confidence. Allowing students autonomy over their learning choices, methods, and activities further enhances their motivation and fosters active engagement (Katz & Halpern, 2015). Educators play a critical role in helping learners connect new knowledge to their existing understanding, making the learning experience more meaningful and relevant (Chuang, 2021).

Constructivist theory is often categorized into three main strands: individual constructivism, social constructivism, and contextualism (Chuang, 2021). This discussion places particular emphasis on individual constructivism, which highlights the role of personal experiences in shaping the learning process (Chuang, 2021). From this perspective, learning is viewed as a cognitive activity in which individuals organize and interpret new information based on their existing knowledge structures (Smith & Ragan, 2005).

The core principles of constructivist theory have been widely applied across various educational contexts, including experiential learning (Kolb, 1984; Wijnen-Meijer et al., 2022), self-directed learning (Candy, 1991; Garrison, 1997), and informal learning methods such as mentoring, coaching (Lave & Wenger, 1991; Dennen, 2004), online education (Ally, 2008), and active learning strategies (Freeman et al., 2014). Constructivism also encompasses incidental learning, which occurs naturally through task completion and social interaction (Hunter, 2008; Swanson & Holton, 2009). As Chuang (2021) highlights, constructivist ideas have significantly influenced the development of contemporary approaches and discussions in adult education.

In summary, the constructivist approach ensures that the IL MOOC extends beyond procedural demonstrations to foster conceptual, transferable, and learner-centered IL skills. This theoretical foundation enhances the MOOC's ability to develop critical and reflective learners, aligning with the objectives of higher education and lifelong learning (Association of College & Research Libraries, 2016; Gross et al., 2022).

(i) Theoretical foundations for interactive and experiential information literacy instruction

Constructivist learning theory is widely recognized for emphasizing learner-centred and interactive educational environments, where students actively construct their own understanding (Priyamvada, 2018). At the heart of this theory is the belief that true comprehension arises not from rote memorization, but through meaningful engagement with personal experiences and critical reflection (ELM Learning, 2025). Students are encouraged to integrate new ideas by connecting them to their existing knowledge and cognitive frameworks, fostering deeper and more lasting learning. This cognitive development is supported by the processes of assimilation where new information is incorporated into existing mental models and accommodation where learners adjust their prior understanding to incorporate new concepts (ELM Learning, 2025).

Moreover, constructivist theory highlights the essential role of social interaction in the learning process, suggesting that collaboration and dialogue are key drivers of cognitive development. This perspective closely aligns with the principles of meaningful learning, which emphasize the ongoing construction and refinement of knowledge, as well as its application to real-world contexts. Reflection is seen as a crucial element, providing students with the opportunity to evaluate their understanding and identify areas for further growth. In addition, constructivist approaches view mistakes as valuable learning opportunities, encouraging experimentation and the development of problem-solving skills (ELM Learning, 2025).

In the context of Information Literacy (IL) instruction, constructivist methodologies have been shown to effectively enhance critical thinking and promote active, hands-on learning. The Association of College & Research Libraries (ACRL) Framework for

Information Literacy emphasizes the importance of learner engagement in processes such as information retrieval, source evaluation, and research (Association of College & Research Libraries, 2016). Grounded in six interconnected threshold concepts, the framework encourages students to interact directly with information rather than passively absorb content. The work of scholars such as Vygotsky (1978) and Marsh (2004) further supports the use of constructivist approaches, advocating for interactive learning activities, collaborative discussions, and problem-based tasks to help students develop robust IL competencies (Hmelo-Silver, 2004).

Vygotsky's concept of the Zone of Proximal Development (ZPD) provides a valuable framework for Information Literacy (IL) instruction, emphasizing how scaffolded support can help bridge the gap between what learners can accomplish independently and what they can achieve with appropriate guidance. Integrating IL learning into real-world contexts further enhances its relevance and supports stronger knowledge retention. Overall, constructivist approaches foster autonomy and encourage self-directed inquiry, empowering students to take ownership of their learning journeys and strengthening their proficiency in information literacy (Lasmawan & Budiarta, 2020).

(ii) Application in information literacy instruction

An expanding body of research highlights the importance of integrating constructivist principles into Information Literacy (IL) instruction to promote deeper, more meaningful learning. The Association of College & Research Libraries (2016) advocates for IL programs that emphasize active learning strategies, encouraging students to develop their understanding through experiential activities such as hands-on exercises, meaningful discussions, and problem-solving tasks. Vygotsky's (1978) socio-constructivist theory, alongside Marsh's (2004) focus on collaborative learning, further supports the notion that

students should play an active role in shaping their educational experiences. Similarly, scholars like Jonassen (1999), Piaget (1952), and Hmelo-Silver (2004) emphasize that constructivist learning environments foster greater engagement by promoting interaction with information, critical evaluation of sources, and the practical application of knowledge in authentic, real-world contexts. The alignment between constructivist methodologies and IL instruction underscores the importance of designing learning experiences that cultivate both critical thinking skills and transferable information literacy competencies

(iii) Connection to MOOC design

Massive Open Online Courses (MOOCs) are highly relevant for information literacy (IL) training because they offer accessible, flexible, and scalable platforms for skill development (Wahab et al., 2019; Albelbisi et al., 2023). Unlike traditional one-shot library sessions, which often provide limited exposure, MOOCs enable a large and diverse group of learners to engage with IL instruction regardless of their geographical or financial background (Phade & Chaudhari, 2025; Albelbisi et al., 2023). Their self-paced and self-directed structure enables students to revisit content, reflect on learning, and apply IL skills such as evaluating authority, practicing ethical citation, and conducting inquiry-based research in authentic academic contexts (Wahab et al., 2019). The integration of interactive activities, discussions, and assessments aligns with constructivist learning principles, making IL training more engaging and learner-centered (Kasch et al., 2021; Albelbisi et al., 2021). Furthermore, MOOCs provide standardized yet adaptable modules that can be embedded across disciplines, ensuring consistent delivery of IL skills while accommodating institutional needs (Wahab et al., 2019). The availability of learner analytics and assessment tools also allows librarians and educators to monitor engagement, evaluate competency, and continuously refine instructional design (Kasch et al., 2021). As higher education

increasingly adopts digital and hybrid learning models, MOOCs offer a sustainable and effective approach to equipping students with essential information literacy competencies (Wahab et al., 2019; Albelbisi et al., 2023).

An increasing body of research highlights the importance of student-centred learning activities in enhancing engagement within MOOCs. These activities have been shown to promote active learner participation, foster intrinsic motivation, and support stronger knowledge retention (Kerimbayev et al., 2023; Alj & Bouayad, 2024; Xiong et al., 2015). Incorporating interactive and contextually relevant content has been consistently associated with improved participation levels and higher course completion rates (Ucha, 2023) underscoring the importance of student-focused approaches in maintaining learner engagement within MOOCs.

Scholars also suggest a range of approaches for incorporating student-centred learning into MOOCs, including the use of active learning strategies, promoting interactivity, encouraging peer collaboration, providing personalized and adaptive instruction, and integrating real-world scenarios (Kerimbayev, 2023; Moldez et al., 2024; Tegos et al., 2021). These approaches help foster more engaging and effective learning environments, ultimately leading to improved student achievement and overall course success (Rahimi, 2024). Taken together, the literature highlights that incorporating student-centred approaches into MOOC design is essential for enhancing the learner experience and improving course outcomes.

a) Active learning and interactivity

Extensive research emphasizes that integrating active learning strategies and interactive elements is key to enhancing learner engagement in MOOCs. Interactive tools

such as gamified quizzes, challenges, badges, leaderboards, and progress tracking have been shown to help sustain learners' interest and motivation, ultimately contributing to higher course completion rates (Bonk & Khoo, 2014). These gamification features create a goal-oriented and enjoyable learning environment that promotes sustained engagement over time. Bonk and Khoo (2014) further highlight the importance of interactive assessments that encourage collaboration and active participation, noting that such practices are critical for maintaining learner motivation throughout the course.

In addition to gamification, strategies such as simulations and case studies are commonly used to introduce authentic, real-world learning contexts, allowing learners to apply their knowledge in practical ways. This sense of relevance not only makes the learning experience more meaningful but also deepens learners' engagement with the content. Similarly, incorporating hands-on projects and peer assessments fosters problem-solving skills, critical thinking, and collaboration, all of which contribute to stronger and more sustained engagement.

Research further reinforces the positive effects of active learning in online education. Chi and Wylie (2014) proposed the ICAP framework, which classifies cognitive engagement into four levels: Passive, Active, Constructive, and Interactive. Their findings suggest that activities encouraging Constructive and Interactive engagement lead to better knowledge retention than those based on passive learning. This highlights the importance of incorporating active learning strategies into MOOC design to promote deeper cognitive engagement and enhance learning outcomes.

b) Social learning and peer interaction

A growing number of studies have identified the lack of social interaction as a significant factor contributing to high dropout rates in MOOCs. Researchers stress that fostering peer-to-peer interaction is crucial in addressing this issue, as it not only enhances learner engagement but also helps build a sense of community within the course environment. Tools such as discussion boards and study groups provide structured spaces for meaningful exchanges among participants, with instructor facilitation further supporting sustained involvement (Zhu et al., 2018). In addition, peer mentoring programs where more experienced learners guide newer participants have been associated with higher course retention rates and greater learner persistence.

Empirical evidence further supports the effectiveness of integrating peer collaboration into MOOCs. Zhu et al. (2018) found that MOOCs incorporating collaborative elements consistently achieve higher completion rates than those without interactive features. Collaborative activities, such as group assignments and peer assessments, help foster a sense of accountability, enhance motivation, and encourage active participation, all of which contribute to stronger course outcomes.

Theoretical frameworks further emphasize the importance of peer engagement in the learning process. Vygotsky's (1978) sociocultural theory highlights the vital role of social interaction, particularly through the concept of the Zone of Proximal Development (ZPD), which suggests that learners are able to achieve more complex tasks with support from more knowledgeable peers. This perspective strengthens the argument that incorporating collaborative learning opportunities into MOOCs is essential for enhancing learner engagement, supporting cognitive development, and reducing attrition rates.

c) Personalised and adaptive learning

Customizing MOOC content to address the unique needs of individual learners is widely recognized in the literature as an effective strategy for enhancing engagement and retention, ultimately helping to reduce dropout rates. Researchers highlight several key approaches to personalization, including the use of adaptive learning systems, microlearning formats, and flexible, self-directed pacing. Adaptive learning systems, in particular, adjust the difficulty of course material in real time based on a learner's performance, ensuring an optimal level of challenge without overwhelming the student. Supporting this approach, a study by Kizilcec et al. (2017) found that adaptive quizzes tailored to learner behavior significantly improved MOOC completion rates.

Microlearning has also attracted significant attention as an effective strategy for enhancing learner engagement, particularly through the use of brief, focused instructional segments. Research by Kim et al. (2014) found that videos shorter than six minutes are especially successful in maintaining learner attention, highlighting the importance of concise, well-structured content in online education.

Additionally, allowing students to progress through course material at their own pace supports diverse learning styles and accommodates individual schedules. A self-paced model enables learners to manage their learning based on their prior knowledge and time availability, ultimately leading to higher retention rates and more positive learning outcomes. Overall, the literature consistently emphasizes the crucial role of personalized learning approaches in promoting learner motivation, fostering autonomy, and improving course completion rates within the MOOC environment.

d) Real-world application and motivation

Research consistently shows that learner engagement in MOOCs is heavily influenced by how relevant students perceive the content to be in real-world contexts. Scholars often argue that integrating activities aligned with industry practices and career-oriented tasks is essential for boosting motivation and sustaining participation. A common approach involves incorporating authentic problem-solving exercises that mirror professional environments, helping learners develop practical, job-relevant skills. Supporting this perspective, Deci and Ryan's (1985) Self-Determination Theory emphasizes that intrinsic motivation fuelled by factors such as autonomy, competence, and relatedness is crucial for maintaining long-term engagement. When students see clear practical applications in their coursework, their commitment to the learning process is significantly strengthened.

The literature also highlights the effectiveness of offering certification opportunities that support career advancement. Credentials such as digital badges, micro-certifications, and employer-recognized endorsements have been shown to positively impact course completion rates by providing tangible professional benefits. Hone and El Said (2016) found that MOOCs integrating practical applications with certification mechanisms tend to achieve higher levels of learner engagement and retention, suggesting that clear career incentives can serve as powerful motivators.

In addition, incorporating guest speakers and insights from industry professionals is frequently recommended as a strategy for bridging academic concepts with real-world practices. Exposure to expert perspectives helps students contextualize course content, making it more relevant to their future careers and, consequently, supporting sustained learner engagement.

2.3.2 Self-Directed Learning (SDL) Theory

Integrating self-directed learning (SDL) with technological tools plays a central role in the IL MOOC, fostering learner autonomy and enhancing motivation. This study explores how this approach is implemented, emphasizing its contribution to developing independent learning skills while also strengthening student engagement and motivation within the IL MOOC framework.

(i) IL MOOC engagement through Self-Directed Learning (SDL)

Self-directed learning enhances engagement in IL MOOCs by promoting learner independence, effectively utilizing technological tools, and supporting sustained motivation and commitment.

a) Learner anatomy

The literature consistently emphasizes learner autonomy as a key factor in enhancing student engagement and fostering essential competencies in MOOCs, especially within information literacy (IL) programs. Scholars argue that providing students with greater control over their learning—such as setting personal goals, determining their own pace, and selecting strategies—promotes the development of critical thinking and effective decision-making skills, both of which are fundamental to mastering IL competencies (Knowles, 1975). From a self-directed learning (SDL) perspective, learners are encouraged to take responsibility for planning, implementing, and evaluating their educational experiences, nurturing a stronger sense of independence and accountability.

Numerous empirical studies highlight the critical role that self-directed learning (SDL) plays in MOOC environments. For example, Zhu et al. (2020) examined the interplay

between learners' motivation, self-monitoring, and self-management, finding that SDL is instrumental in fostering autonomy and critical thinking. Their study showed that motivation has a direct influence on self-monitoring, which subsequently enhances self-management. Additionally, motivation was found to indirectly improve self-management through its impact on self-monitoring. These findings suggest that strengthening both learners' self-monitoring skills and their intrinsic motivation is essential for promoting SDL, leading to better engagement, stronger learning outcomes, and more effective learner behaviors in MOOCs.

Building on this, Zhu (2021) examined instructional practices that support the development of self-management skills critical for self-directed learning (SDL) in MOOC environments. The study identified four key strategies commonly employed by instructors: helping students establish clear learning objectives, promoting effective time management through structured schedules and progress tracking, offering flexible learning resources and peer assessment opportunities, and facilitating smooth course navigation through well-organized content and instructional videos. Zhu's (2021) findings highlight the vital role of thoughtful MOOC design in fostering goal-setting, autonomy, and critical evaluation skills, ultimately contributing to greater learner independence, engagement, and cognitive growth.

b) Technology integration enhances SDL

The integration of technology into self-directed learning (SDL) environments is widely recognized for enhancing learning experiences by providing personalized and adaptive pathways tailored to individual learner needs. Garrison (1997) emphasized the pivotal role of SDL in adult education, highlighting the importance of learners taking ownership of their educational journey. Building on this foundation, more recent studies

have identified technology as a crucial enabler of SDL, offering learners access to diverse resources and interactive tools that promote greater independence and active engagement in the learning process (Kruger, 2020).

Adaptive learning technologies, in particular, have significantly advanced self-directed learning (SDL) approaches. These tools enable students to set their own learning goals, engage in continuous self-assessment, and monitor their progress through regular evaluations. By leveraging learner-specific data, adaptive systems personalize the learning experience, ensuring it remains engaging and relevant. Kruger (2020) introduced a conceptual model that integrates SDL principles into adaptive learning platforms, illustrating how such technologies can strengthen learner autonomy and support the development of self-regulation skills.

The integration of interactive multimedia elements, such as videos, quizzes, and discussion forums has also been shown to play a crucial role in promoting student engagement and encouraging active participation. Aulia et al. (2024) investigated the impact of these interactive features on learner engagement and academic achievement, finding that they significantly improve comprehension and learning outcomes. Their study underscores the importance of incorporating multimedia tools into instructional design to create dynamic, learner-centered environments that enhance both motivation and academic performance.

Collectively, these findings strongly affirm the benefits of integrating technology—particularly adaptive learning systems and interactive media—into SDL frameworks. This integration not only fosters active engagement but also helps develop self-reliant learners who are capable of managing their own educational journeys.

c) Motivation and persistence in IL MOOC

Self-Determination Theory (SDT), as proposed by Ryan and Deci (2000), highlights autonomy, competence, and relatedness as key factors that drive learner motivation. Scholars have suggested that incorporating real-world tasks, such as case studies and applied research projects can effectively strengthen these elements, thereby boosting intrinsic motivation and enhancing learner engagement. This perspective aligns with the view that self-directed learning (SDL) is essential for fostering sustained engagement and developing lifelong learning skills (Candy, 1991).

Several empirical studies reinforce these theoretical perspectives. For instance, Lan and Hew (2020) applied Self-Determination Theory (SDT) to examine engagement dynamics within MOOCs. Their findings revealed that MOOCs designed to fulfil students' needs for autonomy, competence, and relatedness resulted in higher intrinsic motivation and increased long-term participation. Their mixed-method analysis indicated that perceived competence had the most significant positive impact on engagement, while perceived relatedness showed a slightly negative effect. Additionally, emotional engagement was found to be the most consistent predictor of perceived learning success, although overall engagement factors had limited direct influence on course completion rates. Qualitative insights from the study further emphasized the importance of active learning strategies, well-structured course content, and accessible instructors in meeting these motivational needs, offering valuable guidance for MOOC designers seeking to sustain learner engagement.

Similarly, Zhu et al. (2022) explored learners' motivations for enrolling in MOOCs and their strategies for self-directed learning (SDL). The study found that both intrinsic motivations, such as curiosity, personal interests, and the desire to expand knowledge and extrinsic motivations, including academic advancement and career growth, were central

drivers of participation. The research also highlighted several key SDL strategies, including task-oriented activities (e.g., note-taking, engaging with videos, conducting research), self-monitoring techniques (e.g., reflection, self-assessment, tracking progress, and applying knowledge in real-world contexts), and effective self-management practices (e.g., time and resource management). In addition, the study identified essential instructional supports for fostering SDL, such as opportunities for self-assessment, peer interaction, instructor feedback, flexible course designs, clear learning objectives, authentic content, and the integration of microlearning modules.

Building on this, Li et al. (2023) explored the relationship between information literacy, self-directed learning (SDL) competencies, and engagement in online learning environments. Their findings revealed that students with strong SDL skills and a positive emotional outlook exhibited higher levels of engagement. Information literacy, SDL abilities, and positive academic emotions were identified as key predictors of engagement, with positive emotions serving as a mediator that strengthened the connection between SDL skills and student participation. These results emphasize the importance of enhancing students' SDL capacities, emotional well-being, and information literacy to foster sustained engagement and promote lifelong learning behaviours in digital learning contexts.

(ii) Foster learning autonomy in IL MOOC design

Designing an Information Literacy (IL) MOOC to promote student autonomy involves creating a learning environment where learners are encouraged to take control of their own educational journey. This approach allows them to set personal learning goals, track their progress, and assess their understanding. As a result, the course not only boosts student engagement but also fosters key skills for lifelong learning.

a) Encouraging learner autonomy

Researchers have highlighted that promoting learner autonomy in an Information Literacy (IL) Massive Open Online Course (MOOC) requires creating a learning environment where students are empowered to manage their own educational journeys (Slamet et al., 2024; Zhu et al., 2022). A key strategy for achieving this is the incorporation of self-paced modules, which give learners the flexibility to engage with content at their own speed, accommodating their individual schedules and learning preferences. According to the Digital Learning Institute (Mighty Team, 2024), self-paced learning enhances accessibility by allowing students to control the timing and pace of their studies, making it more adaptable to a diverse range of learners.

Additionally, offering students a wide range of topics tailored to their personal interests has been found to boost engagement and intrinsic motivation. Slamet et al. (2024) emphasize that allowing learners the freedom to choose content encourages self-directed learning and helps sustain motivation throughout the course. Equally crucial is the incorporation of reflective activities, which are key to fostering critical thinking and self-regulation. Zhu et al. (2022) argue that embedding reflective practices within MOOCs enhances learners' ability to assess their own progress and develop higher-order thinking skills.

Collectively, these elements contribute to the development of a learner-centred IL MOOC that promotes student independence, fosters personal growth, and enhances key information literacy skills.

b) Facilitating personal goal setting

Integrating personal goal-setting strategies into Information Literacy (IL) MOOCs is widely recognized as an effective approach to promoting learner autonomy and improving academic outcomes. Researchers emphasize that structured goal-setting techniques are crucial for boosting student motivation, fostering self-regulation, and encouraging deeper engagement with course content. For instance, interactive workshops centred around goal-setting enable learners to define their own objectives and develop plans to achieve them, aligning with the principles of self-directed learning. A notable example is the University of Michigan's (2020) "Microlearning Goal Setting Workshop: How to Use SMART Goals," which equips students with tools to set clear and achievable goals.

Additionally, incorporating personalized learning plans allows learners to monitor their progress and make adjustments as they move through the course. The Learning Accelerator (n.d.) advocates for "Virtual Personalized Student Learning Plans," which prioritize student choice and encourage reflective learning practices. Regular progress reviews are also considered essential for ensuring goal alignment, as they facilitate ongoing self-assessment and refinement. Pearson Online Academy (2025) further emphasizes the importance of collaboration between students, instructors, and parents in assessing and adapting individual learning paths to help ensure successful goal achievement.

Integrating goal-setting and self-monitoring elements into IL MOOCs helps establish a supportive, student-centred learning environment that promotes independence while cultivating the critical information literacy skills essential for lifelong learning.

c) Implementing self-assessment opportunities

Incorporating self-assessment strategies into Information Literacy (IL) MOOCs is widely recognized as an effective way to encourage learner independence and boost engagement. Researchers emphasize that integrating formative assessments and reflective activities allows students to evaluate their understanding, identify areas for improvement, and adjust their learning strategies. For example, formative quizzes offer a low-stakes environment where learners can receive immediate feedback, helping to identify misconceptions and promote greater self-awareness (Yale Poorvu Center for Teaching and Learning, 2017). These tools are essential for supporting continuous academic development.

In addition to quizzes, peer review mechanisms have been recognized as valuable tools for fostering a collaborative learning environment. Research highlights that when learners assess each other's work, they not only strengthen their critical thinking skills but also gain exposure to diverse perspectives, which enhances their academic growth (York College, 2025). Another effective practice is the use of reflective journals, where students document their learning experiences, challenges encountered, and strategies applied. According to the Center for Innovative Teaching and Learning (2025), such journals play a crucial role in boosting learner engagement and promoting meaningful self-reflection.

Collectively, formative assessments, peer evaluations, and reflective journaling serve as foundational components in IL MOOCs, supporting a student-centred approach that fosters autonomy, encourages continuous learning, and strengthens the critical information literacy skills essential for lifelong learning.

d) Providing flexible and autonomous learning pathways

The integration of flexible and self-directed learning approaches in Information Literacy (IL) MOOCs is widely regarded as crucial for accommodating diverse learner preferences and promoting autonomy. Researchers argue that flexible instructional designs enhance both accessibility and learner engagement by allowing participants to interact with course materials in ways that align with their individual needs and learning objectives. Specifically, modular course designs that allow for non-linear navigation enable learners to concentrate on the topics most relevant to their goals, thus improving the effectiveness of both teaching and learning (Kelly, 2009).

Moreover, empirical research highlights the advantages of adaptive learning technologies in providing personalized learning experiences. These technologies dynamically adjust the complexity of content based on students' performance, ensuring that the material remains appropriately challenging, which fosters sustained engagement and leads to improved academic outcomes (Mitrovic, 2024). Additionally, offering instructional resources in various formats—such as videos, readings, podcasts, and interactive components—has been shown to accommodate diverse learning preferences. This approach not only increases accessibility but also aligns with different learning styles, ultimately boosting student participation and satisfaction (Centre for Teaching and Learning, n.d.).

Collectively, the use of flexible course structures, adaptive technologies, and diverse resource formats is seen as crucial in creating a learner-centered environment within IL MOOCs that empowers students, promotes autonomy, and develops essential information literacy competencies.

e) The role of self-directed learning in enhancing motivation and engagement in MOOCs

Self-directed learning (SDL) is widely acknowledged for its ability to encourage learners to take greater responsibility for their educational progress, thereby boosting motivation and engagement. Research published in Open Praxis highlights a strong connection between intrinsic motivation and learners' ability to effectively manage their own learning processes, particularly within the context of massive open online courses (MOOCs).

f) Enhanced engagement

Altinpulluk et al. (2023) highlight the important role of self-directed learning (SDL) in enhancing student motivation, particularly within online and technology-supported educational settings. Their research indicates that promoting SDL enables learners to take charge of their educational experiences, resulting in higher levels of engagement and a stronger commitment to learning. The study found a moderately positive relationship between SDL and intrinsic motivation, with regression analysis revealing that SDL accounted for 20.5% of the variance in intrinsic motivation levels. Based on these findings, the authors recommend enhancing both students' technological skills and SDL capabilities as effective strategies to further boost motivation.

g) Improved learning satisfaction

Hua et al. (2024) emphasize that incorporating self-directed learning (SDL) strategies in online educational settings significantly enhances student satisfaction. Their study, conducted with Chinese university students, reveals the motivational benefits of SDL, showing that learners with prior SDL experience report higher levels of satisfaction, especially in blended learning environments.

The research also found significant correlations between SDL experience, students' perceptions of the course, their adoption of deep versus surface learning approaches, and overall satisfaction with their learning. Furthermore, the findings suggest that learning approaches act as mediators, influencing the relationship between SDL, course experiences, and student satisfaction. This implies that promoting SDL can enhance satisfaction by encouraging deeper engagement with learning materials.

h) Reduction in cognitive fatigue

Adopting self-directed learning (SDL) strategies has been shown to reduce cognitive fatigue, thereby supporting sustained learner motivation. A study published in the Asia Pacific Education Review found that students with strong SDL tendencies experienced lower levels of internet-related cognitive fatigue, which in turn positively affected their motivation and engagement in online learning environments.

Shao et al. (2022) emphasize the role of self-directed learning (SDL) strategies in influencing students' academic outcomes in online learning environments. In a study with 377 university students using structural equation modeling, their analysis revealed that students who embraced strong SDL strategies experienced lower levels of internet cognitive fatigue (ICF) and were more likely to enter a state of flow during their studies. Additionally, the findings indicated that ICF negatively impacted students' perceptions of learning effectiveness, whereas achieving flow had a positive influence. These results highlight the importance of promoting SDL as a way to reduce cognitive strain and enhance learner engagement.

Therefore, incorporating SDL strategies into digital and technology-based education is seen as crucial for promoting autonomy, sustaining motivation, and developing the skills needed for lifelong learning.

2.3.3 Cognitive Load Theory (CLT)

John Sweller's Cognitive Load Theory (CLT) offers valuable insights into structuring Information Literacy (IL) Massive Open Online Courses (MOOCs) to enhance both learning effectiveness and student engagement. In relation to Objective iii, the use of established frameworks, such as the Association of College & Research Libraries (ACRL) Framework for Information Literacy for Higher Education, is emphasized. Integrating CLT principles with the ACRL Framework allows IL content to be organized in a way that supports more efficient information processing and improves knowledge retention. By incorporating both CLT strategies and the ACRL Framework into course design, educators can create learning environments that encourage critical thinking while minimizing unnecessary cognitive load (Association of College & Research Libraries, 2016).

(i) Integrating CLT in IL MOOC design

Applying Cognitive Load Theory (CLT) principles in the development of Information Literacy (IL) MOOCs is recognized as an effective way to improve learning outcomes by managing cognitive effort. Goodman and Royce (2022) suggest that breaking down complex topics into smaller, more manageable segments reduces intrinsic cognitive load, making it easier for learners to process and retain information. This practice is in line with the core principle of CLT, which aims to minimize cognitive burden to facilitate more effective learning.

Additionally, Cook and Klipfel (2015) advocate for the use of scaffolding techniques, highlighting that providing structured support helps learners gradually build their knowledge without feeling overwhelmed. Hostetler and Luo (2021) also stress the importance of minimizing unnecessary information, suggesting that simplifying instructional materials and eliminating extraneous content can prevent cognitive overload. These strategies allow learners to focus on core concepts, promoting deeper engagement. By integrating these CLT-based approaches—such as segmenting content, scaffolding learning, and streamlining instructional materials—educators can create IL MOOCs that are both learner-centered and pedagogically effective. Moreover, these techniques help design assessments that appropriately challenge learners while avoiding cognitive strain, thus supporting the objectives of promoting learner engagement and enhancing information literacy skills.

(ii) MOOC completion

Research consistently shows that well-designed instruction aimed at reducing cognitive load can greatly enhance learner engagement and increase course completion rates (Goodman & Royce, 2022). Simplifying learning materials and minimizing cognitive demands are crucial in maintaining student motivation, which, in turn, supports their continued participation and success in the course.

The integration of Cognitive Load Theory (CLT) with self-directed learning (SDL) principles, along with established frameworks like the ACRL Framework, creates a solid foundation for evaluating the effectiveness of Information Literacy (IL) instruction. CLT emphasizes the need to organize instructional content in a way that prevents cognitive overload, making complex IL concepts more accessible to students. Meanwhile, SDL promotes learner autonomy, motivation, and active involvement, allowing students to take control of their educational journey. By incorporating these strategies into IL MOOC design,

educators can create instructional practices that enhance comprehension and critical thinking while also improving student retention and completion rates.

2.4 The Relevance of Information Literacy Instruction and the Need to Evaluate Its Effectiveness

In today's digital age, developing information literacy (IL) competencies is crucial, as it enables learners to effectively find, evaluate, and use information. Equally important is assessing the outcomes of IL instruction to ensure that educational programs meet their objectives and remain adaptable to the constantly evolving information landscape.

Erlinger (2018) offers a comprehensive review of both the theoretical and practical literature on Information Literacy Instruction (ILI) assessment, exploring key questions about current assessment practices, guidelines, techniques used by academic librarians, and how well these practices align with established recommendations. Building on this, Miller et al. (2023) present empirical findings from a cross-institutional study utilizing the Association of College & Research Libraries' (ACRL) Project Outcome Toolkit. Their survey assesses students' perceptions in four key areas—knowledge enhancement, confidence, application of skills, and familiarity with resources—showing consistent positive feedback on IL instruction across various institutions. In addition, Meena's (2024) mixed-methods research highlights the positive impact of IL programs (ILPs), with results showing a 23% average improvement in students' post-assessment scores and a 30% increase in library usage, suggesting a strong link between library engagement and IL skill development. However, Meena also identifies challenges such as limited resources and technological constraints and offers practical recommendations based on successful case studies. Together, these studies underscore the importance of continuous evaluation and

improvement of IL instruction to foster student engagement, enhance skill acquisition, and support adaptive library practices.

2.5 Technological Pedagogical Content Knowledge (TPACK)

The Technological Pedagogical Content Knowledge (TPACK) framework, introduced by Mishra and Koehler (2006), provides a comprehensive model for understanding how effective teaching arises from the integration of three domains of knowledge: *Technological Knowledge (TK), Pedagogical Knowledge (PK),* and *Content Knowledge (CK)* (Lee & Pham, 2023).

In the context of information literacy (IL) instruction, this framework is particularly relevant to academic librarians, who must navigate the intersections of content expertise, teaching strategies, and digital tools (Abang Mohtar & Mohamad, 2023). *Technological Knowledge (TK)* enables librarians to leverage digital resources such as databases, citation management tools, learning management systems (LMS), and online platforms to deliver IL instruction in engaging and accessible ways, *Pedagogical Knowledge (PK)* equips them with instructional strategies, including inquiry-based learning, flipped classrooms, and active learning activities, to foster student engagement and support diverse learning needs, and *Content Knowledge (CK)* reflects librarians' expertise in information literacy frameworks, particularly the ACRL Framework for Information Literacy for Higher Education, ensuring that instruction covers core competencies such as evaluating authority, practicing ethical citation, and conducting research as an inquiry-based process (Abang Mohtar & Mohamad, 2023).

Research demonstrates that TPACK provides librarians with a helpful lens for strengthening their teaching practices (Greenwood, 2023). For example, it is highlighted in

the same study about how librarians' professional identity as educators is enhanced when they intentionally integrate technology, pedagogy, and IL content in their practice. Similarly, Stonebraker et al. (2012) illustrates how librarians apply TPACK in BYOD (Bring Your Own Device) classrooms to design IL instruction that meaningfully connects learning objectives, teaching approaches, and digital tools. Mullins, & Boyd-Byrnes (2024) further emphasize that academic librarians are uniquely positioned to deliver IL instruction because of their content expertise, their growing pedagogical skills, and their increasing use of technology, demonstrating the implicit application of TPACK in their work. In the Asia–Pacific region, Abang Mohtar and Mohamad (2023) provide comparative evidence that academic librarians are beginning to recognize the importance of TPACK in IL instruction. However, they continue to face challenges in pedagogical readiness and technological integration.

In the Malaysian context, while studies directly linking TPACK to librarians are limited, research on higher education related to TPACK highlights its growing significance. Aziz et al. (2022), for instance, found that lecturers in Malaysian public universities demonstrated varying levels of TPACK readiness for open and distance learning (ODL), reflecting the challenges of balancing pedagogy, content, and technology in local academic settings. Similar patterns are observed in teacher education research, where Akun and Mohamad (2021) stress the role of TPACK in enhancing professional development for educators in East Malaysia. These findings suggest that academic librarians, who also serve as educators in higher education, must adopt a TPACK-guided approach to deliver IL instruction effectively. By integrating TK, PK, and CK, librarians can design holistic IL programs that are technologically enhanced, pedagogically sound, and content-rich, thereby equipping students with critical skills to navigate today's complex information landscape.

2.6 Academic Librarians in Higher Education Institutions

The evolving landscape of academic library instruction reflects a significant shift in how librarians approach teaching, driven by technological advancements, societal changes, and cultural developments that have reshaped both educational and informational needs. Researchers have noted that these transformations have broadened librarians' instructional roles and responsibilities, placing greater emphasis on information literacy (IL) education and the development of librarians' pedagogical skills (Baer, 2021). This shift has led to a redefinition of librarians' professional identities, moving them beyond traditional service roles to become active educators and teaching collaborators. As a result, many librarians have moved from a focus on skills-based instruction to more holistic, concept-driven teaching models, marking a broader evolution in IL pedagogy.

The shift in librarians' roles has been widely discussed in existing literature. Studies by Ducas et al. (2020) and Walter (2008), alongside key professional guidelines from organizations such as the Association of College & Research Libraries (2016), Coonan et al. (2018), and the American Library Association (2008), highlight the increasing importance of librarians' teaching functions in recent years. These works attribute the expansion of instructional responsibilities to the natural evolution of library instruction, emphasizing the vital role of information literacy (IL) in helping individuals navigate complex and ever-evolving information environments, which are deeply influenced by societal and political contexts (Baer, 2021).

The convergence of librarians' evolving roles as educators and the conceptual development of IL education is further outlined in the ACRL Framework, which encourages librarians to identify key foundational concepts, engage in curriculum design, and

collaborate closely with faculty members (Association of College & Research Libraries, 2016). Similarly, the Chartered Institute of Library and Information Professionals (CILIP) highlights the crucial role of information professionals in supporting and advocating for information literacy across various professional contexts (Coonan et al., 2018).

Despite the increasing prominence of librarians' teaching roles, studies have consistently highlighted a lack of formal pedagogical training. While librarians' instructional knowledge has evolved, much of it has been acquired informally through professional experience rather than through structured teacher preparation programs (Walter, 2008; Julien & Genuis, 2011; Austin & Bhandol, 2013; McKinney & Wheeler, 2015). Moreover, research examining how librarians' teaching philosophies and methods develop over time remains limited. Although the existing literature provides valuable insights into librarians' instructional practices and strategies for professional growth (Walter, 2008; Julien & Pecoskie, 2009; Julien & Genuis, 2011; Austin & Bhandol, 2013; McKinney & Wheeler, 2015; Corrall, 2017; Saunders, 2012), further research is needed to explore how these perspectives evolve as librarians gain more pedagogical experience.

2.7 Academic Librarians' Understanding of the ACRL Framework for Information Literacy for Higher Education

The development of information literacy (IL) instruction in higher education has seen significant changes, especially in terms of teaching focus and assessment methods. The Information Literacy Competency Standards for Higher Education, introduced in 2000, provided a crucial framework for assessing students' IL proficiency. These standards offered clear performance indicators, developed collaboratively by faculty, librarians, and other academic stakeholders, to measure students' competencies (Association of College &

Research Libraries, 2000). However, ongoing changes in higher education, driven by technological advancements, evolving teaching methodologies, and the rise of students as content creators, have highlighted the need to re-evaluate these structured standards.

In response to these changes, the Association of College and Research Libraries (ACRL) introduced the Framework for Information Literacy for Higher Education in 2016, fifteen years after the original standards were established (Association of College & Research Libraries, 2016). This new framework provided a more flexible and concept-driven approach, encouraging librarians to reassess the effectiveness of the previous standards (Berkman, 2016).

Research has explored how the ACRL Framework has been applied within academic libraries. For example, a case study by Latham et al. (2019) examined how librarians incorporated the framework into their instructional practices. The study found that while the framework offers both structural and philosophical guidance, its elements are often applied selectively, sometimes in implicit rather than explicit ways. The integration of the framework was found to foster greater engagement and discussion during IL sessions. However, the study's limited participant pool and the varying levels of familiarity with the framework among respondents suggest that further, more extensive research is needed to draw more definitive conclusions.

The shift from the standards to the framework has also sparked considerable debate. Schulte and Knapp (2017) compared the two approaches, highlighting that the framework moves away from the clear, observable learning objectives of the standards, opting instead for a more theoretical focus grounded in threshold concepts. While the original standards emphasized measurable outcomes, such as the ability to effectively access information and critically evaluate sources, the framework introduces broader, interconnected ideas like

"Authority is Constructed and Contextual" and "Scholarship as Conversation." These threshold concepts aim to deepen students' disciplinary understanding and offer librarians greater flexibility in designing assessments tailored to their unique teaching environments (Schulte & Knapp, 2017).

The framework also broadens the purpose of information literacy (IL) instruction beyond the development of basic skills. According to the Association of College & Research Libraries (2016), it provides librarians, educators, and institutional partners with an opportunity to revisit teaching methods, assignments, and assessment strategies in support of wider goals such as student success, increased collaboration, and student involvement in research processes. Additionally, the framework fosters reflective conversations about learning outcomes at institutional, local, and even broader levels. A key feature of the framework is its emphasis on knowledge practices and dispositions—elements that not only address students' cognitive abilities but also their attitudes and values related to IL learning (Association of College & Research Libraries, 2016).

Overall, the transition from the Information Literacy Competency Standards to the ACRL Framework represents a significant shift in IL education, moving from a task-oriented, measurable model to one that prioritizes conceptual understanding, critical thinking, and adaptability. Although the framework has been widely adopted, further research is needed to fully evaluate its impact on librarians' instructional methods and student development of information literacy skills.

(i) Authority is Constructed and Contextual

The *"Authority is Constructed and Contextual"* frame emphasizes that the credibility and relevance of information are shaped by the context in which it is used, as well as by the

specific informational needs of the individual. Rather than being absolute, authority is influenced by cultural, disciplinary, and situational factors, which vary across different communities (Association of College & Research Libraries, 2016). Scholars argue that this frame encourages both learners and educators to critically assess information sources while being aware of the social structures, privileges, and systems of oppression that influence how authority is constructed (Seeber, 2015).

The literature also suggests that authority is recognized as a form of influence within a particular community and requires openness to diverse perspectives, new ideas, and evolving paradigms (Association of College & Research Libraries, 2016). It emphasizes the importance of cross-checking information from various authoritative sources, promoting inclusivity by acknowledging individuals who may benefit from accessing alternative forms of authority (Association of College & Research Libraries, 2016). For novice learners, there is often a tendency to defer to established experts; however, they are encouraged to question the factors and methods through which authority is constructed (Association of College & Research Libraries, 2016).

(ii) Information Creation as a Process

The *"Information Creation as a Process"* frame emphasizes that information is produced in various formats, each intentionally designed to meet specific communication goals and distributed through particular channels. The processes of generating, shaping, revising, and sharing information vary significantly, resulting in diverse outcomes that reflect both the advantages and limitations of each method used in its creation (Association of College & Research Libraries, 2016).

Researchers argue that the value placed on information is largely shaped by the context in which it is used. While more experienced individuals are generally aware of these contextual factors, less experienced learners often begin to make more informed decisions once they understand how different types of information align with their specific needs. This awareness typically deepens their understanding of and engagement with the information creation process (Association of College & Research Libraries, 2016).

Additionally, this frame is conceptually linked to the *"Authority is Constructed and Contextual"* frame, as both highlight the role of context in determining the value and credibility of information. However, Seeber (2015) critiques the limited examples provided in the *"Information Creation as a Process"* frame, noting that its focus on academic and workplace contexts neglects other environments where these concepts could be applied. Seeber suggests that expanding the range of contextual examples would better demonstrate the frame's broader relevance.

(iii) Information has Value

Information takes on different significance depending on the context in which it is used, serving as a commodity, a tool for education, a means of influence, a tool for negotiation, or a way to interpret the world (Association of College & Research Libraries, 2016). However, researchers have critically examined how the production and distribution of information are shaped by broader legal frameworks and socioeconomic factors (Association of College & Research Libraries, 2016). Watkins (2018) critiques the *"Information Has Value"* frame, suggesting that it reflects neoliberal ideologies by reducing information to a market-driven commodity. He argues that this view overlooks important issues, such as inequalities in information access, and fails to emphasize the right to knowledge as a public good.

Existing studies highlight the challenges that novice learners face in understanding the value of information, particularly in environments where information is freely accessible. These learners often do not fully grasp citation standards, intellectual property rights, and ethical information use (Association of College & Research Libraries, 2016). In contrast, more experienced users, who function as both information creators and consumers, are generally more aware of their responsibilities within academic and scholarly communities. They also recognize how powerful entities can manipulate the value of information to suppress certain viewpoints. Furthermore, scholars note that the value placed on information is often shaped by individuals and institutions for personal, social, economic, or political gain (Association of College & Research Libraries, 2016).

(iv) Research as Inquiry

Researchers often describe the research process as cyclical, evolving in response to the nature and complexity of the questions being investigated. Each answer typically leads to new questions, fostering the ongoing development of knowledge across various disciplines (Association of College & Research Libraries, 2016). Gross et al. (2018) observe that librarians in the United States have adopted the Framework for Information Literacy to improve teaching strategies, emphasize the importance of information literacy (IL), and advocate for the roles of librarians. Their study suggests that the framework promotes collaborative efforts and supports research initiatives, ultimately enhancing IL education.

Existing literature emphasizes that inquiry involves more than just finding information; it is a dynamic, problem-solving process often marked by ambiguity and interdisciplinary collaboration (Association of College & Research Libraries, 2016). Scholars argue that working together within academic communities deepens the exploration of topics and contributes to the expansion of knowledge. Engaging in debates and critical

discussions is seen as an essential part of inquiry, helping to refine ideas. Moreover, inquiry extends beyond academic settings to include community, societal, and personal contexts. It encourages learners to grow from asking basic questions to developing more complex research queries, using advanced methods, and incorporating diverse disciplinary perspectives. While experienced researchers typically approach inquiry with greater sophistication, novice learners gradually acquire the skills needed to make thoughtful methodological decisions (Association of College & Research Libraries, 2016).

(v) Scholarship as Conversation

Researchers often describe academic and professional inquiry as an ongoing, interactive process in which ideas are developed, challenged, and refined over time (Association of College & Research Libraries, 2016). Rather than viewing complex issues as having definitive solutions, scholars emphasize the value of sustained engagement and dialogue between information creators and users, particularly when differing perspectives emerge. This continuous exchange fosters critical thinking and encourages individuals to explore unfamiliar viewpoints, thereby deepening knowledge within specific disciplines and promoting interdisciplinary understanding (Association of College & Research Libraries, 2016). Additionally, existing literature highlights that participation in these intellectual discussions is often influenced by prevailing power dynamics and authority structures, which can impact how novice learners engage in scholarly discourse. To contribute effectively, learners must become familiar with accepted sources of evidence, research methods, and communication practices within their field. Recognizing prior scholarship is also essential, as it positions new insights within the broader academic conversation and supports the advancement of knowledge (Association of College & Research Libraries, 2016).

Empirical studies further support this viewpoint. For example, Fullard (2016) illustrates how disciplinary context shapes experts' views on the role of dialogue. His research reveals that educators from different fields have different expectations; a physiotherapy lecturer, for instance, saw ideas as always open to improvement, while a dentistry lecturer emphasized the importance of conversation in the learning process. Fullard (2016) notes that these dialogues can occur externally, through discussions with colleagues, or internally, through reflective engagement with scholarly texts, prompting individuals to reevaluate their existing knowledge and assumptions.

Additionally, Seeber (2015) cautions against presenting information as absolute or unchanging in educational settings. He argues that doing so undermines the dynamic and evolving nature of inquiry, potentially creating a false sense of certainty. Librarians are therefore encouraged to present information as open to interpretation and critique, fostering an environment where diverse perspectives can be explored and critically assessed.

(vi) Searching as Strategic Exploration

Scholars emphasize that information searching goes beyond simply locating and evaluating sources; it also involves adapting to new insights as one's understanding deepens. The literature acknowledges that this process is heavily influenced by cognitive, emotional, and social factors, which vary depending on the searcher’s level of expertise (Association of College & Research Libraries, 2016). Experienced researchers typically employ a broader range of sophisticated strategies, adjusting their search methods based on the type and scope of the information needed. In contrast, novice learners often rely on more limited resources and basic search techniques, due to their lack of familiarity with advanced methods (Association of College & Research Libraries, 2016). This distinction is highlighted in the *"Searching as Strategic Exploration"* frame, which recognizes that information is created

and valued in different ways, serving various purposes depending on the context (Seeber, 2015).

Although the framework offers significant theoretical value, its practical application has been somewhat inconsistent, largely due to its recent introduction and the gradual process of integrating new teaching methods. For instance, Aharony et al. (2020) encourage Israeli librarians to become familiar with the framework, emphasizing its potential to enhance instructional approaches and improve information literacy education. However, the framework's adoption appears particularly limited in fields like health sciences. Schulte and Knapp (2017) found that many librarians in health-related disciplines are either unaware of the framework or skeptical about its relevance, as their teaching often focuses on evidence-based practice (EBP) rather than broader information literacy models. While the ACRL Framework's flexible, conceptual structure could support learners at different levels, it is often seen as more suited to general academic settings than to specialized disciplines (Schulte & Knapp, 2017).

Additionally, Seeber (2015) argues that the interconnected components of the framework are essential not only for fostering information literacy but also for advancing broader educational goals in higher education. The framework encourages educators and librarians to critically engage with issues such as privilege and oppression, topics that have historically been overlooked in academic environments. This perspective reinforces the notion that information literacy instruction is shaped by the sociocultural context in which it takes place, urging practitioners to incorporate these wider societal factors into their teaching.

2.8 Current Teaching Practices in Information Literacy

Information literacy (IL) plays a central role in higher education, providing students with the essential skills to locate, evaluate, and effectively use information in both academic and professional contexts. As digital technologies evolve rapidly, IL instructional practices have adapted by incorporating modern tools, innovative teaching models, and student-centered approaches. While traditional methods such as lectures and library workshops remain in use, they are increasingly complemented by interactive digital resources, subject-integrated IL instruction, and collaborative learning activities. Additionally, recent trends emphasize the integration of critical thinking, digital competencies, and research skills into IL programs to boost student engagement and promote long-term skill development. This shift reflects the growing recognition of IL's importance in supporting academic success and fostering lifelong learning.

2.8.1 Instructional Approaches

The literature on information literacy (IL) instruction consistently emphasizes the importance of combining traditional teaching methods with modern, interactive strategies to enhance both student engagement and learning effectiveness. Abang Mohtar and Mohamad (2023) note that academic librarians often use a mix of instructional techniques, blending traditional formats like lectures with interactive elements such as practical exercises, group discussions, quizzes, and digital learning modules. Research also supports the use of active learning approaches including problem-based, project-based, and inquiry-driven models since they promote critical thinking and deeper student involvement. However, practical challenges, particularly time constraints, are often cited as barriers to fully integrating these methods. Additionally, some librarians employ structured instructional designs like

Backward Design, which starts by defining learning outcomes and then aligning teaching activities to achieve those goals. Despite these innovations, variability in IL instructional practices across institutions remains, underscoring the ongoing need for a more consistent, student-centred approach to teaching.

Morris and McDermott (2022) highlight the benefits of innovative teaching strategies through their case study of Leeds Beckett University's Library Academic Support Team (LAST). By implementing a flipped classroom model that combines asynchronous resources such as pre-recorded videos, interactive tasks, and online materials with live Q&A sessions, the team was able to offer greater flexibility and foster more meaningful in-person engagement. This approach proved especially beneficial for postgraduate and distance learners by improving accessibility through features like closed captioning. Feedback from both students and faculty suggested that the flipped classroom model positively influenced learning outcomes and student participation, although there were some challenges in ensuring that students engaged with the preparatory materials.

Similarly, Thorn (2022) explores a blended instructional approach that integrates principles of adult learning theory and constructive alignment to create a more interactive information literacy (IL) teaching environment. Moving away from passive lectures, this approach incorporated active learning tools such as Active Learning Classrooms, digital engagement platforms like Mentimeter, and guided Q&A sessions, with the librarian acting as a facilitator to encourage student participation. The restructured five-session lecture series introduced workshops, quizzes, and hands-on activities, culminating in an extended open workshop session. This revised model led to a significant boost in student engagement and performance, as evidenced by a marked increase in the number of students successfully completing their scientific reports on the first attempt.

2.8.2 Technology Integration

Recent studies emphasize the increasing importance of integrating technology into information literacy (IL) instruction to improve teaching efficiency and boost student participation. Abang Mohtar and Mohamad (2023) highlight the relevance of the Technological Pedagogical Content Knowledge (TPACK) framework, which helps librarians effectively combine technological tools, instructional methods, and IL content. Their research shows that librarians regularly use a variety of digital resources—such as EndNote, Mendeley, PowerPoint, Kahoot, Google Forms, Moodle, YouTube, and Learning Management Systems (LMS) to facilitate IL instruction, often incorporating interactive elements like quizzes and videos to enhance student engagement. However, they also identify challenges in integrating advanced technologies, such as AI-based chatbots and text/data mining tools, citing infrastructure limitations and a lack of technical expertise as significant barriers. These findings highlight the need for librarians to continue strengthening their digital skills and explore innovative technological solutions to help students navigate and critically evaluate digital information more effectively.

Other scholars have also highlighted the importance of theoretical models and frameworks in guiding the adoption of technology within educational settings. Bajracharya (2021) advocates for the use of the TPACK model, alongside frameworks like SAMR, which categorizes technology integration into four levels, namely substitution, augmentation, modification, and redefinition to help educators incorporate digital tools in more impactful ways. Additionally, instructional design models such as TPACK-COPR (Comprehension, Observation, Practice, Reflection) and TPACK-IDDIRR (Introduce, Demonstrate, Develop, Implement, Revise, Reflect) provide structured approaches for integrating technology into

information literacy (IL) instruction. These models ultimately support students in developing the skills necessary to locate, evaluate, and apply information critically.

Koob et al. (2022) further explore the use of technological tools in information literacy (IL) teaching, particularly focusing on platforms like Kahoot!, Mentimeter, Padlet, Jamboard, and Poll Everywhere, which gained popularity during the transition to remote learning. While these platforms are praised for boosting engagement through gamification, collaboration, and immediate feedback, the study also identifies significant accessibility concerns, particularly for learners who rely on screen readers. Their evaluation found Mentimeter to be relatively accessible, but highlighted major barriers with Jamboard and Padlet, such as unlabeled buttons and complex navigation. As a result, Koob et al. advocate for more careful selection of digital tools, emphasizing the importance of prioritizing accessibility. They encourage collaboration with digital accessibility offices to ensure inclusive IL learning environments. They argue that improving accessibility not only benefits students with disabilities but also enhances the overall usability of these tools for all learners.

2.8.3 Librarian's Teaching Roles

Recent literature consistently highlights the evolving role of academic librarians in information literacy (IL) instruction, signalling a shift from their traditional role of merely directing students to resources towards a more active role in facilitating student learning. Abang Mohtar and Mohamad (2023) argue that this transformation requires librarians to not only provide access to information but also actively teach students critical IL skills. However, this expanded responsibility presents challenges, particularly as many librarians lack formal training in pedagogical theories and instructional methods. Their research

reveals variations in librarians' self-efficacy; while some are skilled at delivering instruction, others encounter difficulties, especially in integrating technology and applying effective teaching strategies. This underscores the need for librarians to strengthen their *Pedagogical Knowledge* and adopt more student-centred teaching practices. Additionally, Abang Mohtar and Mohamad (2023) stress the importance of collaboration between librarians and faculty members to ensure that IL instruction aligns with academic curricula, offering students well-structured opportunities to develop research skills and critical evaluation capabilities.

Breland (2022) further supports this perspective by emphasizing the vital role of librarians as instructional partners in information literacy (IL) education. Faculty members are increasingly recognizing librarians' expertise in guiding students through the research process, introducing digital tools, and promoting independent learning. However, Breland highlights that some faculty members are hesitant to collaborate, often due to a lack of awareness about library services or concerns about losing control over their course content. To address these challenges, the literature suggests proactive strategies, such as joint workshops and targeted outreach, to strengthen partnerships and ensure that IL instruction is more effectively integrated into academic programs.

Baer (2021) contributes to this discussion by examining the evolving instructional roles of academic librarians, highlighting their adoption of flexible and interactive teaching methods designed to promote critical thinking and active student participation. Librarians now work more closely with faculty, contribute to curriculum development, and make use of digital tools to enhance IL education. Baer’s study indicates that librarians have become more confident in their teaching roles, though challenges remain, such as limited recognition of their contributions and the limitations of one-time instructional sessions. Overall, the literature calls for greater institutional support and stronger collaborations to maximize

librarians' impact on IL instruction and better equip students with the critical research and information literacy skills they need.

2.8.4 Student Engagement and Assessment

The crucial role of student engagement and assessment in information literacy (IL) instruction is consistently emphasized in contemporary literature. Abang Mohtar and Mohamad (2023) note that librarians employ a variety of approaches to measure students' learning outcomes, using both formal methods such as surveys, satisfaction assessments, and performance tracking and informal techniques like classroom interactions and direct feedback. Their research underscores how effective IL teaching enhances students' critical thinking, research skills, and overall academic performance, especially when active learning strategies are incorporated. However, they also identify challenges such as inconsistent assessment practices and limited instructional time, which impede the thorough evaluation of student progress. This highlights the pressing need for a standardized assessment framework that can reliably measure IL skill development and ensure that the instructional process leads to meaningful learning outcomes.

Echoing similar concerns, Iqbal (2021) highlights the importance of engagement and assessment strategies in IL programs within Pakistani university libraries. He outlines various techniques used to assess student progress, including quizzes, oral feedback, reflective writing, IL-related assignments, and multiple-choice tests. Additionally, some institutions conduct pre- and post-instruction assessments to track improvements over time. Iqbal’s findings stress that both informal feedback mechanisms and structured evaluations play a crucial role in encouraging student participation and monitoring skill development, thus supporting the ongoing enhancement of IL teaching practices.

Further insight is provided by Gray and DiLoreto (2016), who examine student engagement and assessment in online learning environments, offering valuable implications for IL instruction. Using the Student Learning and Satisfaction in Online Learning Environments (SLS-OLE) tool, they assess factors such as course structure, learner interaction, instructor involvement, and engagement levels. Their study shows that well-designed courses, a strong instructor presence, and interactive learning opportunities significantly enhance student engagement, satisfaction, and perceived learning outcomes. Importantly, their research highlights that engagement serves as a key mediator between instructor involvement and student success, emphasizing the need for intentional engagement strategies and continuous assessment to improve the learning experience.

Taken together, these studies underscore the critical importance of engagement and assessment in delivering effective IL instruction. They advocate for more intentional, standardized assessment methods to better support student participation and offer consistent evaluations of learning outcomes, ultimately ensuring the successful development of students' information literacy skills.

2.8.5 Challenges in IL Instruction

A growing body of literature highlights several challenges that limit the effectiveness of information literacy (IL) instruction, particularly in higher education. Abang Mohtar and Mohamad (2023) identify a major obstacle in the lack of pedagogical training among academic librarians, which affects their ability to apply effective instructional methods. This gap, coupled with constraints such as limited teaching time, reduces opportunities for delivering comprehensive IL instruction and incorporating active learning strategies. Additionally, ongoing technological challenges, such as inadequate IT infrastructure and

limited digital proficiency further complicate the situation. The authors also point out that librarians often face difficulties in engaging students with varying levels of IL competency and addressing their diverse learning needs, which diminishes the overall effectiveness of instruction. Their findings emphasize the need for professional development programs, stronger institutional support, and more integration of IL instruction into academic curricula to overcome these challenges.

In line with these observations, Schachter (2020) highlights the challenges librarians face in IL teaching, particularly due to a lack of familiarity with pedagogical frameworks and formal teaching practices. Schachter notes that many librarians rely on practical experience rather than grounding their instruction in educational theory, which may diminish the effectiveness of their teaching. Time constraints further limit their ability to deliver comprehensive sessions or invest in professional development. Additionally, institutional inertia, limited collaboration with faculty, and slow adoption of new technologies exacerbate these challenges. Schachter advocates for more structured pedagogical training, ongoing upskilling, and stronger partnerships between librarians, faculty, and academic support services to promote more theoretically informed and technology-enhanced IL instruction.

Building on this discussion, Mercado-Sierra and Northam (2023) highlight similar challenges affecting IL instruction. They argue that both librarians and faculty often lack a strong grounding in educational theories, making it challenging to tailor IL instruction to the specific needs of different disciplines. This issue is compounded by limited instructional time, leading to only superficial coverage of IL skills. Additionally, technological shortcomings, such as inadequate IT infrastructure and difficulties in integrating IL content into learning management systems (LMS), further hinder effective instructional delivery. Together, these studies underscore the importance of institutional support for professional

development, enhanced technological resources, and stronger collaboration to better integrate IL instruction into academic programs.

2.9 Information Technology Integration in IL Instructional Approach

The integration of technology into educational environments plays an increasingly important role in shaping the learning experiences of 21st-century students, especially those often referred to as "digital natives." Despite growing up in a technology-rich world, Gross and Latham (2012) argue that university students often lack essential digital literacy skills, particularly when it comes to effectively locating and evaluating information. They suggest that simply being familiar with digital tools does not automatically equate to information literacy competency. This underscores the crucial role of academic librarians in helping students develop the skills necessary to critically navigate information landscapes in academic settings.

In line with this perspective, Aharony et al. (2020) explore the impact of technology on information literacy (IL) instruction within Israeli academic libraries. Their findings reveal that a significant number of librarians recognize technology's considerable influence on both the delivery methods and content of IL instruction. Specifically, 62.6% of participants reported that technology had a major impact on instructional delivery, while 77.5% noted similar effects on the content of IL instruction. Moreover, 46.1% of respondents observed that the use of information technology increased student interest and participation during IL sessions. These results highlight the growing importance of technology, not only in facilitating IL instruction but also in enhancing student engagement.

2.10 Learner-Centred Instruction in Information Literacy

Many librarians are still relatively new to incorporating student-centred or learner-centred pedagogical methods into information literacy (IL) instruction, as these concepts continue to gain momentum. These teaching strategies shift the focus from teacher-led activities to active student involvement, emphasizing the learner's role in shaping their educational experience. Bosch et al. (2008), as cited in Colosimo et al. (2012), describe learner-centred practices as focusing on motivating students, encouraging discovery-based learning, recognizing students' diverse backgrounds, offering varied assessment methods, and providing remedial support when necessary. At the heart of this approach are active and collaborative learning techniques, which prioritize student accountability in constructing knowledge.

Support for the effectiveness of learner-centered methods in IL instruction is provided by Stec (2006), who compared the outcomes of active learning techniques with the more traditional demonstration style commonly used in IL sessions. The study found that instructors' teaching experience had little impact on the effectiveness of instruction, with those using active learning strategies reporting better student learning outcomes (Colosimo, 2012).

Additionally, An and Mindrila (2020) argue that learner-centred approaches are more effective in meeting the diverse needs of students and preparing them for the fast-paced nature of today's world. Despite challenges in implementation, research indicates that educators generally have a positive view of these practices, which can be delivered through various methods, including problem-based, project-based, or inquiry-based learning.

Dahlen (2012) further explores the use of learner-centred pedagogy in IL instruction, emphasizing its broad application in adult and higher education settings. This approach encourages learners to take ownership of their learning, including self-assessment and goal-setting. As a result, librarians must carefully evaluate whether face-to-face or online formats are more suitable when implementing learner-centred strategies (Kaplowitz, 2012), as understanding the strengths and challenges of each format is crucial for ensuring effective instruction.

Despite the growing adoption of learner-centered education, criticisms remain. Schweisfurth (2011), through a meta-analysis, reports that efforts to implement learner-centered teaching in developing nations often face significant obstacles, including inadequate teacher preparation, limited resources, curricular inconsistencies, and cultural resistance. Teachers may feel hesitant to adopt a facilitative role, sometimes viewing student autonomy as a challenge to their professional identity (Robinson et al., 2007; Sockman, 2015). Furthermore, sustaining student motivation and engagement continues to be a challenge, underscoring the need for more engaging instructional methods (Aharony et al., 2020). In IL instruction, these difficulties are compounded by limited access to students and the time constraints typically associated with these sessions, making it harder to apply more reflective and critical teaching practices (Schachter, 2018).

2.11 Students' Learning Outcomes

Learners in the 21st century are generally self-directed and have clear ideas about their educational interests. However, a significant issue arises from students' overconfidence in their research abilities. While many students believe they excel at finding and evaluating information, both research findings and firsthand observations reveal that their actual skills

in searching for and critically assessing information often fall short (Berkman, 2016). Clearly defined learning outcomes are essential in guiding any educational experience, as they specify the achievements students are expected to reach by the end of a course. Adam (2004) describes learning outcomes as explicit statements outlining what students should be able to demonstrate upon completing a course module. In this context, librarians and faculty members across various disciplines are increasingly working together to develop information-related behaviors that are tailored to the specific needs and context of each academic discipline (Farrell & Badke, 2015).

2.12 Chapter Summary

This chapter examines how Information Literacy (IL) is taught in higher education, particularly as its importance grows in today's digital landscape. It begins by tracing the evolution of IL and introduces key learning theories such as Constructivist Learning, Self-Directed Learning, and Cognitive Load Theory, which inform effective teaching strategies. The chapter also discusses how the ACRL Framework shapes IL instruction and how librarians are applying it in practice. Throughout, it explores various teaching methods, including active learning, the integration of technology through the TPACK model, and strategies for keeping students engaged in IL MOOCs. While the chapter highlights promising innovations, it also addresses challenges such as time limitations and the lack of formal pedagogical training. Ultimately, it advocates for stronger collaboration, ongoing professional development, and continuous assessment to ensure IL instruction remains relevant, effective, and supports lifelong learning.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology, detailing the chosen research approach and the implementation of the study's first and second phases. Each phase is described systematically to ensure clarity and comprehensive understanding. The chapter also covers the overall research design, study population, data collection procedures, as well as strategies for data management and analysis.

3.2 Research Method Approach

This study adopts a mixed-methods exploratory sequential design, encompassing two main phases: an initial qualitative phase followed by a quantitative phase. The first phase involves conducting semi-structured interviews, with the resulting data analysed in depth to uncover key insights. These insights then guide the development of the quantitative phase, ensuring that the subsequent data collection is grounded in the qualitative findings. By integrating the results from both phases, the study aims to offer a more comprehensive and nuanced understanding of the research problem. This approach also enhances the validity and depth of the findings by allowing the quantitative data to clarify and expand upon themes emerging from the qualitative analysis.

In the Digital Era and the 21st century, the landscape of education is undergoing rapid transformation, with both teachers and students taking on increasingly dynamic roles. Educators are no longer seen merely as transmitters of knowledge but as facilitators and mediators of learning, necessitating continuous development of their ICT competencies to

support modern educational needs effectively (Agustini et al., 2019). In response to these evolving demands, educators are expected to possess a comprehensive understanding of *Technological, Pedagogical,* and *Content Knowledge*, collectively referred to as the TPACK framework (Agustini et al., 2019). Within the context of university libraries, the role of "educator" extends to academic librarians, who are tasked with equipping students in higher education with essential information literacy (IL) skills. While Montgomery (2015) argued that librarians have successfully employed effective strategies to facilitate IL skill development among students, Elmborg (2012) took a more critical stance, suggesting that many librarians are not yet adequately prepared to function as pedagogically informed educators. To enhance instructional effectiveness, librarians must critically assess the impact of both conventional and innovative teaching methods on student engagement and learning outcomes in IL instruction (Eke et al., 2010).

Although librarians are expected to engage in educational activities, teaching has traditionally not been recognized as a core component of their professional duties (Wilson, 1979). Furthermore, concerns have been raised about their preparedness to serve as informed educators (Elmborg, 2012). In light of this, the present study integrates elements from the Technological, Pedagogical, and Content Knowledge (TPACK) framework and the ACRL Framework for Information Literacy in Higher Education to explore whether librarians' current practices in teaching information literacy align with these theoretical models—often without their explicit awareness of doing so. This gap between theory and practice highlights a critical area for development. Accordingly, the researcher contends that addressing this gap is essential and should be leveraged to inform future efforts in enhancing academic librarians' professional development and instructional practices in the Malaysian higher education context.

Given the need to gather both qualitative and quantitative data, this study employed a mixed-methods approach. As noted by Creswell (2014), mixed-methods research is closely aligned with the pragmatic paradigm, which values methodological flexibility to best address specific research questions (Teddlie & Tashakkori, 2009). This approach challenges the traditional divide between qualitative and quantitative methods by recognizing that certain inquiries are more effectively explored through the integration of both narrative and numerical data (Teddlie & Tashakkori, 2009). The mixed-methods approach was particularly beneficial for this study, as it enabled a more comprehensive and nuanced analysis through the integration of distinct data types, allowing them to complement and enrich one another (Creswell, 2014). Figure 3 provides an overview of the exploratory sequential design employed in this research.

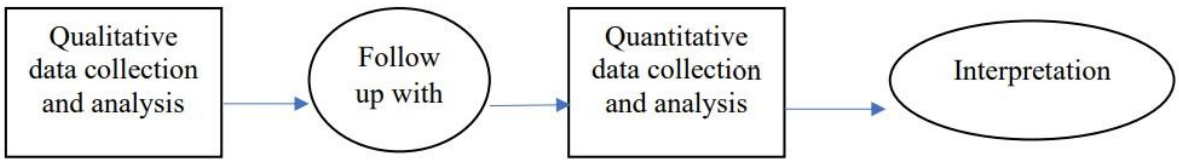


Figure 3.1: Mixed Method Exploratory Sequential Design (Creswell & Clark, 2011)

The study aimed to assess the appropriateness and effectiveness of teaching information literacy (IL) through a MOOC, with particular attention to the role of self-directed learning and technology integration in enhancing students' IL competencies and motivation. The objectives were to examine the extent to which IL instruction is grounded in theoretical concepts, investigate academic librarians' understanding and application of the TPACK framework in IL teaching, evaluate librarians' use of the ACRL Framework for Information Literacy for Higher Education in fostering information-literate students, and

analyze the relationship between learner engagement and course completion in the IL MOOC.

The research design adopted for this study is a mixed-methods approach, specifically the exploratory sequential mixed-methods design. This design unfolds in three phases: an initial qualitative phase, an integration phase, and a subsequent quantitative phase. The study begins with qualitative research to explore in-depth perspectives, which then informs the development and implementation of the quantitative phase.

3.3 Phase One: Academic Librarians' Understanding and Application of TPACK and the ACRL Framework

In this study, the qualitative approach is employed to explore key questions related to current information literacy (IL) teaching practices, as well as academic librarians' awareness and understanding of the elements of the TPACK framework, i.e. *Technological Knowledge, Pedagogical Knowledge, Content Knowledge,* as well as the six frames of the ACRL Framework for Information Literacy in Higher Education. The insights gained from participants' responses will help assess their level of familiarity with the components of the TPACK framework and their application of the ACRL Framework within instructional contexts.

3.3.1 Research Design

The research design serves as a guiding framework that outlines the key components necessary for conducting the study and delineates the sequential steps involved in its planning and execution. For the qualitative phase of this investigation, a case study approach has been adopted. A case study enables an in-depth exploration of a single case or a small

number of cases within their real-world context. This method was deemed appropriate for the study, as it supports the objective of examining and evaluating academic librarians' current understanding and knowledge of the TPACK framework and the ACRL Framework for Information Literacy in Higher Education.

A case study is an empirical research approach that employs systematic and rigorous procedures to investigate contemporary phenomena within their real-life context (Othman, 2015). The findings derived from the case study provide a deeper and more comprehensive understanding of information literacy (IL) instruction among academic librarians, particularly in relation to their teaching practices and theoretical knowledge.

This qualitative research is conducted through semi-structured interviews with academic librarians. These interviews sought to examine the degree to which current information literacy instruction is informed by theoretical foundations, while examining academic librarians' understanding of the TPACK framework and how they apply its components in teaching information literacy (IL), as well as to investigate the extent to which they comprehend the elements of the ACRL Framework for Information Literacy for Higher Education and integrate them into efforts to develop information-literate students. A qualitative approach is particularly well-suited for this inquiry, as it emphasizes how individuals interpret and assign meaning to social experiences and real-world situations, providing rich insights into their professional realities and practices.

3.3.2 Population and Sample Techniques

This study adopts a non-probability sampling strategy, specifically purposive sampling, to select participants from a defined population based on predetermined criteria. The selection focuses on academic librarians with knowledge of both the TPACK framework

and the ACRL Framework for Information Literacy in Higher Education. Accordingly, the study involves academic librarians responsible for teaching information literacy across 20 public universities in Malaysia.

Academic librarians at all twenty public university libraries in Malaysia were selected as participants for this study, comprising eighteen in Peninsular Malaysia and two in East Malaysia. The selection was guided by considerations related to the research context, objectives, and timeline. These factors were carefully evaluated to ensure that the study could be conducted effectively and with logistical efficiency.

The objectives of the first phase of this research are to examine how much academic librarians' current IL instructional practices are based on the theoretical concepts, i.e. adaptation of learning theories or any theoretical framework, understanding of the components of the TPACK Framework, the six frames of the ACRL Framework for Information Literacy in Higher Education, and their understanding of IL instructional methods. Consequently, the selection of university libraries needed to align with institutions where information literacy sessions are actively conducted. Public university libraries in Malaysia were deemed highly suitable for this purpose, as they offer IL classes or sessions delivered by academic librarians, thereby providing a relevant and contextually appropriate setting for the study.

Another consideration for academic librarians at public university libraries as research participants is the alignment with the study's duration and logistical constraints. Public universities in Malaysia generally follow a similar academic calendar, with consistent semester periods throughout the year. This uniformity provides the researcher with a practical advantage in planning and coordinating data collection within a defined timeframe, thereby facilitating more efficient scheduling and execution of the research.

3.3.3 Unit of Analysis

This study identifies academic librarians at Malaysian public universities as the unit of analysis, with a specific focus on those actively engaged in teaching information literacy (IL) to students in higher education. These librarians hold qualifications at the bachelor's, master's, or doctoral level and have prior experience in delivering IL module content. Recognized as subject-matter experts, academic librarians frequently assume roles as educators and curriculum advisors, collaborating with faculty members to support and implement a wide range of IL initiatives within the university setting (Mullins & Boyd-Byrnes, 2024).

The research focuses on the instructional practices of academic librarians in information literacy (IL), with particular attention to how these practices are grounded in theory and frameworks. Specifically, it examines the extent to which current IL instruction is informed by theoretical foundations, while also exploring librarians' understanding of the Technological Pedagogical Content Knowledge (TPACK) framework and how its components are applied in their teaching. Additionally, the study examines librarians' understanding of the ACRL Framework for Information Literacy for Higher Education and the ways in which they incorporate its elements into their instructional practices to foster information-literate students.

3.3.4 Data Collection Techniques

In this study, the semi-structured interviews are conducted with academic librarians from public universities in Malaysia who are actively involved in teaching information literacy (IL) modules. The interview comprises questions aligned with the research constructs examined in this study, which are based on the three main components of the

TPACK framework, i.e. *Technological Knowledge, Pedagogical Knowledge, Content Knowledge* (Koehler & Mishra, 2009); as well as the six frames outlined in the Framework for Information Literacy for Higher Education namely, *Authority is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration* (Association of College & Research Libraries, 2016). In addition to questions based on these frames, the interview also includes inquiries related to the instructional delivery methods currently employed by academic librarians in public university libraries across Malaysia, aiming to gain insight into their practical approaches to information literacy (IL) teaching.

3.3.5 Development of Research Instruments

The initial step in drafting the interview questions involved identifying the key constructs that the study aims to examine. To guide this process, the researcher referred to two foundational frameworks: the Technological Pedagogical Content Knowledge (TPACK) framework and the ACRL Framework for Information Literacy for Higher Education. According to the TPACK framework, the core constructs consist of three primary forms of knowledge: *Technological Knowledge (TK), Pedagogical Knowledge (PK),* and *Content Knowledge (CK).* Meanwhile, the ACRL Framework outlines six key elements of information literacy to be explored: *Authority is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration*.

After identifying the relevant constructs, the next step involved developing the interview protocol. The instrument used in this study is a semi-structured interview protocol

designed by the researcher, grounded in the constructs outlined in the TPACK framework and the ACRL Framework for Information Literacy in Higher Education.

To ensure the credibility and validity of this study, three expert panels were consulted. Each panel member was selected based on their professional experience, academic background, and subject expertise relevant to the research focus. The first panel member is a senior lecturer at a public university in Malaysia with extensive experience in teaching and higher education. With ten years of teaching experience and twenty-one years as a lecturer, the panel member's academic and professional background establishes expertise in Information Literacy, qualifying this individual to contribute significantly to the evaluation of the study's instructional design and framework.

The second panel member is also a senior lecturer at a public university in Malaysia, with twenty-seven years of academic experience. Expertise in Translation Studies, Bilingual Lexicography, and Corpus Linguistics complements the interdisciplinary dimensions of the study. Extensive scholarly and teaching experience provides critical insights into language-related aspects of information use and interpretation.

The third panel member is an academic teacher specializing in the Malay language, with nine years of teaching experience. Recognized as an expert in Malay language and literature, this individual contributes valuable cultural and linguistic perspectives, ensuring that the study is aligned with language-specific nuances and contextual relevance in the Malaysian higher education setting.

Subsequently, the interview protocol was translated into Malay to create a bilingual version, accommodating librarians who may prefer to respond in their native language during the interview sessions. To ensure accuracy and clarity, three experts proficient in both

English and Malay were involved in the translation and review process. One expert reviewed the overall structure and content of the interview questions, while the remaining two, specialists in English and Malay, respectively, focused on language accuracy and contextual appropriateness.

The process began with the first expert, a subject matter specialist, reviewing the interview questions to ensure content relevance and alignment with the study's constructs. This was followed by a review conducted by an English language expert to verify the linguistic clarity and accuracy of the questions. The interview protocol was then translated into Malay and subsequently reviewed by a Malay language expert to ensure linguistic and contextual appropriateness. The two language versions were compared to assess consistency and accuracy. Following this comparison and refinement process, the finalized bilingual interview protocol was successfully produced.

(i) Developing semi-structured interview questions

To prepare for the semi-structured interviews, the researcher first developed an interview protocol. The interview protocol was designed to elicit insights into the knowledge and experiences of academic librarians involved in the teaching and learning of information literacy (IL). Interview topics were structured around the three core components of the TPACK Framework: *Technological Knowledge (TK), Pedagogical Knowledge (PK),* and *Content Knowledge (CK).* In addition, the six frames from the ACRL Framework for Information Literacy for Higher Education were incorporated, alongside the seven Learner-Centred Psychological Principles, to ensure a comprehensive exploration of instructional practices and theoretical understanding.

The interview topics are specifically designed to address research questions 1, 2, and 3, which focus on the instructional practices of academic librarians in the area of information literacy (IL), with an emphasis on the theoretical and framework-based foundations of these practices. It explores the extent to which IL instruction is shaped by established theoretical perspectives, while also assessing librarians' comprehension of the Technological Pedagogical Content Knowledge (TPACK) framework and the application of its components in teaching. Furthermore, the research considers librarians' engagement with the ACRL Framework for Information Literacy for Higher Education and examines how its principles are integrated into instructional approaches aimed at developing information-literate students. The questions developed are essential for achieving the research objectives, as they help uncover the depth of understanding and instructional practices applied by librarians, thereby providing meaningful insights into the real-world context of IL teaching.

The development of the interview protocol was guided by the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the dynamic interplay between *Technological Knowledge, Content Knowledge,* and *Pedagogical Knowledge.* In framing the questions, each of these domains was translated into guiding themes to ensure comprehensive coverage of the framework in the context of information literacy instruction.

The *Technological Knowledge (TK)* component was examined through questions about the use of digital tools, platforms, and technologies in information literacy instruction. These questions aimed to determine how librarians select and implement technological resources to enhance student learning. Questions relating to *Content Knowledge (CK)* were designed to explore participants' understanding of information literacy concepts, with particular reference to the ACRL Framework for Information Literacy for Higher Education.

This encouraged participants to reflect on how they defined, interpreted, and integrated these core concepts into their teaching practices. In terms of *Pedagogical Knowledge (PK),* the questions focused on instructional strategies, teaching methods, and approaches used to actively engage students in the learning process. This allowed for deeper insights into how librarians planned and adapted their teaching to support the diverse needs of students.

Although the TPACK framework provided a structured foundation for developing the protocol, the questions were also contextualized to reflect the realities of information literacy instruction in Malaysian higher education. This required adapting the language of the questions to the professional role of librarians as educators, while ensuring alignment with the study's objectives. By framing the interview items in this way, the protocol not only maintained theoretical rigor but also created opportunities for participants to share rich and meaningful accounts of their instructional practices.

3.3.6 Research Instrument: Interview Protocol

The interview protocol for research instrument is divided into six sections, namely Section A, Section B, Section C, Section D, Section E and Section F (refer to Appendix D). Section A aims to gather information regarding the professional background of respondents, specifically their title, full name, gender, year of service, name of library and university (current employment), current position, programme (qualification) and university/ universities they graduated from, specific areas of expertise, most current research in related field and year of study, and their job responsibilities.

Section B contains items for general data on information literacy instruction. This section aims to gather information regarding the current IL teaching practices among the respondents. This section is organised into five main questions, each comprising a few

relevant sub-questions. The first question aims to gather information regarding the academic levels of students receiving information literacy instruction, the specific types of information literacy modules offered, and the significance of information literacy competencies for students. Meanwhile, the second question aims to gather the information examining the duration of experience in teaching information literacy within the context of academic libraries, the availability of training for teaching information literacy, the number of librarians delivering information literacy classes, and the frequency of these classes. The third question on the other hand, seeks to assess the average number of information literacy instruction sessions required to be taught in an academic year, the typical number of students participating in each session, the scheduling practices for these classes whether determined by faculties, librarians, or based on requests from faculty and lecturers, and the preparations made prior to teaching the information literacy module. As for question 4, it aims to gather information investigating the average number of information literacy modules required to be developed in an academic year, the extent to which these modules are designed based on specific models or theories such as the Big 6 or ACRL standards and framework, and the influences of previous practices or educational levels (foundation, diploma, undergraduate, postgraduate) on their design. Finally, question 5 seeks to explore whether information literacy instruction is provided to groups beyond students, identifying the specific groups that receive this instruction.

The interview protocol for this study was developed with reference to the Technological Pedagogical Content Knowledge (TPACK) framework, which provided a structured lens for examining the integration of technology, pedagogy, and content in information literacy (IL) instruction. The framework's main components, namely, *Technological Knowledge (TK), Pedagogical Knowledge (PK),* and C*ontent Knowledge*

(CK) served as the basis for formulating questions that addressed librarians' understanding and application of these areas in practice.

While the framework offered a guiding structure, the formulation of the questions also reflected the researcher's interpretation of how these domains manifest in the specific context of IL instruction. For instance, questions were adapted to explore not only theoretical definitions of TK, PK, and CK, but also their practical application, such as the use of digital tools (TK), implementation of inquiry-based and active learning strategies (PK), and teaching of principles from the ACRL Framework (CK). This interpretive adaptation ensured that the protocol captured both the theoretical underpinnings of TPACK and its practical relevance to the local IL teaching environment.

To enhance content validity, each question was mapped to a specific component of the framework and reviewed in relation to the study's objectives. Expert feedback and pilot testing further ensured clarity, relevance, and alignment with the intended constructs. The combination of framework-driven and researcher-interpreted perspectives allowed the protocol to probe beyond surface-level practices, focusing on how librarians conceptualize and integrate different forms of knowledge in their instructional design and delivery.

Section C includes items designed to assess respondents' awareness of *Technological Knowledge,* aiming to gather information about their level of awareness and understanding regarding the application of *Technological Knowledge* in teaching information literacy. This section is organised into four main questions, in which each main question comprises of a few relevant sub questions. Question 1 seeks to identify the technological tools employed in the content delivery of information literacy modules, such as PowerPoint, library websites, Kahoot, and Slideshare, and to examine the function of each tool within these modules, while question 2 aims to explore the extent to which librarians use technological tools to teach

information literacy modules and how they do so, investigate whether students also utilize these tools during information literacy sessions and their methods of usage, gather insights on librarians' experiences with these tools, identify any challenges faced in their use, such as being time-consuming, inconvenient for students, or encountering technical issues and assess how these technological tools contribute to the teaching of information literacy. Question 3 on the other hand, seeks to examine how librarians began utilising technological tools in teaching information literacy modules, the process of implementing these tools among students during information literacy sessions, the rationale for incorporating technological tools into their modules, any relevant training attended prior to applying these tools, and the origins of the current tools' implementation, whether it stemmed from personal initiative, literature, practices observed in other libraries, or emerging trends in the library field, such as insights gained from seminars, conferences, benchmarking, innovative ideas from librarians, or directives from management. Last but not least, question 4 aims to evaluate librarians' perceptions of the implementation of technological tools in their information literacy teaching compared to traditional methods, assess their views on the use of these tools by students during information literacy sessions, determine their level of skill and knowledge in using the current technological tools applied in the modules and the basis for their self-assessment, identify any additional technological tools they believe would be suitable for information literacy modules, and explore the necessity for librarians to enhance their knowledge and understanding of technological tools to effectively recognize and utilize appropriate tools in their information literacy instruction.

Section D encompasses items considered to assess respondents' awareness of *Pedagogical Knowledge,* aiming to gather information about their level of awareness and understanding concerning the application of *Pedagogical Knowledge* in teaching

information literacy. This section is prepared into four main questions, with each main question contains several related sub questions. The first question aims to investigate the teaching methods employed in each information literacy module, assess whether these methods vary from one module to another, such as collaborative learning, lectures, or facilitation, to examine the consistency of teaching skills and methods among librarians, and explore the approaches librarians use in addressing students' inquiries during their information literacy classes. The second question seeks to explore how librarians plan and teach their sessions based on the content to be delivered, while identifying the most critical aspects of their instruction, examine their strategies for improvisation and knowledge enhancement including attendance at training courses, the influence of student feedback on their teaching strategies, the nature of this feedback and the resultant changes made, and whether they engage with students to solicit opinions on improving their teaching skills or strategies and ultimately gather insights on what librarians can do to adopt best practices for delivering content in information literacy modules for higher education learners. As for the third question, it aims to assess the duration of librarians' implementation of their current information literacy teaching skills or strategies, examine whether these skills are consistent across all modules, gather insights into their experiences applying these strategies, and identify the activities conducted for each module, including the types of activities involved. The last question, question 4 seeks to evaluate librarians' perceptions of the effectiveness of their information literacy teaching skills and strategies for students, assess their self-rating in this regard, and examine their awareness of how their teaching methods align with the delivery of content in information literacy modules and accommodate students' learning styles.

Section E incorporates items intended to assess respondents' awareness of *Content Knowledge,* aiming to gather information about their level of awareness and understanding of implementing *Technological Knowledge* in teaching information literacy. This section is divided into four main questions, with each question comprises of several related sub questions. Question 1 aims to gather information on the module contents taught at the university level in the context of information literacy. Meanwhile, question 2 aims to examine how librarians structure the content of existing information literacy modules, the process by which they develop these modules, the influences behind their structure, such as personal readings, discussions among librarians, or practices observed in other libraries and to evaluate their self-assessment of understanding or knowledge regarding the content of each information literacy module. Besides that, question 3 intended to indicate the duration required to structure the content for each information literacy module, the important factors considered in the planning process, and the examples and materials utilized should be shared. Finally. question 4 aimed to investigate several items, such as the current content of each information literacy module should be evaluated, with particular attention given to the changes observed over the past years, the causes of these changes, and the focus of the current modules. An assessment of the weaknesses or limitations needing improvement should also be conducted, along with an evaluation of whether the current content remains sufficient for students, including the reasons behind this assessment. Satisfaction levels should be gauged, and the identification of which modules require significant improvement, along with justifications, should be made. Consideration should be given to the initiative of reconstructing the modules based on student feedback, including the nature of the feedback received and the methods of reconstruction employed. An overview of the changes made to the content of the modules thus far should be provided, along with the frequency of updates.

The necessity of adding new modules alongside the current ones should be discussed, specifying which modules would be included and their importance to students. Finally, the relevance of the content of information literacy modules to students' needs should be assessed.

Finally, section F includes items designed to assess respondents' awareness and understanding of the elements of the ACRL Framework for Information Literacy for Higher Education and their application in teaching information literacy. This section is organised into two main parts; part 1 on general questions and part 2 particularly on each element of the framework. Part 1 aims to gather information on whether librarians recognize the ACRL's Framework for Information Literacy for Higher Education and their perspectives on its suitability for academic libraries in Malaysia. Part 2 on the other hand, intended to examine librarians' understanding of the need to determine and validate information created by different authorities, the characteristics of information sources including how and for whom they were created, the importance of giving credit to original ideas through proper attribution and citation, the process of asking increasingly complex or new questions for further exploration, the concept of multiple individuals exchanging ideas to foster new conversations and the act of information searching as a means of finding needed information would be appreciated.

3.3.7 Pilot Study

A pilot study was conducted on 1st March 2022 involving six academic librarians. The sample included one librarian from a public university in Kota Samarahan, Sarawak; one each from a private college and a private university in Kuching, Sarawak; and three others, two from public universities and one from a private university in Selangor, Malaysia.

The selection of these participants was intended to reflect the characteristics of the target population for the main study.

3.3.8 Content Validity of the Instrument

Content validity refers to the degree to which a research instrument fully captures all relevant aspects of the construct it is intended to measure. In this study, ensuring content validity is essential to accurately evaluate academic librarians' understanding and application of the TPACK Framework and the ACRL Framework for Information Literacy in Higher Education.

The development of the interview protocol was guided by a comprehensive review of the literature on information literacy and relevant educational frameworks. This literature review informed the formulation of interview questions, ensuring that the protocol captured current IL instructional practices among academic librarians and adequately represented all relevant dimensions of both the TPACK and ACRL frameworks.

To further establish content validity, the interview protocol was reviewed by a panel of three experts specializing in information literacy and educational technology. The panel consisted of experienced academic librarians and educators with in-depth knowledge of both the TPACK and ACRL frameworks, ensuring that the interview items were relevant, comprehensive, and aligned with the study's objectives.

The experts provided detailed feedback on the relevance, clarity, and comprehensiveness of the interview items. Specifically, they highlighted instances where the wording of questions was ambiguous, suggested greater alignment with the operational definitions of the TPACK domains, and identified areas of the ACRL Framework that had not been sufficiently addressed. In response, several questions were rephrased to improve

clarity and precision. At the same time, additional items were incorporated to capture overlooked aspects such as the integration of inquiry-based learning strategies (PK), the use of digital tools in IL instruction (TK), and the application of 'Authority Is Constructed and Contextual' in practice (ACRL Framework). These revisions strengthened the protocol by ensuring closer alignment with both theoretical constructs and the study's research objectives.

Following the expert review, a pilot test was conducted with a small group of academic librarians. The feedback and observations gathered during this phase were used to make final refinements to the interview protocol, ensuring that the questions were both comprehensive in scope and clearly understood by participants.

Through a systematic literature review, expert panel evaluation, and pilot testing, the interview protocol was carefully refined to ensure it accurately and comprehensively captured the constructs of interest. These steps were essential in establishing the content validity of the instrument and contributed significantly to enhancing the overall rigor and credibility of the study.

3.3.9 Reliability of the Study

Reliability refers to the consistency and stability of the measurements produced by a research instrument. In this study, establishing reliability is crucial to ensure that the data collected on academic librarians' understanding and application of the TPACK Framework and the ACRL Framework for Information Literacy in Higher Education are trustworthy, consistent, and capable of being replicated in similar research contexts.

To strengthen the reliability of the instrument, the interview protocol was pretested and refined through a pilot study. Feedback from the pilot, together with insights from the

expert review, informed revisions that improved the clarity, consistency, and alignment of the questions with the study's objectives. The convergence of findings from these two validation processes provides strong evidence that the interview protocol and procedures are reliable, producing stable and dependable data for the study.

Validity refers to the integrity and appropriateness of the research methods, as well as the extent to which the findings accurately reflect the data collected (Noble & Smith, 2015). Reliability, on the other hand, concerns the consistency and dependability of the analytical procedures applied (Noble & Smith, 2015). To uphold both validity and reliability in this study, all direct quotations from participants have been preserved in their original form, with the exception of minor clarifications made to improve the understanding of meanings that were unclear or ambiguous.

In addition, participants were asked to review the analysed data and interpretations, a process known as member checking as recommended by Creswell and Clark (2011). When participants confirm the accuracy of the researcher's interpretations, it serves as an important indicator of validity in qualitative findings. Furthermore, this study provides rich and detailed descriptions, which support transferability by enabling readers to assess the relevance of the findings to their own contexts.

3.3.10 Data Collection Procedures

The data collection process for this study was structured to obtain comprehensive insights into academic librarians' understanding and application of the TPACK Framework and the ACRL Framework for Information Literacy in Higher Education.

Data were collected through semi-structured interviews, guided by a protocol designed to capture qualitative insights into librarians' self-reported knowledge,

instructional practices, and their experiences and perspectives related to information literacy instruction.

A purposive sampling technique was employed to select academic librarians from public universities across Malaysia. Participants were invited to take part in the study through email communications sent to their institutional addresses. Each email included a detailed explanation of the study's purpose and procedures, along with the interview protocol attached for their reference.

The interviews were conducted over a six-month period, during which participants were given the flexibility to schedule sessions at their convenience. Interviews were held with individuals who had agreed to share detailed information about their information literacy (IL) instructional practices. All interviews were conducted via Zoom and were recorded with the participants' informed consent.

Interview recordings were transcribed and anonymised to ensure the protection of participants' identities. Prior to the interviews, participants were fully informed about the purpose of the study, their rights as participants, and the measures taken to maintain confidentiality. Informed consent was obtained from all participants before their involvement in the data collection process.

This study was reviewed and approved by the university's ethics committee to ensure compliance with ethical research standards. Participants were clearly informed about the purpose of the study, their rights as participants, and the procedures in place to maintain confidentiality. Informed consent was obtained from all participants prior to their participation in both the questionnaire and interview phases of the study.

One of the challenges encountered during data collection was the low response rate to the virtual interview invitations. To address this issue, follow-up reminder emails were sent to potential participants two weeks after the initial invitation. Additionally, coordinating interview times proved difficult due to participants' demanding schedules. This was mitigated by offering flexible scheduling options to accommodate their availability.

The data collection procedures were carefully planned and systematically executed to ensure the acquisition of high-quality data capable of offering a comprehensive understanding of the research topic. This approach enabled a robust analysis of academic librarians' knowledge and instructional practices in relation to established information literacy frameworks.

The researcher began the recruitment process by contacting academic librarians who were actively conducting information literacy (IL) classes or sessions during the study period. Initial invitations were sent via email to inform them about the interview and invite their participation. The interviews were conducted virtually via the Zoom platform between 1 November 2021 and 28 February 2022. Depending on the participants' language preferences, the interviews were conducted in either English or Malay.

All participants were verbally briefed on the study prior to the commencement of the interviews. They were informed in advance of their rights as research participants, and only after providing their consent did they sign the interview notification and consent form prepared by the researcher. Each interview lasted between 30 to 60 minutes and was audio-recorded with the participants' permission. Prior to each session, the researcher ensured that the recording equipment was functioning properly. Additionally, several preparatory steps were taken to facilitate the smooth and effective execution of the semi-structured interviews.

At the beginning of each interview, the researcher introduced herself and provided a clear explanation of the purpose of the study. Participants were then informed about the measures taken to ensure confidentiality, including how their identities would be protected throughout the research process. The researcher emphasized that their views and opinions were valuable and would contribute meaningfully to the study. Finally, permission was sought to take notes and audio-record the interview before proceeding with the session.

3.3.11 Data Analysis Approach

The data analysis approach in this study was structured to generate a comprehensive understanding of academic librarians' application of the TPACK Framework and the ACRL Framework for Information Literacy in Higher Education. The qualitative data were systematically analysed to address the research questions and provide meaningful insights into the librarians' instructional practices and theoretical understanding.

The qualitative data obtained from the interviews were analysed using thematic analysis, which involved a systematic process of coding and categorising the data to identify key themes and recurring patterns. To support the organisation and management of the data, Quirkos software was utilised, enabling a more structured, thorough, and efficient analysis process.

The interview transcripts were initially analysed using open coding to identify fundamental concepts and ideas emerging from the data. These initial codes were then grouped into categories based on similarities and recurring patterns. From these categories, broader themes were developed to encapsulate the core findings of the study. The categorisation process was guided by the TPACK and ACRL frameworks, ensuring that the themes remained aligned with the study's objectives and theoretical underpinnings.

To enhance the validity of the qualitative analysis, the researcher thoroughly reviewed the emerging themes and findings to ensure accuracy and alignment with the data. One of the key challenges encountered during the analysis was maintaining consistency in the coding process. This was addressed by independently coding a subset of the data and resolving any discrepancies through discussion to reach a consensus. The overall data analysis approach provided a robust and systematic framework for interpreting the findings. This comprehensive process enabled a deeper understanding of academic librarians' knowledge and instructional practices in relation to the TPACK and ACRL frameworks, thereby fulfilling the study's research objectives.

The qualitative data for this study, derived from semi-structured interviews, required transcription to convert the audio recordings into a readable format suitable for analysis. The transcription process was carried out meticulously to ensure that all data were accurately captured, minimizing the risk of researcher bias in selecting only preferred responses. Thematic analysis was employed to analyse the transcribed data, allowing for the identification of meaningful relationships and differences across the variables. The analysis was supported by Quirkos software, which facilitated the systematic organisation and coding of the data.

3.4 Phase Two: MOOC Design and Development

Massive Open Online Courses (MOOCs) have been widely adopted worldwide for a range of learning purposes, including career development, career transitions, college preparation, supplemental education, lifelong learning, and corporate training (edX, 2023). MOOCs are free online courses that offer accessible, affordable, and flexible opportunities

for individuals to acquire new skills and knowledge, regardless of their location or background (edX, 2023).

In the integration phase of this study, both the TPACK framework and the ACRL Framework for Information Literacy for Higher Education were applied to guide the development of the IL MOOC. The TPACK framework informed the alignment of technological tools, pedagogical strategies, and IL content, ensuring that instructional activities were not only accurate in terms of subject knowledge but also effectively supported by appropriate teaching methods and digital platforms. Concurrently, the ACRL Framework provided the conceptual foundation for structuring the MOOC modules, with each unit mapped to specific frames such as "Research as Inquiry" and *"Information Has Value."* This dual application of TPACK and ACRL enabled the integration of theory and practice, ensuring that the MOOC design was pedagogically sound, technologically enriched, and conceptually consistent with recognized IL standards.

An Information Literacy MOOC (IL MOOC) was developed specifically for the purposes of this study. The development process took place between 6th February 2022 and 8th September 2022, and the course was officially launched on the OpenLearning platform on 9th September 2022. The IL MOOC was designed to introduce learners to the core principles of information literacy and to foster the development of information-literate individuals. Through the course, students explored essential components of information literacy, including the identification and evaluation of various information resources, active participation in ongoing scholarly and professional conversations, and the application of strategic information search techniques.

This study integrates the ACRL Framework for Information Literacy for Higher Education in the development of the information literacy modules and employs the

University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric to assess the information literacy competency of students participating in the IL MOOC.

The IL MOOC consists of six modules, each designed in alignment with the six core elements of the ACRL Framework for Information Literacy for Higher Education. These modules are structured into six distinct units: (i) Authority is Constructed and Contextual, (ii) Information Creation as a Process, (iii) Information Has Value, (iv) Research as Inquiry, (v) Scholarship as Conversation, and (vi) Searching as Strategic Exploration. Each module is further enhanced by incorporating additional criteria identified through the qualitative interview data from the study's first phase, along with the integration of a self-directed learning approach to support learner autonomy and engagement.

3.4.1 About Information Literacy MOOC: Interpreting the ACRL's Framework for Information Literacy for Higher Education

The study began with the development of information literacy (IL) modules, where the integration of a guiding framework was considered essential to ensure a structured and pedagogically sound design. To support this process, the Framework for Information Literacy for Higher Education developed by the Association of College & Research Libraries (ACRL) was adopted to inform the creation of the IL MOOC modules. This framework is grounded in the belief that information literacy, as part of an educational reform movement, can only reach its full potential through the articulation of a more comprehensive and advanced set of core principles (Association of College & Research Libraries, 2016). According to Latham et al. (2019), the ACRL Framework provides flexibility, offering librarians multiple avenues to reimagine and innovate their approaches to IL instruction.

Accordingly, this study integrates the ACRL Framework for Information Literacy for Higher Education into the development of IL modules, which serve as the core content of an IL MOOC aimed at assessing students' information literacy competencies. In 2016, the Association of College & Research Libraries (ACRL) formally adopted the Framework for Information Literacy for Higher Education. Since its introduction, the framework has marked a paradigmatic shift, reflecting evolving approaches in how academic librarians conceptualize, teach, and assess information literacy within the context of higher education (Gross et al., 2022).

(i) Frame 1: Authority is constructed and contextual

The concept Authority is Constructed and Contextual highlights that the credibility of information sources is shaped by how different communities recognize and value them, and that this perception of authority can shift depending on the context in which the information is used (Association of College & Research Libraries, 2016).

The first frame of the ACRL Framework served as the foundation for Unit 1 of the IL MOOC, titled *Authority is Constructed and Contextual*. This unit guides learners in exploring how different types of information sources are evaluated, how authoritative voices are recognized within various fields, and how the concept of authority can differ depending on the context in which information is produced and used.

In this unit, students are guided to recognize the types of information that best suit their specific needs, such as topic, subject area, or focus, and to evaluate and choose appropriate sources, whether scholarly journals, news articles, blogs, or social media platforms. They are also encouraged to identify and select relevant titles from these sources to support their information-seeking goals.

Students are also encouraged to pay close attention to specific details when evaluating information from any source. Before engaging with the content, they should consider key aspects such as the author's background (e.g., Who is the author?), their qualifications (e.g., Do they have academic credentials or relevant experience in the field?), and their overall authority (e.g., Have they completed formal education or gained substantial practical expertise related to the topic?).

As students engage with the retrieved information, they should also be able to identify how certain elements reflect the author's authority. This includes examining how the author's educational background or personal experience shapes their discussion, recognizing any limitations in the author's expertise, whether grounded in data or personal perspective and considering the context in which the information is presented, including any potential biases that may arise.

When selecting sources for research projects or assignments, students are encouraged to critically evaluate the authority behind the information. This includes developing a clear understanding of their research topic, considering whether the author is qualified to make the claims presented, assessing if the author's expertise aligns with the needs of their research, and determining the overall credibility and reliability of the source based on the author's authority.

(ii) Frame 2: Information creation as a process

The concept *Information Creation as a Process* highlights that information is produced in many different formats and shared through a variety of channels, each shaped by distinct purposes, methods, and audiences (Association of College & Research Libraries, 2016).

The second frame of the ACRL Framework, *Information Creation as a Process*, forms the basis of Unit 2 in the IL MOOC. This unit invites students to explore how information is created, the different formats it can take, and how messages are shaped and communicated through various channels.

In this unit, students are encouraged to compare the features of various types of publications to better understand the strengths, limitations, and purposes behind how different kinds of information are created and shared.

Students are also encouraged to examine various aspects of information by considering factors such as ease, time, research, editing, and length. **Ease** refers to how simple or complex they perceive the process of creating or publishing the information to be. **Time** involves estimating how long it might take to produce each type of content. **Research** focuses on assessing the depth of investigation or evidence they believe supports the information. **Editing** encourages students to consider how thoroughly the content may have been revised or reviewed before publication. Finally, **length** invites them to reflect on the appropriate amount of content required for each type of information source

(iii) Frame 3: Information has value

Information Has Value explores the many ways information holds significance whether for educational, social, or political purposes, highlighting how its worth can vary depending on how it is used and by whom (Association of College & Research Libraries, 2016).

The third frame of the ACRL Framework, *Information Has Value,* forms the foundation of Unit 3 in the IL MOOC. In this unit, students explore the different ways

information holds value, whether intellectual, social, legal, or economic, and are encouraged to understand the responsibilities that come with using and sharing information ethically.

This unit helps students recognize the value of the information they find and encourages them to consider how legal and socioeconomic factors can shape its creation and distribution. It also emphasizes the importance of evaluating the accuracy and credibility of different sources. Students are expected to describe the content of each source, assess its reliability, and support their evaluations with clear, well-reasoned arguments

(iv) Frame 4: Research as inquiry

Research as Inquiry emphasizes the importance of curiosity in the research process, recognizing that research is not a one-time event but an ongoing, evolving process. It involves asking meaningful questions and seeking answers by gathering and analysing new information along the way (Association of College & Research Libraries, 2016).

This frame is integrated into Unit 4 of the IL MOOC, titled Research as Inquiry. Designed as a research preparation guide, the unit supports students in navigating the early stages of their research journey. It emphasizes how the questions they ask shape the direction of their inquiry and influence the types of information they uncover, whether for broad overviews or more focused investigations. The unit also guides students in making meaningful connections between the information they find and the questions they have developed around their chosen topic.

This unit guides students in identifying a broad area of interest and using relevant keywords to begin their search for information. Students are encouraged to evaluate the volume and relevance of search results across different platforms, helping them refine their approach. Based on these initial findings, they then formulate focused research questions to

narrow the scope of their study. This process is repeated, allowing students to revisit and adjust their search strategies as their understanding of the topic deepens.

(v) Frame 5: Scholarship as conversation

Scholarship as Conversation highlights the ongoing exchange of ideas among scholars, researchers, and professionals. It reflects how different perspectives and interpretations contribute to a larger academic dialogue, often leading to new insights, deeper understanding, and the development of knowledge over time (Association of College & Research Libraries, 2016).

This ACRL frame is embedded in Unit 5 of the IL MOOC, titled Scholarship as Conversation. In this unit, students learn how to actively engage in academic discussions by contributing their own ideas, conducting independent research, and thoughtfully analysing the work of others. It also supports their development as participants in ongoing scholarly conversations within their chosen fields.

In this unit, students explore how to identify sources that contribute meaningfully to ongoing academic conversations within a particular area of interest or expertise. These conversations can take place across a range of formats, from scholarly articles and videos to blogs, discussion forums, and even social media platforms. Students also develop skills for engaging in these dialogues effectively, such as reading and reflecting on relevant literature, attending expert talks, and participating in discussions that allow them to contribute their own informed perspectives.

(vi) Frame 6: Searching as strategic exploration

Searching as Strategic Exploration emphasizes the importance of using thoughtful and flexible strategies to locate information across a variety of formats. It encourages

learners to make use of different tools and platforms, adapting their search methods as needed to find the most relevant and reliable sources (Association of College & Research Libraries, 2016).

The final frame of the ACRL Framework, *Searching as Strategic Exploration*, is introduced in Unit 6, the concluding module of the IL MOOC. This unit helps students develop effective strategies for finding relevant information and deepening their understanding of the search process. It also familiarizes them with a range of search platforms and tools used to access and retrieve information efficiently.

Before applying the search strategies introduced in this unit, students begin by identifying a topic of interest. They then develop suitable keywords to support both broad and focused searches, including related terms that reflect different aspects of the topic. Once the keywords are refined, students use them to explore relevant resources through the library database and other search platforms, depending on the tools available.

3.4.2 Development of Information Literacy MOOC Content

In developing the Information Literacy MOOC, the ACRL Framework for Information Literacy for Higher Education (2016) served as the central content foundation. Each of the six frames was systematically mapped onto a corresponding MOOC unit, ensuring that the instructional design addressed both conceptual understanding and practical application of information literacy skills. For example, the frame "Authority Is Constructed and Contextual" informed the first unit, which guided students in evaluating the credibility of authors and sources within different contexts. The second unit, aligned with *"Information Creation as a Process,"* emphasized how different formats and purposes shape the way information is produced and used. Similarly, *"Information Has Value"* was embedded in the

third unit through lessons on plagiarism, copyright, and ethical citation practices. The iterative and question-driven nature of research reflected in **"**Research as Inquiry" guided the fourth unit, while the fifth unit operationalized **"**Scholarship as Conversation" by having students trace scholarly dialogues through citation networks. Finally, the sixth unit translated *"Searching as Strategic Exploration"* into hands-on exercises involving keyword development, Boolean logic, and advanced search strategies. This systematic integration of the ACRL frames into the MOOC modules ensured that the content was conceptually robust, pedagogically coherent, and aligned with internationally recognized IL standards.

(i) Drafting of course units

Drafts were developed for each unit to serve as scripts for both the promotional and lecture videos. The promotional video script introduced the purpose of the IL MOOC, provided an overview of all course units, and explained how the course supports learners in developing information literacy skills. Each unit draft contained content and examples aligned with the unit's focus, grounded in the theoretical principles of the ACRL Framework for Information Literacy for Higher Education. To enhance the quality and delivery of the videos, existing video materials were reviewed for inspiration and guidance on presentation style. This drafting phase involved several rounds of revision and was completed over a period of 46 days, from 6th February to 23rd March 2022.

(ii) Recording of lecture videos

The recording of lecture videos began on 23rd March 2022 and continued until 19th May 2022, with weekly sessions coordinated in collaboration with the E-Learning Committee at the Centre for Applied Learning and Multimedia (CALM), Universiti Malaysia Sarawak (UNIMAS). During this period, accompanying slides were also

developed for each unit to support and enhance learners' understanding by providing clear visual aids alongside the video content.

(iii) Assignment-based learning assessment

Assignments were created for each unit as a means of assessing student learning, and are submitted to the E-Learning Committee on 17th June 2022. Designed to align closely with the content of each unit, these assessments aimed to measure learners' competency in information literacy skills upon the completion of each module.

(iv) Quizzes and further reading

Quizzes were designed as part of the Learning Activity section in the IL MOOC, with questions carefully aligned to the topics explored in each unit. This section encourages active learner engagement by prompting participants to reflect on the content and share their insights with peers. To further support understanding and aid in completing assignments, supplementary readings were provided at the end of each unit. All related materials were submitted to the E-Learning Committee on 4th July 2022.

3.4.3 Availability and Accessibility of the IL MOOC

Following final revisions and approval by the E-Learning Committee, the IL MOOC was officially launched on the OpenLearning platform on 9th September 2022. Initially, the course was made available until 31st October 2022, aligning with the original two-month plan for the quantitative phase of the study. However, recruiting participants proved to be more challenging than anticipated. To address this, the course availability was extended until 31st December 2022, allowing additional time to attract more participants and enable them to complete the course at their own pace.

Table 3.1: Link to IL MOOC

Name of MOOC	Link
Information Literacy	https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1

Table 3.2: Phases in IL MOOC Development

Development Phase of the IL MOOC	Duration
Scripts for individual units	6th February 2022 – 23rd March 2022
Unit outlines, storyboards (for lecture video production and editing), quizzes (as learning activities), and assignments (as learning assessments)	11th February 2022 – 22nd March 2022
Lecture video recording	23rd March 2022 – 19th May 2022
Presentation slides for lecture videos	29th March 2022 – 19th May 2022
Assignments as Learning Assessments	Submitted to E-Learning committee on 17th June 2022
Quizzes (Learning Activities) and Further Reading Materials	Submitted to E-Learning committee on 4th July 2022
Availability of the Information Literacy MOOC on the OpenLearning Platform	9th September 2022



Figure 3.2: Unit 1 Summary of IL MOOC

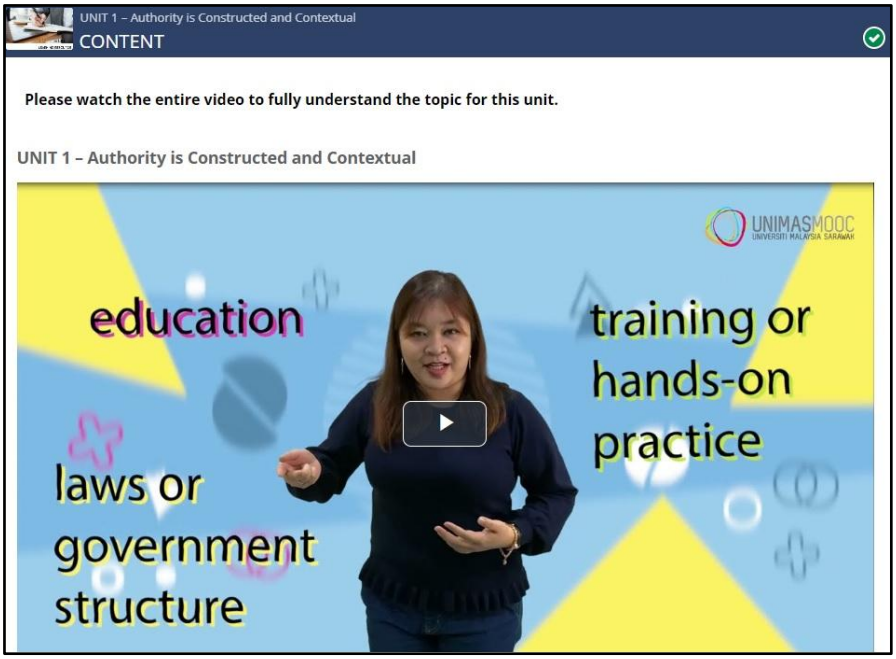


Figure 3.3: Unit 1 Video lecture



Figure 3.4: Comments for Unit 1 lecture video

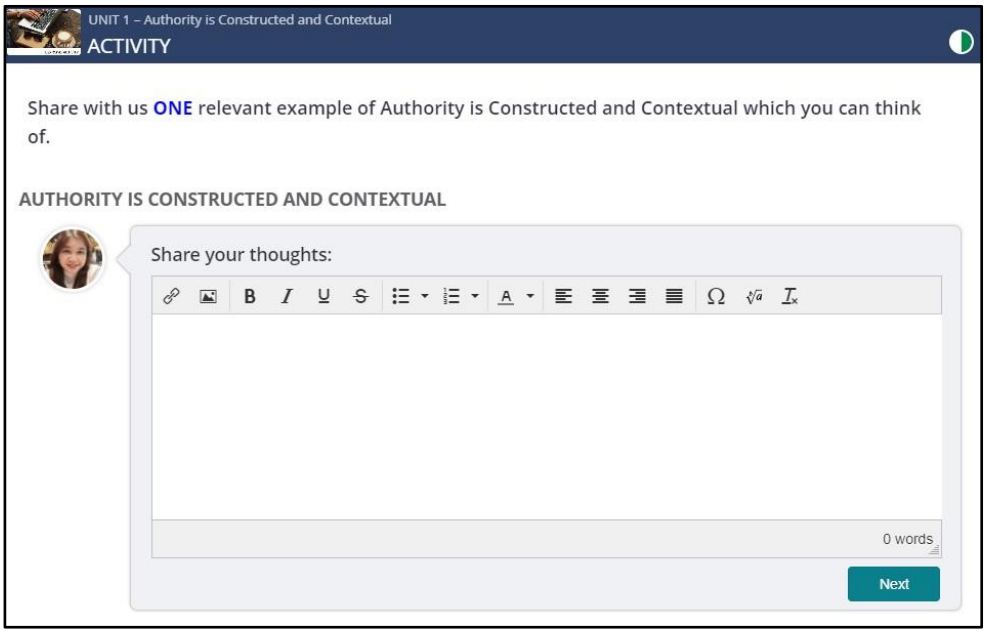


Figure 3.5: Unit 1 Learning Activity (Quiz)

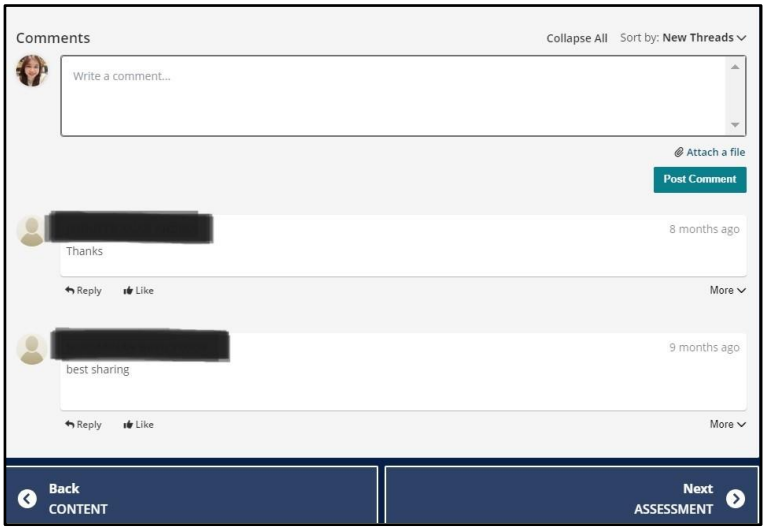


Figure 3.6: Comments for Unit 1 Activity (Quiz)



Figure 3.7: Unit 1 Assessment

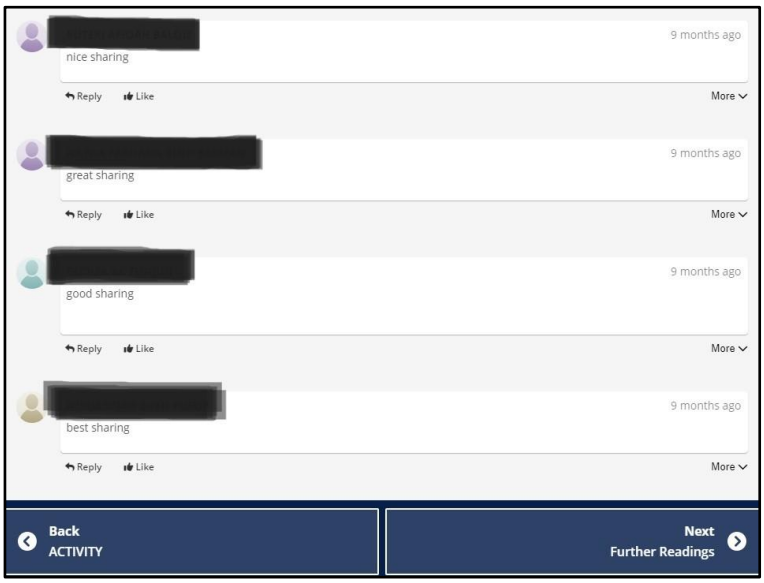


Figure 3.8: Comments for Unit 1 Assessment (Assignment)

3.5 Assessment of Information Literacy Competencies Using the University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric

Assessing information literacy (IL) competencies is essential for understanding an individual's ability to effectively locate, evaluate, and use information. In this study, students' learning outcomes from their participation in the IL MOOC were evaluated using the University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric. This tool was used to assess students' IL competencies and classify them into three levels: developing, proficient, or advanced. The results also offer valuable insights into the effectiveness of the instructional strategies used by academic librarians. Originally designed for both individual and program-level IL instruction at UMD libraries, the rubric has significantly enhanced teaching practices through its iterative and student-centred approach to assessment, resulting in more meaningful evaluations (Gammons & Inge, 2017). Furthermore, it has fostered a more collaborative and compassionate community of practice, supporting librarians in working together to reflect on and improve their instructional methods (Gammons & Inge, 2017).

This study employed the UMD Libraries Information Literacy Dispositions Rubric to examine learners' dispositions, knowledge practices, and developmental levels after completing the IL MOOC. Grounded in the ACRL Framework, the rubric supports library instructors in integrating its principles into their teaching, fostering a deeper understanding and more effective application of the framework in instructional practice (Gammons & Inge, 2017).

UMD Libraries Information Literacy Dispositions Rubric			
	Developing (1)	Proficient (2)	Advanced (3)
Authority is Constructed and Contextual			
Understands importance of evaluating information and demonstrates self-awareness of individual biases	Writer acknowledges information evaluation as concept	Writer articulates the rationale or importance of evaluating the credibility of a source	Writer demonstrates the value of evaluating a source, and indicates an understanding of the role of self-bias in the process
Information Creation as Process			
Matches an information need with an appropriate resource	Writer acknowledges that different resources are available for research	Writer identifies a type, purpose, or title of a specific resource	Writer articulates how a specific resource addresses their individual information need
Information has Value			
Respects the original ideas of others	Writer acknowledges attribution methods	Writer articulates the value of attribution	Writer articulates the importance of attribution and identifies resources for help/attribution methods.
Research as Inquiry			
Values intellectual curiosity in developing questions; Consider research as open ended exploration and engagement with information	Writer acknowledges research as concept	Writer acknowledges research as process	Writer articulates the iterative process of developing / defining a research question.
Scholarship as Conversation			
Seeks out conversations taking place in their research area	Writer acknowledges that there are different points of view on a topic	Writer articulates the need to incorporate different points of view	Writer demonstrates the value of incorporating different points of view
Searching as Strategic Exploration			
Designs and refines search strategies as necessary	Writer acknowledges search strategies for narrowing or broadening	Writer articulates specific search strategies (such as key terms, subject thesaurus, etc...)	Writer demonstrates awareness of search strategies and how they can aid in student research
Seeks guidance from experts such as librarians, researchers, and professionals	Writer acknowledges assistance available	Writer acknowledges assistance available and identifies ways to get in contact with appropriate professionals	Writer articulates specific ways appropriate professionals can support students
Other			
Comfort with UMD library website, physical spaces, or library instructor			
Other			

Figure 3.9: University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric (Gammons & Inge, 2017)

The rubric applies three levels of competency, namely developing, proficient, and advanced across all frames of the ACRL Framework, each representing key dimensions of information literacy (IL) skills and understanding. The following section presents an overview of students' dispositions and knowledge practices as they relate to each of the ACRL Framework's core concepts.

(i) Authority is constructed and contextual

This frame highlights the importance of critically evaluating information while being mindful of one's own biases. Students are considered to be at the developing level of

information literacy (IL) competency if they show a basic understanding that evaluating information is an essential concept. Those at the proficient level are able to explain the reasoning behind assessing a source's credibility and relevance. Students who reach the advanced level not only recognize the value of evaluation but also demonstrate an awareness of how personal biases can influence their judgment during the process.

(ii) Information creation as a process

The second frame focuses on aligning specific information needs with appropriate sources. Students at the developing level demonstrate awareness that a variety of research materials exist. Those at the proficient level are able to identify the type, purpose, or title of a resource that suits their needs. At the advanced level, students can clearly explain how a particular source effectively addresses their specific information needs.

(iii) Information has value

This frame underscores the importance of giving proper credit to the original ideas of others. Students at the developing level show a basic understanding of attribution strategies. At the proficient level, they can explain why acknowledging sources is important in academic and professional contexts. Those at the advanced level not only understand the significance of attribution but can also identify appropriate resources to support proper citation and ethical information use.

(iv) Research as inquiry

The fourth frame highlights the role of intellectual curiosity in developing thoughtful questions and approaching research as an open-ended journey of discovery and engagement with knowledge. Students at the developing level demonstrate a basic awareness of research as a concept. Those at the proficient level understand research as a process that involves

multiple steps. At the advanced level, students can articulate research as an iterative process, one that involves refining ideas and continually shaping or redefining the research focus

(v) Scholarship as conversation

Scholarship as Conversation encourages students to engage with the ongoing dialogue within a field of study. At the developing stage, students begin to recognize that multiple perspectives exist on a given topic. Those at the proficient level understand the value of drawing from a range of viewpoints to inform their work. At the advanced level, students actively emphasize the importance of incorporating diverse perspectives to enrich their understanding and contribute meaningfully to the scholarly conversation.

(vi) Searching as strategic exploration

This final frame focuses on building and refining effective research strategies. At the developing stage, students are beginning to understand how to adjust their search by narrowing or broadening the scope. Proficient students can describe specific techniques, such as using keywords, Boolean operators, or subject-specific thesauri. Those at the advanced level not only understand these strategies but also apply them purposefully to improve the quality and relevance of their research.

3.6 Phase Three: Learner Engagement, IL Competencies, and Course Completion Rate

This study adopts a quantitative approach, specifically through the use of correlational research. Correlational research aims to explore the relationship between variables, examining whether changes in one variable are associated with changes in another (Ghanad, 2023). In this design, researchers do not manipulate variables but instead observe

and analyze natural associations—for example, investigating whether there is a link between diet and anxiety. Unlike experimental research, which involves controlled testing and hypothesis verification, correlational research is descriptive in nature. It helps identify the strength and direction of relationships, which may be positive, negative, or show no correlation at all (Ghanad, 2023).

3.6.1 Research Design

The quantitative phase of this study aims to evaluate students' levels of information literacy competency following their participation in the Information Literacy (IL) Massive Open Online Course (MOOC). This phase focuses on measuring how effectively the MOOC supports the development and enhancement of students' information literacy skills.

In this study, the quantitative phase is conducted through the use of an assessment rubric, which serves as a structured tool for evaluating students' work and their learning experiences during Information Literacy (IL) sessions. As Moskal (2000) explains, rubrics are descriptive scoring schemes designed to guide the analysis of student performance. Rooted in principles of learning assessment, motivation, and constructivist theory (Oakleaf, 2008; Oakleaf, 2009), rubrics outline key components of a task and define levels of achievement associated with specific outcomes (Hafner, 2009, as cited in Oakleaf, 2009). In this study, the rubric is used to assess students' IL competencies in relation to real-world learning activities and assignments. It also serves as a valuable tool for academic librarians, enabling them to assess students' skills more objectively and make informed decisions about the most effective methods of learning support (Oakleaf, 2007; Arter & McTighe, 2001, as cited in Rinto, 2013).

The research design for the quantitative phase was thoughtfully developed to assess students' information literacy competencies through their engagement with the IL MOOC. Using assessment rubrics as the primary evaluation tool, this phase aims to generate meaningful insights into the extent to which participants developed their information literacy skills over the course of the MOOC.

3.6.2 Population and Sampling Techniques

The main objective of this phase of the study is to examine the correlation between learner engagement and course completion rates in the IL MOOC, as well as to explore the relationship between students' information literacy (IL) competencies and their MOOC completion outcomes. To achieve this, participants are drawn from students currently enrolled in any of the 20 public universities across Malaysia. Eligible participants include those pursuing various levels of education, such as Diploma, Bachelor's, Master's, or Doctoral degrees, across all disciplines, with no restrictions based on field of study.

The quantitative phase of this study focuses on evaluating the information literacy skill levels of participants enrolled in the Information Literacy (IL) Massive Open Online Course (MOOC). This section describes the target population and the sampling methods employed to ensure the selection of a representative and reliable group of participants for meaningful analysis.

The target population for this study comprises students who are enrolled in the IL MOOC developed by the researcher. This group includes both undergraduate and postgraduate students from a wide range of academic disciplines who are actively engaging with the course content.

The researcher reached out to all 20 public university libraries in Malaysia, selecting these institutions based on their relevance to the study's context, objectives, and timeline. This purposeful selection helped ensure that the research remained focused, manageable, and aligned with the overall goals of the study.

The sampling frame for this study includes all students who were enrolled in the IL MOOC during the second half of 2022. Data on these participants, including their demographic details and course participation status were obtained through the MOOC's administrative records.

A purposive sampling technique was used to intentionally select participants who met specific criteria aligned with the objectives of the study. In this case, participants were chosen from among active students regardless of discipline or level of study who were currently enrolled at public universities in Malaysia. From each university, a sample was then drawn, resulting in a total of 300 participants for the study.

A sample size of 300 participants was determined to ensure adequate statistical power for identifying meaningful patterns and relationships in information literacy skills. This number was derived through power analysis, targeting a 95% confidence level and a 5% margin of error to support the reliability and validity of the findings.

Participants were recruited through a multifaceted outreach strategy, including email invitations sent to university students, lecturers, and library staff; WhatsApp messages targeting both students and lecturers; social media announcements; and promotional posters shared with librarians and selected individuals via email and WhatsApp. To be eligible, participants had to be at least 18 years old and currently enrolled at any Malaysian public university, regardless of their academic field or level of study.

A convenience sampling method was adopted based on the accessibility of the university student population. While voluntary participation guided the recruitment process, no fixed sample size was set, as securing a sufficient number of participants for a study involving a Massive Open Online Course (MOOC) can be particularly challenging. Factors such as high attrition rates, voluntary participation, data privacy concerns, technical limitations, varying levels of motivation, and time constraints often impact participant availability. Students were selected based on their willingness and availability to take part in the study. Once recruited, participants were randomly assigned to either the experimental or control group using a computer-generated randomization sequence.

One of the challenges faced during the study was ensuring a strong response rate from selected participants. To encourage participation, follow-up reminders were sent periodically. Another concern was the potential for sampling bias, particularly due to varying levels of student engagement with the MOOC.

Participants were fully informed about the purpose of the study, their right to withdraw at any time, and the confidentiality of their responses. Informed consent was obtained prior to data collection to ensure ethical compliance. The population and sampling strategies for the quantitative phase were carefully planned to secure a representative sample of IL MOOC participants.

3.6.3 Unit of Analysis

In the quantitative phase of this study, the unit of analysis is the individual student enrolled in the Information Literacy (IL) Massive Open Online Course (MOOC). This section defines the unit of analysis and highlights its importance in assessing students' information literacy competencies at the individual level.

The unit of analysis in this study is the individual student enrolled in the IL MOOC. Each student's information literacy competency is assessed and analysed based on their performance in course assessments, including learning activities and assignments completed within each module.

The individual student was selected as the unit of analysis to enable the assessment of information literacy competency on a per-student basis. This focus allows the study to generate detailed insights into how participation in the MOOC influences each learner's skill development, while also identifying variations across different demographic groups.

Data is be collected from each student via the OpenLearning platform, where individual profiles store participants' activity and performance records. Students' information literacy competencies will be assessed using the UMD Information Literacy Dispositions Rubric. In addition, performance metrics such as assignment scores and participation levels within the MOOC will be analyzed to provide a more comprehensive understanding of each student's competency development.

The data analysis focuses on evaluating each student's performance in the IL MOOC by examining their participation in learning activities and completion of assignments to determine their level of information literacy competency. Descriptive statistics will be used to summarize overall trends and performance across the sample, while inferential statistical tests such as t-tests and ANOVA are employed to explore differences in competency levels based on demographic characteristics and course engagement metrics.

One potential challenge in this phase is maintaining the consistency and accuracy of data collected from individual students. To mitigate this, a standardized assessment tool will

be used, and data validation procedures will be implemented to ensure the completeness and reliability of responses.

Ethical considerations for this study include ensuring the confidentiality and anonymity of all student data. Informed consent is obtained from each participant prior to data collection, and all responses will be anonymized to safeguard their privacy throughout the analysis process.

In this study, the individual student serves as the unit of analysis, allowing for a detailed examination of how participation in the IL MOOC impacts information literacy skills competency. By focusing on individual learners, the study aims to generate precise, evidence-based insights into the effectiveness of the MOOC in supporting the development of information literacy skills.

3.6.4 Data Collection Techniques

Quantitative research provides a range of techniques for data collection, and in this study, assessment rubrics are used as the primary tool. This method was chosen for its practical application in evaluating information literacy instruction at the program level. It also supports the need for a structured, evidence-based approach to assessment while aligning with the principles of the ACRL Framework (Gammons & Inge, 2017).

The researcher carefully reviews each student's responses to the learning activities and evaluates their performance on assignments, determining the most appropriate category and competency level through a consensus-based approach. The assessment, based on the University of Maryland Disposition Rubric (UMD Rubric), focuses on students who have actively engaged with the IL modules and aims to provide meaningful insights into their information literacy competencies, guided by the six frames of the ACRL Framework for

Information Literacy for Higher Education: *Authority Is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration*. In addition to assessing competency levels, this process also helps to evaluate the effectiveness of self-directed learning as an instructional approach within the context of information literacy education.

3.6.5 Development of Research Instrument

The research instrument used in the quantitative phase of this study is specifically designed to measure students' information literacy competency as demonstrated through their participation in the Information Literacy Massive Open Online Course (IL MOOC). This section outlines the development of the instrument, detailing the processes involved in its design, validation, and pilot testing to ensure its reliability and effectiveness.

The research instrument used in this study is the University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric, a structured tool designed to assess students' information literacy competency through their participation in the IL MOOC. The rubric features three levels of competency: Developing, Proficient, and Advanced, applied across all six frames of the Framework for Information Literacy for Higher Education. Each frame represents distinct aspects of information literacy skills and knowledge practices, guiding the evaluation of students' dispositions. These frames include: *Authority is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration.*

The constructs used in the assessment rubric were adopted from the study by Gammons and Inge (2017), which is grounded in the key principles of the Framework for

Information Literacy for Higher Education. These constructs serve as guiding dimensions for evaluating student competencies in information literacy. They include: *Authority is Constructed and Contextual,* which emphasizes the ability to assess the credibility of sources; *Information Creation as a Process,* which highlights an understanding of different formats and the purposes they serve; *Information Has Value,* which focuses on the ethical use of information and respect for intellectual property; Research as Inquiry, which reflects the iterative nature of research and the development of meaningful questions; Scholarship as Conversation, which views research as an ongoing dialogue among scholars; and *Searching as Strategic Exploration*, which refers to the ability to refine search strategies and seek appropriate guidance. Together, these constructs offer a comprehensive framework for assessing students' information literacy development, making them especially relevant for research focused on instructional design and competency-based assessment.

These constructs provide a valuable framework for interpreting student learning outcomes in this study, which evaluates information literacy competency among participants of the IL MOOC. The MOOC is designed to enhance students' abilities to locate, evaluate, and use information effectively. As such, assessing whether students develop competencies aligned with the framework's constructs is essential. For example, evaluating how students critically assess the credibility of sources *(Authority is Constructed and Contextual)* or how effectively they formulate and refine research strategies *(Searching as Strategic Exploration)* offers meaningful insights into their learning progress. Furthermore, by analyzing students' engagement with course content, participation in discussions, and quiz performance, the study captures how their competencies evolve in relation to the framework's core dimensions.

The study by Gammons and Inge (2017) also offers a valuable methodological approach for assessing information literacy competency, particularly through the use of rubric-based evaluations and qualitative student reflections. Their research introduced the 'a-ha moment' assessment, which encouraged students to describe their most meaningful learning experience. These reflections were then analysed and categorized according to the ACRL Framework constructs. This student-centred approach is especially relevant to the present study, as it aligns with the goal of examining students' self-reported experiences and their engagement with the IL MOOC content.

Additionally, by comparing competency levels across the various MOOC units, the study explores how students engaged with different learning activities and whether these patterns of engagement align with their perceived growth in information literacy skills.

3.6.6 Research Instrument

The research instrument used in the quantitative phase of this study is the University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric, developed to assess students' competencies in information literacy. This section outlines the design and content of the rubric, as well as its application in evaluating the impact of students' participation in the Information Literacy (IL) Massive Open Online Course (MOOC).

The use of the UMD disposition rubric in this study provides a structured approach to evaluating student performance, particularly in determining whether students demonstrate developing, proficient, or advanced levels of information literacy competency. This aligns with the study's objective of assessing the effectiveness of a self-directed learning approach integrated with technology in enhancing information literacy skills. The rubric also supports the interpretation of variations in student engagement and competency development,

offering potential insights into factors that influence MOOC completion rates and learning behaviours. The rubric incorporates three levels of competency: Developing, Proficient, and Advanced, applied across the six core frames of the Framework for Information Literacy for Higher Education. Each level defines specific IL skills and competencies, while the six frames, i.e. *Authority is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration* that capture students' dispositions and knowledge practices in relation to key information literacy concepts.

By incorporating ACRL constructs and student-centred assessment approaches, this study offers a more comprehensive evaluation of information literacy competency within a MOOC environment. Through the use of this framework, the study examines how effectively students develop IL skills through self-directed online learning, while also evaluating the instructional strategies employed throughout the course. This approach moves beyond traditional standardized testing, providing meaningful insights into how students engage with and apply information literacy concepts in real-world academic and personal contexts.

3.6.7 Pilot Study

A pilot study was carried out prior to the full implementation of the quantitative phase to evaluate the feasibility, reliability, and validity of the research design, instruments, and procedures. This preliminary phase aimed to identify potential challenges and refine the methodology to ensure a smooth and effective data collection process. The pilot involved a small group of students (n=8) enrolled in the Information Literacy Massive Open Online Course (IL MOOC), providing an opportunity for the researcher to assess the suitability and

effectiveness of the University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric in measuring students' competency levels.

The University of Maryland Disposition Rubric (UMD Rubric), adopted from a study by Gammons & Inge (2017), was employed during the pilot study to assess students' engagement with the IL modules. Its adoption was justified by its strong alignment with the six frames of the ACRL Framework for Information Literacy for Higher Education and its established use in evaluating IL competencies. In the pilot phase, the rubric was applied to a small group of participants to examine its clarity, applicability, and consistency. The findings from this process informed minor refinements and confirmed the rubric's suitability for use in the main study, thereby enhancing the validity and reliability of the assessment.

The data collection procedures were also refined during the pilot phase to minimize potential technical issues and ensure a smoother implementation process. Conducting the pilot study allowed the researcher to enhance the reliability and validity of the quantitative phase, helping to ensure that the final data collection would produce meaningful and accurate insights into students' information literacy competencies.

3.6.8 Content Validity of the University of Maryland (UMD) Assessment Rubric

Content validity refers to the degree to which a research instrument thoroughly and accurately captures the construct it is designed to assess. In the context of this study, establishing content validity is essential to ensure that the University of Maryland (UMD) Libraries Information Literacy Dispositions Rubric effectively measures students' information literacy competencies as demonstrated through their participation in the Information Literacy (IL) Massive Open Online Course (MOOC). This section outlines the steps taken to establish the rubric's content validity.

The key construct measured in this study is students' information literacy competency, which encompasses their ability to identify information needs, evaluate the credibility of sources, and apply ethical standards in the use of information. This construct is central to assessing the effectiveness of the IL MOOC in fostering the development of these essential academic and lifelong learning skills.

The University of Maryland (UMD) Libraries developed the Information Literacy Dispositions Rubric as part of a broader initiative to shift from a traditional, skills-based assessment model to one that emphasizes student engagement and deeper learning. Previously, their library instruction program relied on standardized assessments focused primarily on basic search functions, such as the use of Boolean operators. While effective for measuring technical proficiency, this approach fell short in capturing the more complex, reflective aspects of information literacy, such as critical thinking, source evaluation, and ethical information use. Recognizing these limitations, UMD librarians set out to create a more holistic and meaningful assessment tool, one that aligns with the ACRL Framework for Information Literacy for Higher Education and supports a more student-centred evaluation process.

The content validity of the University of Maryland Disposition Rubric (UMD Rubric) is established through its alignment with the ACRL Framework for Information Literacy for Higher Education. Each developmental level in the rubric, from emerging to mastery, is explicitly mapped to the six frames of the framework: *Authority is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration*. This alignment ensures that the rubric accurately represents the essential constructs of information literacy as defined by the ACRL Framework.

The developmental descriptors are designed to reflect progressively advanced competencies within each frame, providing sufficient coverage and granularity to assess students' growth in information literacy skills. When applied in the context of the information literacy MOOC, the rubric enables the systematic evaluation of student competencies by measuring the extent to which learners demonstrate dispositions and practices central to information literacy. This approach ensures that the assessment is both theoretically grounded and practically relevant for identifying varying competency levels among students engaging with the information literacy modules.

The UMD Rubric demonstrates strong content validity. Its categories and performance levels are appropriate, representing the critical dimensions of information literacy as theorized in the ACRL Framework, and sufficient, offering an adequate range to capture learners' actual skill development for assessing the information literacy competencies of students participating in the information literacy MOOC.

3.6.9 Reliability of the University of Maryland (UMD) Assessment Rubric

Reliability refers to the extent to which an instrument consistently produces stable and dependable results when measuring the same construct under similar conditions. In the context of this study which evaluates students' information literacy competencies through their participation in the Information Literacy (IL) Massive Open Online Course (MOOC) ensuring high reliability is crucial for generating accurate, consistent, and reproducible findings.

To ensure the reliability of the Information Literacy Dispositions Rubric in this study, several strategies were implemented to support consistent and stable assessment outcomes. Since the research focuses on evaluating students' information literacy competencies and

engagement within a MOOC environment, the use of a structured rubric with clearly defined competency levels (Developing, Proficient, and Advanced), which offers a systematic and standardized approach for assessing student reflections and learning outcomes. To ensure reliability, a norming process was implemented to maintain consistency in evaluating student responses. Before coding, norming sessions were conducted in which sample responses were reviewed and interpretations of the rubric criteria were examined. Through this collaborative process, ambiguities in the rubric descriptors were clarified, and consensus was established on the application of specific indicators of the University of Maryland Disposition Rubric (UMD Rubric). As a result, the rubric was applied consistently and accurately, reducing subjective bias and supporting reliable classification of student responses across evaluators.

Furthermore, the structured rubric used in this study is adapted from the University of Maryland (UMD) model, ensuring alignment with the ACRL Framework for Information Literacy for Higher Education. To further enhance reliability, example responses were developed for each rubric category, providing clear reference points to guide the researcher in making consistent and objective evaluations throughout the assessment process.

To maintain the reliability of the instrument throughout the data collection process, an iterative refinement approach was adopted. Student responses were regularly reviewed to assess whether any adjustments to the rubric were needed to enhance accuracy and ensure continued alignment with the study's objectives. This ongoing evaluation allowed the rubric to remain responsive and adaptable to the dynamics of the MOOC learning environment.

Additionally, standardized digital data collection methods were adopted to improve the accuracy and organization of responses. Building on UMD's transition from Twitter-based reflections to more structured survey formats, this study collected data on students'

information literacy competencies through their responses to learning activities and performance on assignments within the IL MOOC. This approach helped minimize inconsistencies that might arise from varied data collection methods, ensuring a more reliable assessment of students' skill development.

By incorporating these reliability measures, the study ensures that the evaluation of students' engagement and information literacy competency within the MOOC is consistent, accurate, and methodologically sound. These practices align with established standards in information literacy assessment, thereby enhancing the overall credibility and trustworthiness of the study's findings.

3.6.10 Data Collection Procedures

The data collection procedures for this quantitative study were carefully designed to assess students' information literacy competencies as demonstrated through their participation in the Information Literacy (IL) Massive Open Online Course (MOOC). These procedures were structured to ensure the systematic and reliable collection of data, enabling a meaningful evaluation of the MOOC's impact on students' skill development.

The primary data collection instrument used in this study is the Information Literacy Dispositions Rubric, a structured assessment tool designed to evaluate students' information literacy competencies and engagement within a MOOC environment. The rubric classifies student responses into three levels of competency: Developing, Proficient, and Advanced, in alignment with the ACRL Framework for Information Literacy for Higher Education. Adapted from the University of Maryland (UMD) model, the rubric was validated through a pilot study, norming sessions, and iterative refinement to ensure consistency, reliability, and accuracy in the assessment process.

A purposive sampling technique was employed to deliberately select participants based on specific criteria aligned with the study's objectives. The study targeted active students from a range of disciplines and education levels who were currently enrolled in public universities across Malaysia. To enhance representativeness, a convenience selection was then carried out within each institution, with the goal of reaching a total sample size of 300 participants.

During the information literacy (IL) competency assessment phase, a structured data collection process was implemented to evaluate students' IL skills following their completion of the IL MOOC. The primary evaluation tool used was the Information Literacy Dispositions Rubric, which was adapted from the University of Maryland (UMD) model and aligned with the ACRL Framework for Information Literacy for Higher Education.

To ensure consistency and accuracy in the assessment process, students' responses to learning activities and their performance on assignments within the IL MOOC were used to evaluate their information literacy competency. This approach minimized potential discrepancies that could arise from using varied data collection methods. The collected data were analyzed using a structured rubric, which categorized students' competencies into three levels: Developing, Proficient, and Advanced.

Prior to the assessment, a norming process was carried out by the researcher to establish a consistent understanding of the rubric criteria. This step was crucial in minimizing subjective bias and ensuring uniform evaluation of students' information literacy competencies. In addition, an iterative refinement approach was adopted, whereby responses to learning activities and performance on assignments were periodically reviewed to determine whether adjustments to the rubric were necessary to better align with the study's objectives. These measures helped ensure that the data collection process during the

competency assessment phase was reliable, valid, and methodologically sound, providing a strong foundation for evaluating students' engagement with information literacy concepts in a self-directed online learning environment.

The data collection process began after the completion of the IL MOOC, running from July to December 2022, to ensure that participants had fully engaged with the course content before being assessed. A structured timeline was established to allow students sufficient time to reflect on their learning experiences. During this period, regular reminders and updates were provided to encourage participation and to address any technical or procedural issues that arose, ensuring a smooth and responsive data collection process.

The data collection process was thoughtfully designed to ensure a structured and reliable evaluation of students' information literacy competencies following their completion of the IL MOOC. A standardized rubric, aligned with the ACRL Framework, was applied using rigorous assessment methods to maintain consistency and accuracy in tracking students' learning progress. Throughout the study, ethical standards were strictly observed to uphold transparency and integrity, ensuring that the findings offer meaningful and well-founded insights into the MOOC's impact on the development of students' information literacy skills.

3.6.11 Data Analysis Approach

The data analysis approach in this study is designed to evaluate students' levels of information literacy competency based on their participation in the Information Literacy (IL) Massive Open Online Course (MOOC). Statistical techniques were employed to assess the effectiveness of the MOOC and to identify meaningful patterns and relationships within the data.

Data preparation for this study involves several essential steps, including cleaning, coding, and organizing the dataset. Raw data collected using the UMD Libraries Dispositions Rubric will first be reviewed for completeness and accuracy. Any incomplete or invalid responses will be excluded from the analysis. Once verified, the data were systematically coded and entered into a statistical software package (IBM SPSS Statistics) to facilitate further analysis.

Descriptive statistics will be used to summarize and describe the basic characteristics of the dataset, including measures of central tendency (mean, median) and dispersion (standard deviation, range) for key variables. These statistics will provide an overview of students' responses to learning activities and their performance on learning assessments (assignments) within the IL MOOC, helping to identify patterns and potential relationships between variables. In addition, inferential statistical methods will be applied to draw conclusions about the effectiveness of the IL MOOC in enhancing students' information literacy skills.

The specific analysis for this study is regression analysis. Regression analysis explores the relationships between factors such as the total time spent accessing IL MOOC and students' learning engagement, and their influence on changes in information literacy competency. These analyses aim to identify key predictors of successful outcomes within the IL MOOC. To ensure the reliability and validity of the data analysis, several quality control measures will be implemented, including consistency checks and cross-validation. Consistency checks will verify that results are stable and reproducible across different subsets of the data, while cross-validation techniques will confirm the robustness of the statistical models, ensuring they generalize effectively to the broader population.

The results of the statistical analyses were be interpreted in relation to the research questions, specifically focusing on the impact of the IL MOOC on students' information literacy skills. Significant findings will be discussed in the context of the study's objectives, and any emerging patterns or trends will be examined to better understand their implications for information literacy instruction and curriculum design.

Data analysis were carried out using IBM SPSS Statistics, a software well-suited for performing robust statistical analyses and handling the complex computations required for this study.

Results will be presented using tables, charts, and graphs to visually highlight key findings. Detailed statistical outputs were accompanied by interpretive summaries to ensure clarity and accessibility. The findings will be discussed in relation to existing literature and relevant theoretical frameworks, providing deeper insight into their significance within the context of information literacy education.

The data analysis approach is carefully structured to rigorously assess the impact of the IL MOOC on students' information literacy competencies. By applying a range of statistical techniques, the analysis aims to offer a comprehensive evaluation of the MOOC's effectiveness and generate meaningful insights that can inform future practices and research in the field of information literacy education.

3.7 Chapter Summary

This chapter outlines the research methodology employed in the study, which adopts an exploratory sequential mixed-methods design that integrates both qualitative and quantitative approaches. The first phase involves interviews with academic librarians from 20 Malaysian public universities to explore how they apply the TPACK model and the

ACRL Framework in their Information Literacy (IL) teaching practices. Insights from these interviews informed the design and development of an IL MOOC, ensuring it is responsive to students' learning needs and grounded in practical instructional experience.

In the subsequent phase, the study assesses how effectively students developed information literacy competencies after completing the MOOC, using the University of Maryland's Information Literacy Dispositions Rubric as the primary evaluation tool. Data from 300 student participants were analysed using both descriptive and inferential statistical methods to examine their levels of engagement, course completion rates, and overall skill development.

This chapter also details the design and validation of the research instruments, the pilot testing conducted for both qualitative and quantitative phases, and the ethical considerations observed throughout the study. It further outlines the procedures for data collection and analysis, providing a comprehensive view of how information literacy instruction was examined and assessed within a technology-enhanced learning environment.

CHAPTER 4

INTRODUCTION

4.1 Introduction

This chapter presents the results of the data analysis, organized into two phases: Phase One highlights the qualitative findings, while Phase Two focuses on the quantitative results. Phase One explores the outcomes of interviews conducted with academic librarians from Malaysian public universities, aiming to investigate current practices in teaching Information Literacy (IL) and their understanding of the Technological Pedagogical Content Knowledge (TPACK) framework and the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education. The insights gathered in this phase underscore the need for a new approach to IL instruction—one that integrates theoretical frameworks to better support university students in developing essential information literacy skills. Phase Two presents the quantitative findings of the study, detailing the development of the Information Literacy MOOC, patterns of student participation, and the assessment of students' information literacy competency levels. This phase involved students from various educational levels enrolled in public universities across Malaysia. The analysis includes descriptive statistics and correlation analysis to examine learner engagement, regression analysis and t-tests to explore learning motivation, and a chi-square test to assess course completion rates. Collectively, these findings offer a comprehensive view of students' learning experiences and outcomes throughout their participation in the Information Literacy MOOC.

4.2 Perspectives of Academic Librarians

In the initial phase of the study, qualitative data were analysed to uncover key findings drawn from the perspectives of academic librarians. This section presents those findings, which reflect current practices and theoretical understandings related to Information Literacy (IL) instruction. The data were gathered through semi-structured interviews with academic librarians actively involved in teaching IL at public universities in Malaysia. These interviews explored general practices in IL instruction, as well as participants' awareness of *Technological Knowledge (TK), Pedagogical Knowledge (PK),* and *Content Knowledge (CK),* along with their familiarity with the core components of the ACRL Framework for Information Literacy for Higher Education. These components include *Authority is Constructed and Contextual, Information Creation as a Process, Information Has Value, Research as Inquiry, Scholarship as Conversation,* and *Searching as Strategic Exploration.* In this study, participants, referred to as informants were selected for their ability to provide meaningful, experience-based responses that reflect their instructional practices and contextual realities.

While many academic librarians involved in teaching Information Literacy (IL) at Malaysian public universities were identified, only eight consented to participate in the study. The limited response was primarily due to a lack of replies to both the initial invitation and subsequent follow-up emails. The eight librarians who agreed to take part are referred to as AL1 through AL8 for confidentiality purposes. These participants were selected based on their voluntary response to the interview invitations and are academic librarians actively engaged in delivering IL instruction at their respective institutions.

All interviews with participating librarians were conducted via the Zoom online platform. Each of the eight librarians has experience teaching Information Literacy (IL) as part of their professional responsibilities. They share similar academic backgrounds, having pursued degrees in fields such as Information Science, Information Management, and Library and Information Science. Among the participants, one holds a doctorate, another is pursuing a PhD, four have earned master's degrees, and the remaining two hold bachelor's degrees. Table 4.1 provides an overview of the professional and academic backgrounds of the librarians involved in this study.

Table 4.1: Professional Background of Participants

Label	Title	Gender	Year of Service	Name of Library	Name of University	Current Position
AL1	Mr.	Male	11-15 years	LIB1	UNI1	Senior Librarian
AL2	Dr.	Female	More than 20 years	LIB2	UNI2	Assistant Chief Librarian
AL3	Ms.	Female	11-15 years	LIB3	UNI3	Senior Librarian
AL4	Ms.	Female	16-20 years	LIB4	UNI4	Senior Librarian
AL5	Ms.	Female	11-15 years	LIB5	UNI5	Senior Librarian
AL6	Ms.	Female	16-20 years	LIB6	UNI6	Senior Librarian
AL7	Dr.	Female	11-15 years	LIB7	UNI7	Senior Librarian
AL8	Ms.	Female	16-20 years	LIB8	UNI8	Senior Librarian

Label	Programme (qualification)/ Universities Graduated From	Specific Area of Expertise	Most Current Research in Related Field	Job Responsibilities
AL1	1. Bachelor of Information Systems Management/ MARA University of Technology, Malaysia 2. Diploma in Information Studies/ MARA University of Technology, Malaysia	1. User Education Services 2. Library User Services	None	1. Head of User Education Unit 2. Information Literacy 3. Interlibrary Loan
AL2	1. Doctor of Information Science/ Robert Gordon University, United Kingdom 2. M.A. Information and Library Management/ Loughborough University, United Kingdom 3. Bachelor of Library Science/ The University of Indonesia, Indonesia	Academic Library Management and Strategy	None	Head of User Education Unit
AL3	1. Master of Science in Information Management/ MARA University of Technology, Malaysia 2. Bachelor of Library and Information Management/ MARA University of Technology, Malaysia 3. Diploma in Information	1. Information Literacy 2. Library Management	None	Planning and implementing User Education services activities, reference services, consultation, and information research required by library users

	Management/ MARA University of Technology, Malaysia			
AL4	Master of Library and Information Science/ International Islamic University Malaysia, Malaysia	1. Information Literacy 2. Repository	None	1. Information Services 2. Coordinator for Information Literacy Programme
AL5	1. BSc. Information Studies (Library & Information Management)/ MARA University of Technology, Malaysia 2. Diploma in Information Management/ MARA University of Technology, Malaysia	1. Acquisition 2. Reference Services 3. Information Literacy	None	Responsible for managing the reference services, library promotion, and programme
AL6	1. Master of Library and Information Science/ International Islamic University Malaysia, Malaysia 2. Bachelor of Science of Revelation & Islamic Heritage/ International Islamic University Malaysia, Malaysia	1. Item Cataloguing 2. Information Consultation	None	The main responsibility is to provide advice and consultation services related to resources and information search to university students and to teach Information Literacy programme
AL7	1. Doctor of Philosophy in Information Management/ MARA University of Technology, Malaysia	1. Knowledge Management (KM) 2. Information Literacy 3. Research Support Services	Reaching the End-Users and the Continuity of Academic Library Services	Planning, preparing, managing, implementing, and monitoring: i. Reference and Consultation Services

	2. Master of Science in Information Management/ MARA University of Technology, Malaysia 3. Bachelor of Science (Hons.) in Information Management/ MARA University of Technology, Malaysia	4. Bibliometric Analysis 5. Authentic Personal Branding 6. Corporate Social Responsibility (CSR)	during COVID-19 Pandemic: The experience of UNI7 library	ii. Document Supply Services (article) iii. User Education Services
AL8	1. Master of Science in Information Management/ MARA University of Technology, Malaysia 2. Bachelor of Science in Information Studies (Library and Information Management)/ MARA University of Technology, Malaysia	1. Information Literacy 2. Cataloguing 3. Circulation	None	1. Managing the Services Department 2. Handling Information Literacy 3. Providing information services such as interlibrary loan

Table 4.1 continued

The following section presents the findings from individual interviews, highlighting each academic librarian's current practices in teaching information literacy, along with their theoretical knowledge and understanding of the components within the TPACK framework and the ACRL Framework for Information Literacy for Higher Education.

The analysis of the collected data followed several key phases, beginning with the researcher's familiarization with the interview content. All interviews were transcribed verbatim by the researcher, accompanied by observational notes recorded during each session. These materials were documented using Microsoft Word. Subsequently, the data

were organized and coded, using a systematic coding method that was also shared with the participants to ensure transparency and clarity.

Following the initial familiarization with the data, the researcher developed preliminary codes based on recurring themes that emerged during early observations. The first interview was closely examined, and prominent themes identified at this stage served as a foundational guide for coding subsequent interviews. This approach allowed the researcher to organize and refine the data systematically, using emerging patterns from the academic librarians' responses to inform the ongoing coding process.

4.2.1 Interview with Academic Librarians

Interviews were conducted with in-service academic librarians working at public university libraries across Malaysia. A total of eight participants were interviewed virtually via the Zoom platform, with sessions scheduled on different dates and at times most convenient for each respondent. The interviews were structured around several key constructs: (i) participants' current practices in Information Literacy (IL) instruction, (ii) their level of technological proficiency, (iii) pedagogical expertise, (iv) content knowledge, and (v) their understanding of the ACRL Framework for Information Literacy for Higher Education. Additional questions explored participants' perspectives on IL teaching strategies, the potential value of integrating theoretical frameworks to enhance instructional effectiveness, and their recommendations for updating current IL modules to better align with students' learning needs and contemporary educational contexts.

The analysis process followed the six phases of thematic analysis outlined by Braun and Clarke (2006): (i) familiarizing oneself with the data, (ii) generating initial codes, (iii)

searching for themes, (iv) reviewing themes, (v) defining and naming themes, and (vi) producing the final report. Thematic analysis, when approached from an essentialist or realist perspective, seeks to capture and reflect the experiences, meanings, and realities conveyed by participants. This method allows for a rich, detailed, and nuanced interpretation of the themes and patterns that emerge from qualitative data (Yevelson-Shorsher & Bronstein, 2018).

During this phase, several key aspects of the inquiry were explored. First, the current Information Literacy (IL) teaching practices of academic librarians were examined to gain insight into how they deliver IL instruction to university students. This investigation helped the researcher assess whether and to what extent theoretical components are integrated into existing teaching approaches. At this stage, the focus was on addressing the study's first research question: To what extent does the current IL teaching approach incorporate theoretical elements? To explore this, the researcher asked participants about how their IL modules were developed, their familiarity with relevant instructional frameworks, and the depth of their understanding of these frameworks. Secondly, participants were asked about their awareness of the three core dimensions of the TPACK Framework: *Technological Knowledge, Pedagogical Knowledge,* and *Content Knowledge.* This part of the inquiry aimed to assess the extent to which these elements are recognized and integrated into their current IL teaching practices. The objective was to determine whether a strong understanding of these dimensions enables academic librarians to adopt more effective instructional strategies and enhance students' learning experiences. To evaluate this, the researcher explored participants' perceptions of their need to improve technological competence, particularly in relation to the use of digital tools in IL instruction. Further questions focused on the librarians' approaches to implementing best practices in IL delivery and how they

assess student learning outcomes to ensure teaching effectiveness. The relevance and currency of existing IL module content were also examined, including whether updates were considered necessary to meet evolving student needs. These areas of inquiry directly address the study's second research question: How are the components of the TPACK Framework understood and applied by academic librarians in the context of teaching Information Literacy?. The third phase of the analysis focused on addressing the study's third research question, which explored the extent to which participants incorporate elements of the ACRL Framework for Information Literacy for Higher Education into their instructional practices to support the development of information-literate students.

The analytic process began with familiarization with the interview data. All sessions, conducted via the Zoom platform with eight participants, were recorded and manually transcribed by the researcher. The process started with verbatim transcription and was later refined into intelligent verbatim form. Any segments spoken in other languages or dialects were translated into English using simultaneous translation. The final transcriptions were documented using Microsoft Word. In addition to the transcripts, the researcher incorporated observational notes taken during the interviews, which provided valuable context and supported the development of initial codes. These early codes were largely consistent across participants, reflecting common perspectives, practices, and reflections shared by the academic librarians regarding their experiences and challenges in teaching information literacy to university students.

4.2.2 Qualitative Data Analysis (Interview data)

The qualitative analysis of interviews with academic librarians revealed distinct yet interconnected dimensions of information literacy (IL) instructional practices, each aligned

with the study's research objectives and guiding frameworks. For Objective 1 (RQ1), the findings highlighted how theoretical foundations underpin IL instruction, as evidenced through tailored approaches to diverse student groups, the integration of ethics and holistic development, the application of pedagogical strategies, and librarians' commitment to continuous professional growth. These practices illustrate the influence of constructivist, active learning, and lifelong learning theories. For Objective 2 (RQ2), the analysis demonstrated librarians' application of the Technological Pedagogical Content Knowledge (TPACK) framework in practice, with themes emphasising technology integration, varied pedagogical methods, content-specific expertise, and responsiveness to student feedback. Their instructional practices reveal a pragmatic yet evolving engagement with the interrelationship of technological, pedagogical, and content knowledge in IL delivery. For Objective 3 (RQ3), the findings showed varying levels of understanding and application of the ACRL Framework for Information Literacy for Higher Education, reflected in the use of structured literacy modules, emphasis on research and ethical information practices, interactive engagement, outcome-based evaluation, and contextualised instruction. Collectively, these results underscore that while librarians' theoretical awareness of IL frameworks may differ in depth, their practices consistently demonstrate efforts to embed foundational principles into teaching, thereby supporting the development of information-literate students across diverse academic contexts.

Figure 4.1 presents a visualisation of the key themes that emerged from the qualitative data on information literacy (IL) instruction. Each bubble in the figure represents a theme, while the size of the bubble reflects the relative frequency or emphasis placed on that theme across participants' responses. Themes are grouped in close proximity to indicate

conceptual or practical relationships, enabling a clearer understanding of how ideas are clustered within the data.

The figure highlights a wide range of topics, including the design and content of IL modules, teaching methods and strategies, the role of technology tools in IL instruction, and librarians' understanding of the ACRL Framework. For instance, larger clusters such as IL Module Content, Teaching Preparation, Tech Tools Usage, and ACRL Framework (suitability and familiarity) indicate that these areas were recurrently discussed by participants, suggesting their centrality to current IL teaching practices. Smaller or more peripheral bubbles, such as Exclusivity & Community Engagement and Other Tech Tools (Suggestions), represent themes that were mentioned less frequently but still provide important insights into niche or emerging concerns.

By visualising the themes in this way, the figure not only illustrates the diversity of perspectives captured in the interviews but also shows how different aspects of IL instruction intersect. For example, how technological tools are tied to pedagogical approaches, or how module design connects with framework implementation. This representation makes it possible to identify both dominant trends and less prominent but meaningful issues in librarians' IL practices, thereby supporting a more holistic interpretation of the findings.

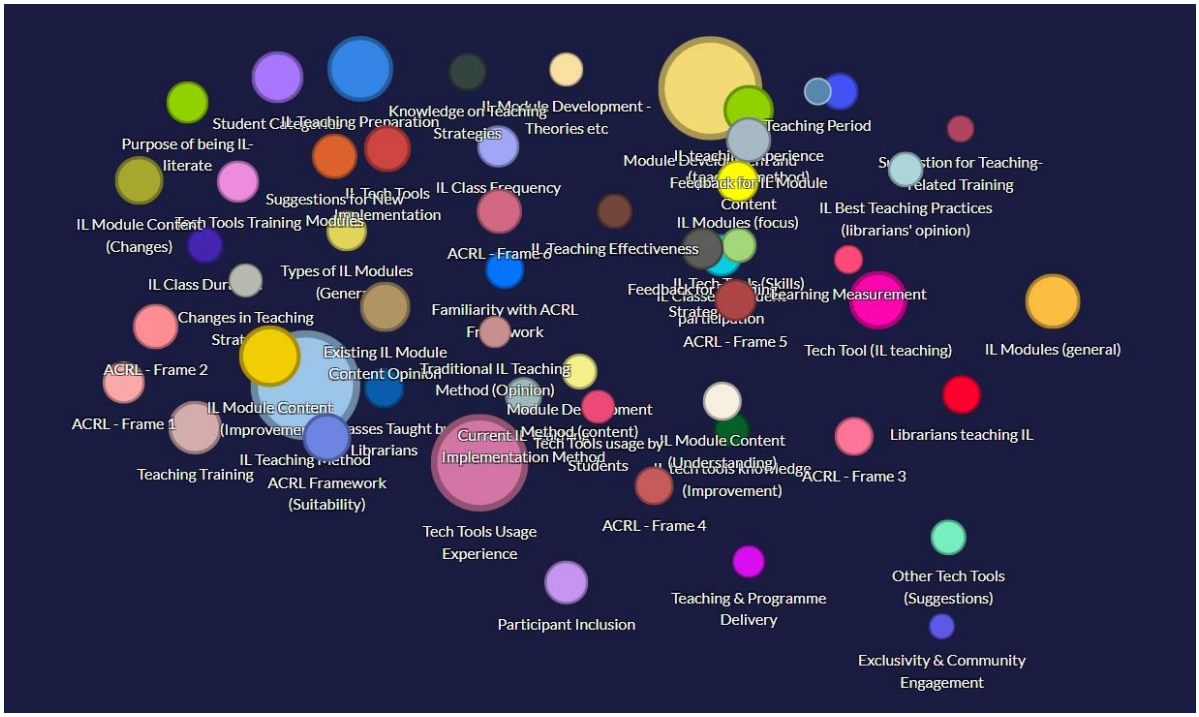


Figure 4.1: Visualising Key Themes in IL instruction

Figure 4.2 visualises the key themes that emerged from the qualitative analysis of librarians' perspectives on information literacy (IL) instruction. Each bubble represents a distinct theme, with size indicating its relative prominence in the dataset and placement reflecting conceptual or practical connections with other themes. The themes highlight several critical areas of focus in IL instruction. Central issues include the basics of IL teaching, librarians' understanding and engagement with the ACRL Framework for Information Literacy for Higher Education, and the use of technological tools for online teaching. These themes suggest that both foundational IL concepts and framework-based practices remain at the core of instructional activities. Other themes point to pedagogical concerns, such as teaching methods, communication strategies, personalised and adaptive approaches to enhance student engagement, and effective planning and time management. These highlight how librarians navigate classroom realities while attempting to apply pedagogical best practices.

The figure also reveals structural and institutional challenges, including resource constraints in librarian training and professional development, the need for continuous updates to maintain content relevance, and collaborative module development. These underscore the importance of sustained institutional support and collaboration in ensuring effective IL instruction.

Finally, themes related to evaluation and improvement, such as assessing the impact of IL instruction, optimising strategies and environments, and emphasising knowledge sharing, point to librarians' commitment to reflective practice and continuous enhancement of teaching effectiveness.

By mapping these themes visually, Figure 3.3 demonstrates the multidimensional nature of IL instruction, showing how librarians balance framework adoption, pedagogical innovation, technological integration, and institutional constraints to deliver effective IL teaching.

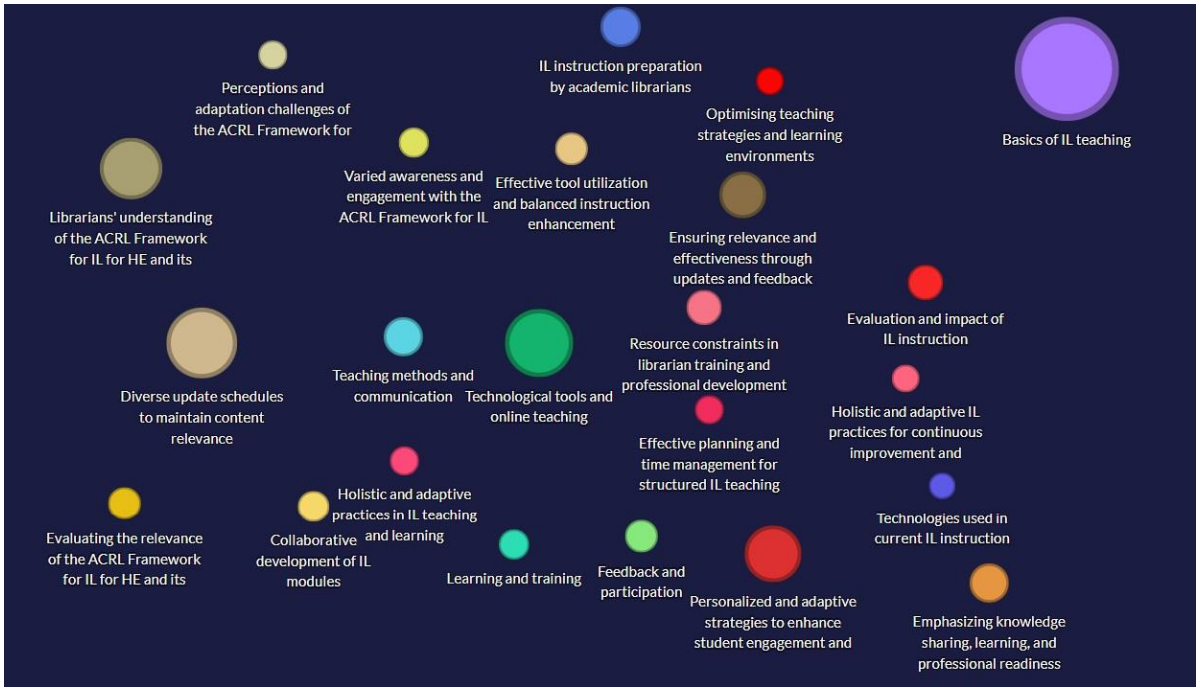


Figure 4.2: Key Themes in IL Instruction

1) Examining the extent of theoretical integration in IL instruction (RQ1)

The analysis of librarian interviews for Research Question 1 (RQ1) revealed that theoretical underpinnings were evident across several dimensions of information literacy (IL) instructional practices. Research Question 1 (RQ1) emphasizes the theoretical foundations of information literacy instruction, which are reflected through practices such as tailoring instruction to learners' needs, embedding ethical considerations, applying pedagogical strategies, and promoting continuous learning. Four main themes emerged:

Theme 1: Tailored teaching approaches & student categorisation

First, librarians demonstrated tailored teaching approaches and student categorisation, reflecting constructivist principles of scaffolding by differentiating modules for new undergraduates, PSM students, and postgraduates. This tailoring aligned instruction with learners' prior knowledge and academic levels, as highlighted by one participant who explained,

"It is divided into three categories: new students, PSM students, and senior students… postgraduate students who focus more on Research Methodology" (AL1). Another noted, *"We tailor our teaching approach based on the suitability for our target audience… we focus solely on the current level of understanding and knowledge of the students"* (AL1).

Theme 2: Holistic support & integration of ethics and values

Some librarians incorporated holistic support and values into IL sessions by embedding ethics, integrity, and resilience, thereby moving beyond technical competencies toward the affective and moral dimensions of learning. This integration reflects broader educational theories emphasising holistic development, as illustrated by one librarian's statement:

"Integrating aspects of ethics, student integrity, and core values would be advantageous… the library could support this initiative by offering resources and techniques to improve mental, physical, and spiritual resilience" (AL1).

Theme 3: Pedagogical training & best practices

Participants emphasised pedagogical training and best practices, stressing the value of interactive delivery and two-way learning approaches that draw on constructivist and active learning theories. One participant highlighted,

"In my view, it's crucial to undergo training initially, especially in pedagogical methods… to ensure that even those interested in attending our classes find them enjoyable" (AL5), while another noted, *"Implementing two-way learning promotes student engagement, while integrating both technological and conventional methods fosters creativity in information retrieval"* (AL8).

Theme 4: Continuous learning and professional development

Continuous learning and professional development emerged as a theme, with librarians actively engaging in self-study, seminars, and benchmarking activities that reflect lifelong learning theory. Their reflective practices highlight the evolving nature of IL instruction, as expressed in comments such as,

"We do some readings, we conduct research, personal research… we also joined conferences and seminars organised by others" (AL1) and *"I regularly attend training sessions hosted by publishers… I acquire new knowledge and strategies that I can implement in my own sessions"* (AL2).

Collectively, these findings suggest that while IL instruction is often practical in focus, it incorporates a theoretical grounding through constructivist approaches, holistic learner development, pedagogical strategies, and principles of lifelong learning.

2) Exploring librarians' use of the TPACK Framework for IL instruction (RQ2)

The analysis of interviews addressing Research Question 2 (RQ2) revealed that academic librarians demonstrate a varied yet practical understanding of the Technological Pedagogical Content Knowledge (TPACK) framework, which is evident in their integration of technological tools, pedagogical methods, and subject-specific knowledge in information literacy (IL) instruction. Research Question 2 (RQ2) focuses on the Technological Pedagogical Content Knowledge (TPACK) framework, which is addressed through the integration of technology, pedagogical strategies, and information literacy content knowledge in teaching practices. Four major themes were identified:

Theme 1: Integration of technology for quality delivery

The integration of technology for quality delivery reflects librarians' *Technological Knowledge (TK).* They employed digital tools such as PowerPoint, Canva, Kahoot, Quizziz, and MOOC platforms, alongside synchronous applications like Zoom and WebEx, and even social media platforms such as TikTok, to enrich delivery and foster engagement. As one participant explained,

"We use PowerPoint, Canva, videos, and the library website… adding elements like cartoons and videos helps attract students" (AL8). Another highlighted the value of blended learning through technology: *"Essentially, implementing a flipped classroom model would represent an ideal approach, incorporating blended learning by combining technology with face-to-face interaction"* (AL7).

Theme 2: Instructional methods and variation in approaches

The pedagogical dimension (PK) was reflected in the diversity of instructional methods employed. Beyond traditional lectures, librarians adopted facilitation roles, encouraged collaborative learning, and introduced hands-on activities. The incorporation of flipped classroom models demonstrated their awareness of learner-centred strategies that promote active engagement. One participant noted,

"Primarily, we utilize facilitation to support students, providing both instructional guidance and hands-on classes… collaboration is integral" (AL2), while another observed, *"Collaborative learning, lectures, and librarians serving as facilitators… some educators are comfortable with continuous questioning during teaching sessions, while others simply deliver content"* (AL5).

Theme 3: Content knowledge in IL modules

Librarians demonstrated *Content Knowledge (CK)* by focusing on advanced IL skills and tools that directly meet students' academic and research needs. Modules addressed database searching, reference management (e.g., EndNote, Mendeley), plagiarism detection systems (e.g., Turnitin), and thesis formatting, highlighting their expertise in aligning IL content with disciplinary and postgraduate requirements. This was emphasised by one participant:

"Postgraduate students typically aren't interested in basic modules like the OPAC module; they are more interested in online databases, Mendeley, and Turnitin" (AL5). Another explained, *"For example, when demonstrating how to search for materials… we always engage in hands-on activities, including using the Boolean operator technique"* (AL1).

Theme 4: Feedback and student engagement

The integration of *Technological and Pedagogical Knowledge* (TK and PK) was evident in how librarians engaged students and adapted instruction based on feedback. They employed interactive tools, facilitated Q&A sessions, and adjusted their pace in response to learners' needs. Such practices demonstrated an ability to integrate technology with pedagogy to sustain student engagement and continuously improve instruction. As one librarian highlighted,

"From the technical aspect, we also need responses from students regarding their usage of the tools" (AL3), while another reflected, *"If there's a mention of time constraints during previous sessions… we make efforts to decelerate the pace to ensure everyone can follow along"* (AL7).

Overall, the findings suggest that while librarians' theoretical awareness of the TPACK framework may differ in depth, their instructional practices demonstrate an active and practical application of its components. Their *Technological Knowledge* is evident in the use of diverse tools, their *Pedagogical Knowledge* is reflected in varied and interactive teaching strategies, and their *Content Knowledge* is grounded in IL competencies. Importantly, the integration of feedback mechanisms highlights their growing ability to combine these domains in practice, thereby strengthening the quality and relevance of IL instruction.

3) Exploring librarians' use of the ACRL Framework to develop information-literate students (RQ3)

The analysis of interviews for Research Question 3 (RQ3) revealed that academic librarians demonstrate varied levels of understanding and application of the ACRL

Framework for Information Literacy for Higher Education. Their practices indicate efforts to incorporate the six frames through structured module design, skill-focused teaching, student engagement strategies, and assessment mechanisms. Research Question 3 (RQ3) focuses on the ACRL Framework for Information Literacy for Higher Education, which is addressed through the use of structured modules, the teaching of information literacy skills, interactive student engagement, and assessment practices. Five key themes were identified:

Theme 1: Structured literacy modules aligned with learning outcomes

Structured literacy modules aligned with learning outcomes were emphasised, reflecting intentional scaffolding of instruction and alignment with course syllabi. This outcome-based approach illustrates librarians' awareness of the need for systematic and purposeful module design, as highlighted by one participant:

"Our module serves as the foundation for our teaching approach… within this module, we have defined the learning outcomes we aim to accomplish and the necessary content required" (AL7). Another reinforced this view, stating, *"Librarians ought to provide literacy modules that cater to students' needs and are structured in an organized manner"* (AL8).

Theme 2: Focus on information search strategies, evaluation, and ethical use

A strong focus on information search strategies, evaluation, and ethical use emerged as a key area of practice. Librarians provided hands-on instruction in Boolean operators, database searching, plagiarism detection systems such as Turnitin, and citation management tools including Mendeley and EndNote. These practices align with the frames *Searching as Strategic Exploration* and *Information Has Value*, underscoring attention to both the technical and ethical aspects of information use. For example, one librarian explained,

"When demonstrating how to search… we always engage in hands-on activities, including using Boolean operators" (AL1). Similarly, another stressed the role of delivery methods, remarking, *"The utilization of technology is one aspect, while language proficiency is another… interactive presentations are essentials for each module"* (AL6).

Theme 3: Two-way learning and student engagement

Librarians adopted two-way learning and student engagement approaches that promoted inquiry-based and collaborative participation. By encouraging students to share their research topics, participate in peer discussions, and engage with quizzes, librarians illustrated practices aligned with the frames Research as Inquiry and Scholarship as Conversation. As one participant noted,

"Two-way learning promotes student engagement… integrating technological and conventional methods fosters creativity" (AL8). Another added, *"We typically ask participants to share the topic they are researching and the keywords they are using… then together we search for materials using those keywords"* (AL3).

Theme 4: Outcome evaluation and student feedback

Assessment and feedback were recognised as integral to evaluating student learning outcomes. Librarians used surveys, key performance indicators (KPIs), and evaluation forms to measure the effectiveness of IL instruction and identify areas for improvement. These reflective practices resonate with the ACRL's emphasis on outcome evaluation. For instance, one librarian reported,

"According to the feedback we've received, we have consistently exceeded their expectations. Overall, students seem satisfied with our classes" (AL2), while another

explained, *"Currently, our guidance mainly relies on the evaluation process conducted after each literacy class… all the feedback received has been positive"* (AL5).

Theme 5: Experience sharing and contextualization

Librarians demonstrated experience sharing and contextualisation in their teaching, tailoring instruction to different faculties, levels of study, and student backgrounds. This reflects application of the frame *Authority is Constructed and Contextual,* as librarians adapted their instruction to diverse learning needs and academic contexts. One participant highlighted this approach by stating,

"I consider it essential for us to comprehend the students' needs and their learning objectives during our sessions" (AL3), while another observed, *"It varies significantly, depending on the faculty, academic level, and whether the student is local or international… By knowing our audience well, we can make our classes lively and engaging"* (AL2).

In summary, while librarians did not always explicitly reference the ACRL Framework, their practices demonstrated applied engagement with its principles. The incorporation of structured modules, practical IL skills, interactive methods, outcome-based evaluations, and contextual adaptations indicates that the six frames are embedded, to varying extents, within their teaching. These findings suggest that although theoretical familiarity with the ACRL Framework differs among librarians, their instructional strategies actively apply its elements to support the development of information-literate students.

4.3 Quantitative Data Analysis (IL MOOC participation)

The second phase of the study involved the analysis of quantitative data, organized into three main sections. The first section provided descriptive statistics outlining the demographic background of the respondents. The second section explored learners'

participation in the Information Literacy (IL) MOOC by analysing their engagement in various activities, including tutorial video views, forum posts, quiz attempts, and assignment submissions. This part also examined the relationship between learner engagement and the IL MOOC completion rate (Research Question 4), focusing on correlations between key variables: (a) tutorial video duration and MOOC completion rate, (b) video duration and percentage of student views, (c) video duration and quiz response rate, (d) video duration and assignment submission rate, (e) type of module content and completion rate, and (f) average time spent on each unit and completion rate based on video content.

The third part of the analysis examined whether learners' competency in information literacy (IL) skills influenced their completion rate in the IL MOOC, addressing Research Question 5. To explore this relationship, the University of Maryland (UMD) Libraries Information Literacy Disposition Rubric was used to evaluate students' quiz responses and assignment submissions throughout the course. Student responses were coded according to relevant ACRL dispositions and knowledge practices, including: (i) recognizing the importance of evaluating information and being aware of personal biases, (ii) identifying appropriate resources to meet specific information needs, (iii) respecting the intellectual contributions of others, (iv) demonstrating intellectual curiosity by developing thoughtful research questions and viewing research as an open-ended process, (v) engaging with ongoing scholarly conversations within their area of study, and (vi) designing and refining search strategies while seeking guidance from experts such as librarians, researchers, and professionals. Each response was assessed and categorized into one of three developmental levels: Developing (1), Proficient (2), or Advanced (3).

4.3.1 Background of Participants

The participants in this study were higher education (HE) students who voluntarily enrolled in the Information Literacy (IL) MOOC developed specifically for this research. They comprised Diploma, Bachelor's, Master's, and PhD students from a range of academic disciplines across public universities in Malaysia. Quantitative data collection was conducted over a six-month period, from June to December 2022.

(i) Participant response rate

Email invitations to participate in the IL MOOC were sent to all 20 public universities in Malaysia, with a target of 600 participants, anticipating that 30 individuals from each institution would voluntarily take part in the study. Participant inclusion was determined based on the number of completed consent forms received. As shown in Table 4.61, a total of 202 consent forms were returned, resulting in a consent return rate of 33.70%. This initial response fell short of the 50% threshold typically regarded as satisfactory for research participation (Mellahi & Harris, 2015), prompting the need for further recruitment efforts.

To increase participation, additional invitations were disseminated through multiple channels, including email, posters, WhatsApp, and outreach during IL sessions facilitated by librarians. WhatsApp messages were also shared with a broad network of individuals, including friends, relatives, colleagues, librarians, and lecturers across Malaysian public universities. These efforts yielded an additional 138 consent forms. Although the overall response rate did not meet the ideal 50% benchmark, several factors help support the validity of the study despite this limitation. These are addressed further in the discussion of study limitations and methodological considerations.

Table 4.2 showed a total of twenty universities were invited to participate in the Information Literacy MOOC (IL MOOC). Of these, nine universities replied to the invitation, representing a 45% institutional response rate. Based on projections across all invited institutions, the expected number of student respondents was 600. However, only 202 students formally agreed to participate in the MOOC. Notably, all students who agreed subsequently enrolled, resulting in 202 valid participations and indicating a full conversion from agreement to actual participation. The effective response rate, calculated against the expected pool of 600 students, was 33.70%. While this rate is moderate, it reflects a realistic outcome commonly observed in educational intervention studies, where attrition between initial projections and actual participation is typical. Despite the reduction, the sample size remained sufficiently robust to support meaningful analysis of student engagement and competency outcomes within the IL MOOC.

Table 4.2: Respondents Response Rate

Item	Frequency (n)
Number of universities invited for IL MOOC participation	20
Number of universities replied to the invitation for IL MOOC participation	9
Response	45%
Expected number of respondents from all universities	600
Number of respondents agreed for IL MOOC participation	202
Number of valid participations	202
Effective response rate	33.70%

(ii) Demographic information

The findings highlighted the gender distribution and demographic profile of participants in the IL MOOC. The analysis revealed a predominantly female cohort, accounting for 70.8% of participants. Most learners were between the ages of 18 and 23

(89.6%), indicating strong engagement from younger students in the early stages of their academic journey. A significant majority of participants were from UNI5 (62.9%) and UNI8 (31.2%), suggesting a strong institutional presence and uptake of the course within these two universities, while representation from other institutions was notably limited. In terms of academic level, most learners were pursuing bachelor's degrees (77.2%), with the highest participation among first-year (38.1%) and second-year students (52%). Engagement decreased considerably among students in later years of study. Postgraduate involvement was minimal, with only 4.5% of participants enrolled in Master's programs and 2% in PhD programs. This suggests a potential need to tailor or promote the course more effectively to appeal to advanced learners. Detailed demographic information is presented in Table 4.3.

Table 4.3: Gender Distribution of IL MOOC Participants

No.	Profile	Frequency (n)	Percent (%)
1	Gender		
	Male	59	29.2
	Female	143	70.8
2	Age		
	18 - 23 years old	181	89.6
	24 - 29 years old	11	5.4
	30 - 35 years old	7	3.5
	36 - 41 years old	2	1
	More than 41 years old	1	0.5
3	Name of University		
	UNI 1	3	1.5
	UNI 2	1	0.5
	UNI 3	1	0.5
	UNI 4	3	1.5
	UNI 5	127	62.9
	UNI 6	1	0.5
	UNI 7	2	1
	UNI 8	63	31.2
	UNI 9	1	0.5
4	Programme Level		
	Diploma	33	16.3
	Bachelors	156	77.2
	Masters	9	4.5
	Doctor of Philosophy	4	2
5	Year of Study		
	Year 1	77	38.1
	Year 2	105	52
	Year 3	15	7.4
	Year 4	4	2
	Others (Year 6)	1	0.5

(iii) Completion rate metrics in IL MOOC participation

Table 4.4 illustrates diverse patterns in IL MOOC completion, revealing a polarized engagement among participants. A substantial portion (39.1%, or 79 learners) did not complete any sections, indicating significant early disengagement. Conversely, a notable segment (33.7%, or 68 learners) fully completed the course, demonstrating high commitment and motivation. However, intermediate completion rates were comparatively low: only 18.3% completed less than 25% of the course, with even smaller groups (ranging between 2.5% and 3.5%) progressing past the 25% mark without completing the course fully. These observations highlight the importance of enhancing initial learner engagement, maintaining motivation throughout the course, and providing targeted support to help learners progress successfully through intermediate stages toward completion.

Table 4.4: IL MOOC Completion Rates

Completion Rate	Frequency (n)	Percent (%)
0% Completed	79	39.1
Less than 25% Completed	37	18.3
More than 25% Completed	6	3
More than 50% Completed	5	2.5
More than 75% Completed	7	3.5
100% Completed	68	33.7

Table 4.5 indicates that the majority of learners (65.3%, or 132 individuals) did not complete the IL MOOC, whereas 34.7% (70 learners) successfully finished the course. This relatively high non-completion rate points to potential issues such as low learner motivation, insufficient support mechanisms, or perceived course difficulty. The findings highlight the importance of identifying and addressing these barriers, enhancing learner engagement, and improving overall retention and completion rates.

Table 4.5: Cumulative Completion Percentage of IL MOOC

Completion Status	Frequency (n)	Percent (%)
Not Completed	134	66.3
Completed	68	33.7

4.3.2 Exploring the Link between Student Engagement and Completion Rates in IL MOOCs (RQ4)

(i) Relationship between IL MOOC Video Duration and Learning Activity Completion Status

Table 4.6 examines the relationship between video duration and learning activity completion status across six IL MOOC modules. It reveals a consistent trend of low completion rates, regardless of module duration, with "Not Completed" percentages exceeding 55% for all units. The longest video duration, Unit 1 (9 minutes 32 seconds), shows 44.6% completion and 55.4% non-completion, while shorter modules like Unit 2 (3 minutes 44 seconds) also exhibit low completion at 37.6%. This suggests that shorter video durations do not necessarily guarantee higher completion rates, although longer durations, as seen in Unit 1, may contribute to higher non-completion. Units 4, 5, and 6, with intermediate durations, share identical completion (36.6%) and non-completion (63.4%) rates, indicating that factors beyond video length, such as content difficulty, engagement strategies, or learner motivation, may play a critical role. The overall pattern underscores the need to investigate additional variables influencing learner completion to optimize MOOC design.

The correlation analysis indicates a moderate positive correlation (0.627) between video duration and completed percentages, suggesting that longer videos are moderately

associated with higher completion rates. Conversely, there is a moderate negative correlation (-0.627) between video duration and non-completion percentages, implying that longer videos are linked to lower non-completion rates. These findings highlight that while longer videos can have a positive influence on completion rates, their impact is moderate and does not necessarily ensure higher engagement or consistent completion outcomes.

Table 4.6: The Relationship between IL MOOC Video Duration and Learning Activity Completion Status

IL Module	Module Duration (Mins & Secs)	Learning Activity Completion Status	n	%
Unit 1	9 mins 32 secs	Completed	90	44.6
		Not Completed	112	55.4
Unit 2	3 mins 44 secs	Completed	76	37.6
		Not Completed	126	62.4
Unit 3	3 mins 54 secs	Completed	82	40.6
		Not Completed	120	59.4
Unit 4	4 mins 37 secs	Completed	74	36.6
		Not Completed	128	63.4
Unit 5	5 mins 15 secs	Completed	74	36.6
		Not Completed	128	63.4
Unit 6	6 mins 44 secs	Completed	74	36.6
		Not Completed	128	63.4

(ii) The Relationship between IL MOOC Video Duration and Assessment Completion Status

The next table (Table 4.7), illustrates the relationship between IL MOOC video duration and assessment completion status across six modules, showing consistently low completion rates despite variations in video length. The longest module, Unit 1 (9 minutes 32 seconds), has a completion rate of 42.1% and a non-completion rate of 57.9%, while shorter modules such as Unit 2 (3 minutes 44 seconds) and Unit 3 (3 minutes 54 seconds)

show similar trends, with completion rates of 40.1% and 39.6%, respectively. Units with intermediate durations, such as Unit 4 (4 minutes 37 seconds) and Unit 5 (5 minutes 15 seconds), exhibit even lower completion rates (36.1% and 35.5%). Unit 6, with a duration of 6 minutes 44 seconds, follows a similar pattern with a 35.6% completion rate. These findings suggest that video duration alone is not a strong determinant of completion, as shorter videos do not significantly boost engagement. Instead, other factors, such as content quality, learner motivation, or instructional strategies, may influence completion rates and warrant further investigation to optimize course design. The correlation analysis for video duration and assessment completion rates reveals a weak positive correlation (0.304) between video duration and completed percentages, suggesting a slight association between longer videos and higher assessment completion rates. Conversely, there is a weak negative correlation (-0.309) between video duration and not completed percentages, indicating a minor relationship between longer videos and lower rates of incomplete assessments. Overall, these findings suggest that while video duration shows some relationship with assessment outcomes, its influence on completion and non-completion rates is relatively minor and not a significant determining factor.

Table 4.7: The Relationship between IL MOOC Video Duration and Assessment Completion Status

IL Module	Module Duration (Mins & Secs)	Assessment Completion Status	f	%
Unit 1	9 mins 32 secs	Completed	85	42.1
		Not Completed	117	57.9
Unit 2	3 mins 44 secs	Completed	81	40.1
		Not Completed	121	59.9
Unit 3	3 mins 54 secs	Completed	80	39.6
		Not Completed	122	60.4
Unit 4	4 mins 37 secs	Completed	73	36.1
		Not Completed	129	63.9

Unit 5	5 mins 15 secs	Completed	71	35.1
		Not Completed	131	64.9
Unit 6	6 mins 44 secs	Completed	72	35.6
		Not Completed	130	64.3

(iii) IL MOOC Completion Status based on Average Time Spent on the Course

Table 4.8 demonstrates the statistical relationship between the average time spent on the IL MOOC platform (independent variable) and the completion status of the MOOC (dependent variable). The regression model shows a significant F-value of 306.751 with a p-value of < 0.001, indicating that the average time spent on the platform significantly predicts the MOOC completion status. The model explains a substantial portion of the variance, as shown by the Sum of Squares for regression (20.631) compared to the residual (9.618). The high mean square value for regression (20.631) relative to the residual (0.067) supports the strength of the model.

Table 4.8: IL MOOC Completion Status based on Average Time Spent on the Course

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Regression	20.631	1	20.631	306.751	<.001[b]
Residual	9.6176	143	0.067		
Total	30.248	144			

(iv) Regression Coefficients for Predicting IL MOOC Completion Status Based on Average Time Spent on the Platform

Table 4.9 shows that the time students spend on the IL MOOC platform strongly predicts whether they complete the course. For every unit increase in time spent, the completion status increases by 0.178. This relationship is highly significant (p<0.001p <

0.001p<0.001), meaning it's unlikely to be due to chance. The standardized value (β=0.826\beta = 0.826β=0.826) shows that time spent has a large influence compared to other possible factors. The constant (−0.052-0.052−0.052) is not significant (p=0.076p = 0.076p=0.076), meaning it doesn't play an important role in predicting completion. Overall, spending more time on the platform significantly increases the likelihood of completing the course.

Table 4.9: Regression Coefficients for Predicting IL MOOC Completion Status Based on Average Time Spent on the Platform

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	-0.052	0.029		-1.788	0.076
Average time spent on IL MOOC platform OVERALL	0.178	0.010	0.826	17.514	0.000

(v) Prediction of IL MOOC Completion Status based on the Number of Learning Activities Attempted

Table 4.10 presents the ANOVA results for predicting IL MOOC completion status based on the number of learning activities attempted. The regression model explains a significant portion of the variance in completion status, as evidenced by a large regression sum of squares (34.895) compared to the residual sum of squares (10.848). With a high F-value of 643.359 and a significance level of <.001, the relationship between the number of learning activities attempted and completion status is statistically significant. The mean square values (34.895 for regression and 0.054 for residual) further highlight the model's ability to capture variance. These results suggest that attempting more learning activities strongly predicts higher completion rates for the IL MOOC.

Table 4.10: Prediction of IL MOOC Completion Status based on the Number of Learning Activities Attempted

	Sum of Squares	df	Mean Square	F	Sig.
Regression	34.895	1	34.895	643.359	<.001[b]
Residual	10.848	200	0.054		
Total	45.743	201			

(vi) Prediction of IL MOOC Completion Status based on the Number of Assessment Attempted

Table 4.11 displays the ANOVA results for predicting IL MOOC completion status based on the number of assessments attempted. The regression model explains a significant proportion of the variance in completion status, with a regression sum of squares of 25.604 compared to the residual sum of squares of 20.139. The F-statistic is notably high at 254.267, with a p-value of <.001, indicating that the predictor (number of assessments attempted) has a statistically significant impact on MOOC completion status. The mean square for regression is 25.604, while the residual mean square is 0.101, highlighting the substantial explanatory power of the model. These results suggest that attempting more assessments is a significant predictor of IL MOOC completion, emphasizing the importance of assessment engagement in determining completion rates.

Table 4.11: Prediction of IL MOOC Completion Status based on the Number of Assessment Attempted

	Sum of Squares	df	Mean Square	F	Sig.
Regression	25.604	1	25.604	254.267	<.001[b]
Residual	20.139	200	0.101		
Total	45.743	201			

(vii) Comparison Engagement Levels Among Groups with Different Completion Status

Table 4.12 displays the results of independent samples t-tests comparing various metrics (average time spent on the IL MOOC platform, number of learning activities attempted, and number of assessments attempted) across two groups. Levene's test indicates whether equal variances can be assumed for each comparison. For "Average time spent on IL MOOC platform," the F-value (8.662, p = 0.004) shows unequal variances, so the "Equal variances not assumed" row is used. The t-test is highly significant (t = -24.954, p < 0.001), with a mean difference of -3.994, indicating a significant difference in time spent between the groups. For the "Number of Learning Activities Attempted," Levene's test (F = 5.536, p = 0.020) also shows unequal variances, and the t-test (t = -25.365, p < 0.001) reveals a mean difference of -5.182. Similarly, for the "Number of Assessments Attempted," Levene's test (F = 0.010, p = 0.919) supports equal variances, and the t-test (t = -15.946, p < 0.001) shows a mean difference of -4.217. All metrics indicate statistically significant differences between the groups, with negative mean differences suggesting lower values for one group compared to the other.

Table 4.12: Comparison Engagement Levels Among Groups with Different Completion Status

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Average time spent on IL MOOC platform OVERALL	Equal variances assumed	8.662	0.004	-23.802	200	0.000	0.000	-3.994	0.168	-4.325	-3.663
	Equal variances not assumed			-24.954	160.534	0.000	0.000	-3.994	0.160	-4.310	-3.678
Number of Learning Activities attempted by learners	Equal variances assumed	5.536	0.020	-25.365	200	0.000	0.000	-5.182	0.204	-5.585	-4.779
	Equal variances not assumed			-27.771	179.057	0.000	0.000	-5.182	0.187	-5.550	-4.814
Number of Assessment attempted by learners	Equal variances assumed	0.010	0.919	-15.946	200	0.000	0.000	-4.217	0.264	-4.739	-3.696
	Equal variances not assumed			-16.012	142.399	0.000	0.000	-4.217	0.263	-4.738	-3.696

4.3.3 Examining the Relationship between IL Competency and MOOC Completion Rates (RQ5)

(i) Correlation Analysis of IL Skills Competencies (Learning Activity) Across MOOC Units and Completion Status

Table 4.13 highlights significant positive relationships between competencies for learning activities across the six IL MOOC units and their association with MOOC completion status. Units 5 (Scholarship as Conversation) and 6 *(Searching as Strategic Exploration)* show the strongest correlations with completion (r=.751r = .751r=.751 and r=.731r = .731r=.731, respectively), suggesting these units play a pivotal role in driving overall course success. Strong inter-unit correlations, especially between Units 2 *(Information Creation as a Process)* and 4 (Research as Inquiry) (r=.910r = .910r=.910), indicate that skill development is interconnected across units. In contrast, Unit 1 *(Authority is Constructed and Contextual)* has the weakest correlation with completion (r=.580r = .580r=.580), suggesting it may have less immediate impact on students' progression but remains foundational. These findings emphasize the importance of designing integrative and engaging content in key units while addressing weaker areas to improve overall MOOC outcomes.

Various factors may influence the relationships observed in the data beyond those previously mentioned. Student demographics such as age, educational background, and cultural context can shape how learners approach and interpret course content, potentially affecting competency and completion. Learning environments, including access to resources and the availability of support systems, may also play a role in engagement levels. Additionally, motivational factors such as goal orientation and personal interest in the topic

can drive or hinder participation. Cognitive load may impact students' ability to grasp complex concepts, while unit design and structure, including content clarity and activity design, could influence comprehension and engagement. The quality and timeliness of assessments and feedback are critical, as poor assessments or delayed feedback may discourage learners. External commitments, such as jobs or family responsibilities, and MOOC platform usability, including technical issues or navigation challenges, can also affect participation. Furthermore, learners' prior knowledge and their perception of the relevance of course content to their goals may contribute to these outcomes. These considerations underscore the importance of adopting a holistic approach to understanding student experiences, course design, and external influences when analyzing relationships in the data.

Table 4.13: Correlation Analysis of IL Skills Competencies (Learning Activity) Across MOOC Units and Completion Status

		IL Skills Competency						IL MOOC Completion Status
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	
IL Skills Competency (Unit 1)	**Pearson Correlation**	1	.692**	.579**	.715**	.700**	.707**	.580**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
	Sum of Squares and Cross-products	188.178	119.752	111.396	141.614	126.941	102.812	53.792
	Covariance	0.936	0.596	0.554	0.705	0.632	0.512	0.268
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 2)	**Pearson Correlation**	.692**	1	.731**	.910**	.875**	.836**	.744**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000
	Sum of Squares and Cross-products	119.752	159.233	129.228	165.703	145.916	111.817	63.455
	Covariance	0.596	0.792	0.643	0.824	0.726	0.556	0.316
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 3)	**Pearson Correlation**	.579**	.731**	1	.724**	.748**	.630**	.611**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000
	Sum of Squares and Cross-products	111.396	129.228	196.436	146.475	138.535	93.693	57.871
	Covariance	0.554	0.643	0.977	0.729	0.689	0.466	0.288
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 4)	**Pearson Correlation**	.715**	.910**	.724**	1	.903**	.840**	.717**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000
	Sum of Squares and Cross-products	141.614	165.703	146.475	208.337	172.129	128.574	69.950
	Covariance	0.705	0.824	0.729	1.037	0.856	0.640	0.348
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 5)	**Pearson Correlation**	.700**	.875**	.748**	.903**	1	.820**	.751**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000
	Sum of Squares and Cross-products	126.941	145.916	138.535	172.129	174.520	114.896	67.069
	Covariance	0.632	0.726	0.689	0.856	0.868	0.572	0.334
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 6)	**Pearson Correlation**	.707**	.836**	.630**	.840**	.820**	1	.731**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000
	Sum of Squares and Cross-products	102.812	111.817	93.693	128.574	114.896	112.421	52.386
	Covariance	0.512	0.556	0.466	0.640	0.572	0.559	0.261
	N	202	202	202	202	202	202	202

IL MOOC Completion Status	**Pearson Correlation**	.580**	.744**	.611**	.717**	.751**	.731**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	
	Sum of Squares and Cross-products	53.792	63.455	57.871	69.950	67.069	52.386	45.743
	Covariance	0.268	0.316	0.288	0.348	0.334	0.261	0.228
	N	202	202	202	202	202	202	202

(ii) Correlation Analysis of IL Skills Competencies (Assessment) Across MOOC Units and Completion Status

The correlation analysis (Table 4.14) reveals significant positive relationships between the competencies of six assessment units in the IL MOOC and overall completion status. Units 5 *(Scholarship as Conversation)* and 6 *(Searching as Strategic Exploration)* show the strongest correlations with completion (r=0.680r = 0.680r=0.680 and r=0.717r = 0.717r=0.717, respectively), highlighting their critical role in driving course success. Conversely, Unit 1 *(Authority is Constructed and Contextual)* exhibits the weakest correlation with completion (r=0.514r = 0.514r=0.514), suggesting its foundational role may have less direct influence on progression. Strong inter-unit correlations, particularly between Units 5 and 6 (r=0.897r = 0.897r=0.897), demonstrate the interconnected nature of the skills assessed, emphasizing the importance of an integrated course design. These findings suggest that enhancing engagement in Units 5 and 6 while revisiting the relevance of Unit 1 could improve overall learning outcomes and completion rates.

Beyond the mentioned factors, other possible influences on the observed relationships in the data include learner attributes, such as individual learning preferences (visual, auditory, or kinesthetic) and self-regulation skills like time management and discipline, which may affect engagement and performance. Course timing and pacing, including the sequence and release intervals of units, could impact cognitive load and

participation, especially in earlier or more condensed units. Social and peer influences, such as collaboration opportunities and community support through forums, may foster better understanding and engagement. Perceived difficulty of units, particularly those seen as more challenging, might discourage learners and affect correlations with completion. Assessment design, including alignment with objectives and question types, could influence how competencies are measured and understood. Technological factors, such as platform issues and accessibility challenges, may also disproportionately affect certain units. Contextual relevance, including the professional applicability of content and cultural interpretations, might drive differential engagement. Motivational triggers, like reward systems and gamification, as well as the availability of supplemental learning resources, can enhance performance. Lastly, external distractions, such as competing work or family commitments, may limit learners' focus, particularly on units requiring deeper attention. Addressing these factors can refine course design and improve overall learning outcome.

Table 4.14: Correlation Analysis of IL Skills Competencies (Assessment) Across MOOC Units and Completion Status

		IL Skills Competency						IL MOOC Completion Status
		Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	
IL Skills Competency (Unit 1)	Pearson Correlation	1	.664**	.579**	.645**	.636**	.630**	.514**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
	Sum of Squares and Cross-products	237.267	178.752	141.891	154.188	157.020	168.347	53.554
	Covariance	1.180	0.889	0.706	0.767	0.781	0.838	0.266
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 2)	Pearson Correlation	.664**	1	.790**	.802**	.798**	.801**	.702**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000
	Sum of Squares and Cross-products	178.752	305.822	219.842	217.455	223.574	243.050	83.079
	Covariance	0.889	1.522	1.094	1.082	1.112	1.209	0.413
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 3)	Pearson Correlation	.579**	.790**	1	.834**	.799**	.803**	.701**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000
	Sum of Squares and Cross-products	141.891	219.842	253.470	205.960	203.733	221.822	75.515
	Covariance	0.706	1.094	1.261	1.025	1.014	1.104	0.376
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 4)	Pearson Correlation	.645**	.802**	.834**	1	.824**	.824**	.677**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000
	Sum of Squares and Cross-products	154.188	217.455	205.960	240.614	204.644	221.762	71.020
	Covariance	0.767	1.082	1.025	1.197	1.018	1.103	0.353
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 5)	Pearson Correlation	.636**	.798**	.799**	.824**	1	.897**	.680**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000
	Sum of Squares and Cross-products	157.020	223.574	203.733	204.644	256.594	249.396	73.634
	Covariance	0.781	1.112	1.014	1.018	1.277	1.241	0.366
	N	202	202	202	202	202	202	202
IL Skills Competency (Unit 6)	Pearson Correlation	.630**	.801**	.803**	.824**	.897**	1	.717**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000
	Sum of Squares and Cross-products	168.347	243.050	221.822	221.762	249.396	300.931	84.089
	Covariance	0.838	1.209	1.104	1.103	1.241	1.497	0.418
	N	202	202	202	202	202	202	202

IL MOOC Completion Status	Pearson Correlation	.514**	.702**	.701**	.677**	.680**	.717**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	
	Sum of Squares and Cross-products	53.554	83.079	75.515	71.020	73.634	84.089	45.743
	Covariance	0.266	0.413	0.376	0.353	0.366	0.418	0.228
	N	202	202	202	202	202	202	202

(iii) ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and IL MOOC Completion Rate

Table 4.15 presents the results of a one-way ANOVA for IL Skills Competency across six units and IL MOOC Completion Rate, revealing statistically significant differences between groups for all units ($p < 0.001$). Unit 1 shows significant group-level differences ($F = 34.688$), with variability between groups exceeding within-group differences. Unit 2 exhibits the highest F-value (80.578), indicating substantial disparities in group approaches or experiences. Similarly, Units 3 and 4 show significant F-values (44.793 and 71.751, respectively), while Unit 5 demonstrates the most pronounced group differences ($F = 87.843$), likely highlighting disparities in how groups engage with complex competencies. Unit 6 also reveals substantial differences ($F = 79.812$). Across all units, between-group variability consistently surpasses within-group variability, underscoring meaningful differences between groups. Units 5 and 2 stand out with the largest disparities, suggesting group-specific factors like instructional strategies or engagement levels may play a critical role. These findings highlight the need for educational interventions, such as additional support for underperforming groups, and post hoc tests to identify specific group differences. Furthermore, adjustments in course design and further research into factors like prior knowledge or engagement are recommended to address competency gaps effectively.

Table 4.15: ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and IL MOOC Completion Rate

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	88.344	5	17.669	34.688	0.000
	Within Groups	99.834	196	0.509		
	Total	188.178	201			
IL Skills Competency (Unit 2)	Between Groups	107.120	5	21.424	80.578	0.000
	Within Groups	52.112	196	0.266		
	Total	159.233	201			
IL Skills Competency (Unit 3)	Between Groups	104.758	5	20.952	44.793	0.000
	Within Groups	91.678	196	0.468		
	Total	196.436	201			
IL Skills Competency (Unit 4)	Between Groups	134.729	5	26.946	71.751	0.000
	Within Groups	73.607	196	0.376		
	Total	208.337	201			
IL Skills Competency (Unit 5)	Between Groups	120.671	5	24.134	87.843	0.000
	Within Groups	53.849	196	0.275		
	Total	174.520	201			
IL Skills Competency (Unit 6)	Between Groups	75.392	5	15.078	79.812	0.000
	Within Groups	37.029	196	0.189		
	Total	112.421	201			

(iv) ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and IL MOOC Completion Rate

Table 4.16 presents ANOVA results analyzing IL skills competency across six learning units in a MOOC, revealing statistically significant differences between groups for all units ($p = 0.000$). The F-values range from 32.023 (Unit 1) to 79.713 (Unit 2), indicating varying degrees of variance explained by group differences. Unit 2 exhibits the highest F-value, suggesting the most pronounced group differences. Across all units, the sum of squares for "Between Groups" consistently exceeds that of "Within Groups," highlighting that the majority of the variability in IL skills competency stems from differences between

groups. These findings emphasize the need for further exploration of group characteristics and targeted interventions to address disparities.

Table 4.16: ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and IL MOOC Completion Rate

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	106.679	5	21.336	32.023	0.000
	Within Groups	130.589	196	0.666		
	Total	237.267	201			
IL Skills Competency (Unit 2)	Between Groups	205.007	5	41.001	79.713	0.000
	Within Groups	100.815	196	0.514		
	Total	305.822	201			
IL Skills Competency (Unit 3)	Between Groups	150.755	5	30.151	57.534	0.000
	Within Groups	102.715	196	0.524		
	Total	253.470	201			
IL Skills Competency (Unit 4)	Between Groups	145.076	5	29.015	59.526	0.000
	Within Groups	95.538	196	0.487		
	Total	240.614	201			
IL Skills Competency (Unit 5)	Between Groups	143.555	5	28.711	49.783	0.000
	Within Groups	113.039	196	0.577		
	Total	256.594	201			
IL Skills Competency (Unit 6)	Between Groups	185.533	5	37.107	63.025	0.000
	Within Groups	115.397	196	0.589		
	Total	300.931	201			

(v) ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and IL MOOC Completion Status

Table 4.17 presents ANOVA results for IL skills competency across six learning units, focusing on learning activities and IL MOOC completion status. Significant differences between groups are evident for all units, with p-values of 0.000, indicating strong statistical significance. The F-values range from 101.278 (Unit 1) to 258.174 (Unit 5), highlighting varying levels of group variance. Units 5 and 6 exhibit the highest F-values

(258.174 and 228.873, respectively), suggesting these units have the most substantial differences between groups. The "Between Groups" mean square values consistently exceed "Within Groups" values, underscoring that most of the variance in IL skills competency arises from differences between groups. These findings indicate the need for deeper exploration of factors influencing group differences and potential strategies to address observed disparities in learning outcomes.

Table 4.17: ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and IL MOOC Completion Status

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	63.258	1	63.258	101.278	0.000
	Within Groups	124.920	200	0.625		
	Total	188.178	201			
IL Skills Competency (Unit 2)	Between Groups	88.027	1	88.027	247.249	0.000
	Within Groups	71.205	200	0.356		
	Total	159.233	201			
IL Skills Competency (Unit 3)	Between Groups	73.216	1	73.216	118.838	0.000
	Within Groups	123.220	200	0.616		
	Total	196.436	201			
IL Skills Competency (Unit 4)	Between Groups	106.970	1	106.970	211.055	0.000
	Within Groups	101.367	200	0.507		
	Total	208.337	201			
IL Skills Competency (Unit 5)	Between Groups	98.339	1	98.339	258.174	0.000
	Within Groups	76.181	200	0.381		
	Total	174.520	201			
IL Skills Competency (Unit 6)	Between Groups	59.995	1	59.995	228.873	0.000
	Within Groups	52.426	200	0.262		
	Total	112.421	201			

(vi) ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and IL MOOC Completion Status

The ANOVA results in Table 4.18 indicate that IL skills competency across all six learning units in the IL MOOC significantly varies based on completion status, with ppp-values (Sig.\text{Sig.}Sig.) of 0.0000.0000.000 for each unit, confirming statistical significance. Units 2 and 6 exhibit the highest F-values (194.786 and 211.252, respectively), suggesting the most substantial differences in competency levels between groups. The "Between Groups" variability consistently accounts for a significant portion of the total variance, while "Within Groups" variability remains relatively low, indicating that group differences are the primary contributors to competency disparities. These results highlight the importance of course completion in achieving higher IL competency levels, especially in foundational or complex units like Units 2 and 6. Further exploration, such as post-hoc testing or engagement analysis, could provide deeper insights into the relationship between completion status, engagement, and learning outcomes.

Table 4.18: ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and IL MOOC Completion Status

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	62.700	1	62.700	71.835	0.000
	Within Groups	174.567	200	0.873		
	Total	237.267	201			
IL Skills Competency (Unit 2)	Between Groups	150.891	1	150.891	194.786	0.000
	Within Groups	154.931	200	0.775		
	Total	305.822	201			
IL Skills Competency (Unit 3)	Between Groups	124.665	1	124.665	193.571	0.000
	Within Groups	128.805	200	0.644		
	Total	253.470	201			
IL Skills Competency (Unit 4)	Between Groups	110.265	1	110.265	169.185	0.000
	Within Groups	130.349	200	0.652		
	Total	240.614	201			
IL Skills Competency (Unit 5)	Between Groups	118.531	1	118.531	171.706	0.000
	Within Groups	138.063	200	0.690		
	Total	256.594	201			
IL Skills Competency (Unit 6)	Between Groups	154.582	1	154.582	211.252	0.000
	Within Groups	146.349	200	0.732		
	Total	300.931	201			

(vii) Information literacy skills competency levels among learners

As shown in Table 4.19, learners identified *"Authority is Constructed and Contextual"* as the most significant area of learning (42.9%, n=90). This area involves recognizing different types of information sources and understanding how authority is established in various contexts. The next most significant areas were *"Information has Value"* (39.6%, n=83), which involves recognizing the value and accuracy of information, *"Information Creation as a Process"* (36.3%, n=76), which concerns the production and delivery of information, and "Research as Inquiry" (35.8%, n=75). The areas *"Scholarship as Conversation"* and *"Searching as Strategic Exploration"* were identified as the least significant, with response rates of 35.4% (n=74).

Table 4.19: Information Literacy Skills Competency among Learners

ACRL Frame	Developing (1)	Proficient (2)	Advanced (3)
	% N (n)	% N (n)	% N (n)
Authority is Constructed and Contextual	67% (60)	11% (10)	22% (20)
Information Creation as a Process	63.6% (49)	16.9% (13)	19.5% (14)
Information has Value	59.5% (50)	13.1% (10)	27.4% (23)
Research as Inquiry	59.2% (44)	7.9% (6)	32.9% (25)
Scholarship as a Conversation	57.3% (43)	20% (15)	22.7% (16)
Searching as Strategic Exploration	80% (59)	9.3% (7)	10.67% (8)

4.3.4 Examining Student Engagement across the Elements of the IL MOOC (RQ6)

(i) Average Time Spent on IL MOOC Platform

The data presented in Table 4.20 indicates that learners were most engaged with tutorial videos, spending an average of 3 to 4 minutes per video—reflecting a strong preference for visual learning formats. Learning activities also received steady interaction, with average engagement ranging from 2 to 4 minutes, and Unit 6 notably showing higher levels of participation. In contrast, further reading materials attracted minimal attention, with learners spending only 1 to 2 minutes on average. This suggests that such resources may be perceived as supplementary rather than essential, or that they may not be effectively integrated into the learning experience.

Assessment components maintained consistent engagement across all units, averaging 2 minutes per interaction. This uniformity may be attributed to a standardized assignment structure. To enhance overall engagement, strategies such as embedding reading materials within activities, diversifying assignment formats, and keeping videos concise and focused could be employed to better align with learner preferences. These findings offer

valuable insights for improving course design, with the goal of increasing learner participation and completion rates.

Table 4.20: Average Time Spent on IL MOOC Platform

No.	Page	Average Time Spent on Page (minutes)
1	Unit 1	
	Tutorial Video (content)	4
	Learning Activity	2
	Further Readings	3
	Assessment (assignment)	2
2	Unit 2	
	Tutorial Video (content)	3
	Learning Activity	2
	Further Readings	1
	Assessment (assignment)	2
3	Unit 3	
	Tutorial Video (content)	4
	Learning Activity	2
	Further Readings	2
	Assessment (assignment)	2
4	Unit 4	
	Tutorial Video (content)	3
	Learning Activity	2
	Further Readings	2
	Assessment (assignment)	2
5	Unit 5	
	Tutorial Video (content)	3
	Learning Activity	2
	Further Readings	2
	Assessment (assignment)	2
6	Unit 6	
	Tutorial Video (content)	3
	Learning Activity	4
	Further Readings	2
	Assessment (assignment)	2

(ii) Number of attempts for learning activities by learners

Table 4.21 presents an interesting pattern of learner engagement with the activity. Notably, a majority (52%, or 105 learners) did not engage with the activity at all, while a

smaller yet notably persistent group (36.6%, or 74 learners) attempted the activity up to six times. This distinct split indicates two contrasting trends: a significant segment exhibiting limited or no interaction, alongside a committed group actively engaging with repeated attempts. These patterns could reflect barriers such as learners perceiving the activity as irrelevant or overly challenging. Additionally, the minimal proportion of learners attempting the activity between one and five times points to possible gaps in catering to learners with intermediate engagement levels. These insights emphasize the need to further investigate reasons behind low engagement, critically assess the activity's difficulty, and enhance instructional support to strike an appropriate balance between challenge and accessibility. Further analysis examining how the frequency of attempts relates to learning outcomes is recommended to guide improvements in activity design, ensuring alignment with learner preferences and educational goals.

Table 4.21: Number of Attempts for Learning Activities by Learners

Attempt	Frequency (n)	Percent (%)
None	105	52
1 attempt	19	9.4
2 attempts	2	1
3 attempts	0	0
4 attempts	1	0.5
5 attempts	1	0.5
6 attempts	74	36.6

(iii) Number of Attempts for Assessments by Learners

Table 4.22 highlights varying patterns in learner engagement with assessments. Over half of the learners (51%, or 103 individuals) did not attempt the assessments, reflecting significant non-participation. Conversely, a substantial minority (27.7%, or 56 learners) attempted the assessments six times, suggesting notable persistence or possibly difficulty in successfully completing the tasks. The low proportion of learners who made between one

and five attempts, ranging from just 2% to 7.4%, indicates limited intermediate engagement. This uneven distribution points to potential challenges such as overly complex assessments, perceived irrelevance, or insufficient instructional support. To address these issues effectively, it is important to systematically explore the reasons behind non-engagement, critically assess the difficulty and relevance of assessment tasks, and introduce targeted support measures. Such efforts could enhance learner participation, improve assessment completion rates, and foster more positive learning outcomes.

Table 4.22: Number of Attempts for Assessments by Learners

ttempt	Frequency (n)	Percent (%)
None	103	51
1 attempt	15	7.4
2 attempts	5	2.5
3 attempts	5	2.5
4 attempts	4	2
5 attempts	14	6.9
6 attempts	56	27.7

(iv) ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and Learning Activity Completion Status

The ANOVA results in Table 4.23 indicate statistically significant differences in IL skills competency across all six learning units based on learning activity completion status (p=0.000p = 0.000p=0.000 for all units). The F-values are exceptionally high, particularly for Units 5 and 6 (501.841 and 486.630, respectively), demonstrating a strong impact of completion status on IL competency. The "Between Groups" variance consistently explains a substantial portion of the total variance, with "Within Groups" mean square values remaining relatively low, suggesting limited variability within groups. These results highlight the critical role of completing learning activities in achieving higher IL

competency, with Units 4, 5, and 6 showing the strongest effects. This suggests that these units may be pivotal in the curriculum and warrant further investigation to understand their design and contribution to competency development.

Table 4.23: ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and Learning Activity Completion Status

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	81.615	1	81.615	153.178	0.000
	Within Groups	106.563	200	0.533		
	Total	188.178	201			
IL Skills Competency (Unit 2)	Between Groups	104.262	1	104.262	379.338	0.000
	Within Groups	54.971	200	0.275		
	Total	159.233	201			
IL Skills Competency (Unit 3)	Between Groups	82.061	1	82.061	143.496	0.000
	Within Groups	114.374	200	0.572		
	Total	196.436	201			
IL Skills Competency (Unit 4)	Between Groups	140.806	1	140.806	417.014	0.000
	Within Groups	67.531	200	0.338		
	Total	208.337	201			
IL Skills Competency (Unit 5)	Between Groups	124.788	1	124.788	501.841	0.000
	Within Groups	49.732	200	0.249		
	Total	174.520	201			
IL Skills Competency (Unit 6)	Between Groups	79.675	1	79.675	486.630	0.000
	Within Groups	32.746	200	0.164		
	Total	112.421	201			

(v) ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and Learning Activity Completion Status

The ANOVA results for IL skills competency across six learning units based on learning activity completion status as shown in Table 4.24 reveal significant differences (p=0.000p = 0.000p=0.000 for all units). The F-values are notably high, particularly for Units 2 and 6 (197.534 and 207.945, respectively), indicating that completion status strongly influences competency levels. The "Between Groups" variability consistently accounts for a substantial proportion of the total variance, while "Within Groups" mean square values remain relatively low, suggesting smaller variations within groups. These findings underscore the importance of assessment completion in achieving higher IL competency, with Units 2 and 6 showing the most pronounced effects. This highlights the need for targeted strategies to enhance engagement and support completion in these key units to maximize learning outcomes.

Table 4.24: ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and Learning Activity Completion Status

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	65.309	1	65.309	75.959	0.000
	Within Groups	171.958	200	0.860		
	Total	237.267	201			
IL Skills Competency (Unit 2)	Between Groups	151.962	1	151.962	197.534	0.000
	Within Groups	153.859	200	0.769		
	Total	305.822	201			
IL Skills Competency (Unit 3)	Between Groups	114.605	1	114.605	165.059	0.000
	Within Groups	138.865	200	0.694		
	Total	253.470	201			
IL Skills Competency (Unit 4)	Between Groups	104.484	1	104.484	153.507	0.000
	Within Groups	136.130	200	0.681		
	Total	240.614	201			
IL Skills Competency (Unit 5)	Between Groups	115.398	1	115.398	163.458	0.000
	Within Groups	141.196	200	0.706		
	Total	256.594	201			

IL Skills Competency (Unit 6)	Between Groups	153.396	1	153.396	207.945	0.000
	Within Groups	147.535	200	0.738		
	Total	300.931	201			

(vi) ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and Assessment Completion Status

Table 4.25 shows the ANOVA results for IL skills competency across six learning units based on assessment completion status show statistically significant differences for all units (p=0.000p = 0.000p=0.000). The F-values are high, especially for Units 5 and 4 (109.682 and 107.266, respectively), indicating that assessment completion status strongly influences IL competency levels. The "Between Groups" sum of squares explains a considerable portion of the total variance, while "Within Groups" mean squares remain relatively low, suggesting that group differences have a more significant impact than within-group variation. These findings emphasize the importance of assessment completion in enhancing IL skills across all units, with some units, such as Units 4 and 5, demonstrating stronger effects. Further investigation could explore the specific aspects of these units that contribute to higher competency when assessments are completed.

Table 4.25: ANOVA Results for IL Skills Competency across Six Learning Units (Learning Activity) and Assessment Completion Status

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	37.597	1	37.597	49.936	0.000
	Within Groups	150.581	200	0.753		
	Total	188.178	201			
IL Skills Competency (Unit 2)	Between Groups	50.709	1	50.709	93.454	0.000
	Within Groups	108.523	200	0.543		
	Total	159.233	201			
IL Skills Competency (Unit 3)	Between Groups	60.713	1	60.713	89.466	0.000
	Within Groups	135.723	200	0.679		
	Total	196.436	201			
IL Skills Competency (Unit 4)	Between Groups	72.730	1	72.730	107.266	0.000
	Within Groups	135.607	200	0.678		
	Total	208.337	201			
IL Skills Competency (Unit 5)	Between Groups	61.811	1	61.811	109.682	0.000
	Within Groups	112.709	200	0.564		
	Total	174.520	201			
IL Skills Competency (Unit 6)	Between Groups	31.049	1	31.049	76.313	0.000
	Within Groups	81.372	200	0.407		
	Total	112.421	201			

(vii) ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and Assessment Completion Status

Table 4.26 shows the ANOVA results for IL skills competency across six learning units based on assessment completion status show highly significant differences for all units (p=0.000p = 0.000p=0.000). The F-values are notably high, with Unit 5 showing the highest value (409.068), followed by Units 4 and 2 (351.981 and 314.239, respectively), indicating that assessment completion status has a substantial impact on IL competency across all units. The "Between Groups" sum of squares accounts for a large portion of the total variance, while "Within Groups" mean squares remain relatively low, suggesting that the differences between groups are the main drivers of variability. These results emphasize the strong

association between assessment completion and IL competency, with Units 5, 4, and 2 showing the most pronounced effects. This suggests that specific factors in these units may be key in improving competency, warranting further analysis of the assessment design and delivery in these areas.

Table 4.26: ANOVA Results for IL Skills Competency across Six Learning Units (Assessment) and Assessment Completion Status

		Sum of Squares	df	Mean Square	F	Sig.
IL Skills Competency (Unit 1)	Between Groups	114.438	1	114.438	186.338	0.000
	Within Groups	122.829	200	0.614		
	Total	237.267	201			
IL Skills Competency (Unit 2)	Between Groups	186.880	1	186.880	314.239	0.000
	Within Groups	118.942	200	0.595		
	Total	305.822	201			
IL Skills Competency (Unit 3)	Between Groups	121.491	1	121.491	184.107	0.000
	Within Groups	131.979	200	0.660		
	Total	253.470	201			
IL Skills Competency (Unit 4)	Between Groups	153.432	1	153.432	351.981	0.000
	Within Groups	87.182	200	0.436		
	Total	240.614	201			
IL Skills Competency (Unit 5)	Between Groups	172.336	1	172.336	409.068	0.000
	Within Groups	84.258	200	0.421		
	Total	256.594	201			
IL Skills Competency (Unit 6)	Between Groups	177.416	1	177.416	287.281	0.000
	Within Groups	123.514	200	0.618		
	Total	300.931	201			

4.4 Chapter Summary

This chapter presents findings from two complementary phases. Phase One (qualitative) investigated how academic librarians in Malaysian public universities teach Information Literacy (IL) and the extent to which their practices reflect the TPACK model and the ACRL Framework. Phase Two (quantitative) analyzed participation and outcomes

in a purpose-built IL MOOC, with a focus on engagement patterns, completion rates, and IL competency.

Phase One is about librarian perspectives. Eight in-service academic librarians (AL1–AL8) with diverse seniority and relevant qualifications described IL instruction as both practical and theoretically informed. Four themes characterized RQ1 (theoretical integration): (i) tailored teaching and scaffolding by student level; (ii) holistic emphasis on ethics and values alongside skills; (iii) interactive, two-way pedagogical practices; and (iv) ongoing professional development. For RQ2 (TPACK), librarians reported: (i) use of technology such as slides, videos, Canva, Kahoot/Quizziz, MOOC platforms, Zoom, WebEx, and some social media; (ii) varied pedagogies including facilitation, collaborative and hands-on activities, and flipped elements; (iii) content depth covering database searching, reference managers, Turnitin, and thesis formatting; and (iv) adaptation based on feedback. For RQ3 (ACRL), practices aligned, either implicitly or explicitly, with the ACRL frames through structured modules linked to outcomes, search, evaluation, ethical use, inquiry-driven engagement, assessment and feedback.

Meanwhile, Phase Two focuses on IL MOOC participation and outcomes. Invitations distributed across 20 public universities resulted in 202 valid participants, with an institutional reply rate of 45 percent and an effective consent return of 33.7 percent. The cohort was predominantly female (70.8 percent), aged 18 to 23 (89.6 percent), and at the bachelor's level (77.2 percent). Completion rates were polarized, with 33.7 percent completing the MOOC and 66.3 percent not completing. Engagement was highest for tutorial videos, averaging approximately three to four minutes per view. Learning activities averaged two to four minutes, while further readings were leaAnalytical results indicated that time spent on the platform was a strong predictor of completion ($F=306.751$, $\beta=0.826$,

p<.001). The number of activities and assessments attempted also significantly predicted completion (both p<.001). Completers spent more time and attempted more tasks, as confirmed by t-tests (all p<.001). ANOVAs across units revealed significant competency differences by completion status and by activity or assessment completion status (all p<.001). Correlations showed that competencies in Unit 5 (Scholarship as Conversation) and Unit 6 *(Searching as Strategic Exploration)* were most strongly associated with completion. In contrast, Unit 1 *(Authority is Constructed and Contextual),* although foundational and frequently recognized by learners, demonstrated a weaker association. Competency distributions indicated that many learners remained at the Developing level, particularly for *Searching as Strategic Exploration,* though foundational and frequently recognised by learners, showed weaker association. Competency distributions suggested many learners remained at Developing level, particularly for *Searching as Strategic Exploration.*

Overall, librarians' practices reflect evolving, framework-informed approaches to IL teaching. Evidence from the MOOC indicates that engagement, measured by time and task attempts, is the primary driver of completion and higher IL competency, particularly in inquiry, conversation, and strategic searching. These findings support the need for a theoretically integrated, activity-rich, and feedback-responsive IL design, and inform the recommendations, limitations, and future research directions presented in the next chapter.

CHAPTER 5

DISCUSSION

5.1 Introduction

The data analysed in this study were derived from both interview sessions with academic librarians and the participation of university students in an Information Literacy MOOC at public universities in Malaysia. Analysis of the interview data revealed several preliminary findings related to (i) academic librarians' current information literacy practices, (ii) their levels of technological proficiency, (iii) pedagogical expertise, (iv) content knowledge, and (v) familiarity with the ACRL Framework for Information Literacy for Higher Education.

As these preliminary findings were in line with the research questions that the present study aimed to answer, it has led to the second phase, which is the integration phase, whereby an Information Literacy MOOC was developed for implementing the third phase, which is student participation in the IL MOOC. Analysis data of students' participation in IL MOOC revealed several findings related to (i) IL MOOC completion rate (%), (ii) IL MOOC completion status (completed/not completed), (iii) IL MOOC video duration, (iv) learning activity (quiz) completion status, (v) assignment completion status, (vi) student engagement in IL MOOC, and (vi) students' level of IL skills competency.

This chapter also discusses additional findings that emerged during the interviews and IL MOOC data analysis, along with the study's contributions, limitations, and implications for future research.

5.2 Summary of Key Findings

1) Examining the Extent of Theoretical Integration in IL Instruction (RQ1)

The analysis of RQ1 indicates that information literacy instruction, while often practical in orientation, is grounded in several key theoretical foundations. Librarians demonstrated constructivist approaches by tailoring instruction to different student groups and aligning content with learners' prior knowledge. Ethical and values-based elements were also embedded, reflecting a holistic view of education that extends beyond technical competencies. In addition, pedagogical training and interactive delivery methods highlighted the application of active learning theories to foster engagement and creativity. Finally, librarians' commitment to professional development through continuous learning, seminars, and benchmarking underscored the influence of lifelong learning theory. Collectively, these findings suggest that IL instruction is informed by a blend of constructivist, holistic, active learning, and lifelong learning perspectives, shaping both teaching strategies and ongoing professional practice.

The findings for Research Question 1 reveal that theoretical principles are meaningfully embedded within current information literacy (IL) instruction, even if often applied implicitly. Librarians demonstrated constructivist orientations through differentiated teaching and student categorisation, ensuring instruction was scaffolded according to learners' prior knowledge and academic levels. This reflects an understanding that IL instruction is not a one-size-fits-all process but one grounded in learner diversity. Several participants also extended IL instruction beyond cognitive development by incorporating ethical values, integrity, and resilience, aligning with holistic education principles that emphasise affective and moral growth.

Pedagogical awareness was another strong theme. Librarians underscored the need for training in teaching methods and prioritised interactive, two-way learning, consistent with constructivist and active learning theories that foster engagement and creativity. Their emphasis on continuous professional development illustrates commitment to lifelong learning, positioning them as reflective practitioners who evolve alongside changing educational demands. Collectively, these findings suggest that IL instruction in Malaysian academic libraries extends beyond technical competencies—it is theoretically grounded, addressing cognitive, ethical, and developmental dimensions of student learning. However, while theoretical underpinnings are evident, they are not always explicitly articulated, highlighting the need for more deliberate alignment between theory and practice through sustained pedagogical training.

The four emergent themes, namely, tailored teaching, holistic ethics and support, pedagogical practices, and continuous professional development, collectively demonstrate alignment with the ACRL Framework for Information Literacy for Higher Education, the Technological Pedagogical Content Knowledge (TPACK) framework, and broader learning theories such as constructivism, self-directed learning, and cognitive load theory.

Within the ACRL Framework, tailored instruction and learner categorisation reflect *Authority Is Constructed and Contextual* and *Research as Inquiry*, as librarians adjust IL content to academic levels and prior knowledge. The integration of ethics and values echoes *Information Has Value* and *Scholarship as Conversation*, expanding IL to moral and affective domains. Pedagogical practices that emphasise interactivity align with *Searching as Strategic Exploration*, while librarians' continuous professional learning embodies *Research as Inquiry*, modeling lifelong inquiry for students.

The TPACK framework is reflected in the balanced integration of technology, pedagogy, and content. Librarians employed digital and conventional tools *(Technological Knowledge),* scaffolded learning through interactive strategies *(Pedagogical Knowledge),* and embedded disciplinary ethics and integrity *(Content Knowledge).* Their ongoing training and benchmarking activities indicate active refinement of TPACK competence to ensure instructional relevance and effectiveness.

From a Constructivist Learning Theory perspective, the centrality of scaffolding and knowledge construction is evident in differentiated instruction, dialogic engagement, and learner-centered design. The inclusion of affective and ethical components extends constructivism beyond cognitive domains, promoting meaning-making through social and moral dimensions of learning.

Self-Directed Learning Theory is demonstrated in librarians' continuous professional growth and in how they cultivate learner autonomy through participatory IL activities that encourage ownership and intrinsic motivation. Meanwhile, Cognitive Load Theory is reflected in tailored teaching that minimizes extraneous load, scaffolded content that manages intrinsic load, and holistic support that reduces affective load, thus sustaining engagement and comprehension.

Taken together, the findings indicate that IL instruction, though grounded in practice, is informed by deep theoretical awareness. Librarians integrate frameworks and theories in ways that address the cognitive, ethical, technological, and pedagogical dimensions of IL learning. This underscores their evolving role as facilitators of meaningful, ethical, and sustainable learning experiences.

When compared with previous studies, these findings both reinforce and extend existing research. Earlier study by Julien and Genuis (2011) highlighted generic, one-shot IL sessions with minimal differentiation. In contrast, participants in this study practiced stratified, level-specific instruction aligned with constructivist scaffolding and the contextual principles of the ACRL Framework. Recent reviews by DeFrain et al. (2025) similarly identify differentiated and active pedagogies as dominant trends, situating this study within contemporary IL discourse.

The integration of ethics, integrity, and resilience expands IL beyond technical competencies, echoing Dow and Hovious's (2024) call for "high-impact IL" that supports both cognitive and affective outcomes, and Tewell's (2025) emphasis on critical and values-based instruction. Pedagogical innovation through active learning and reflective practice also aligns with findings by Campbell-Meier and Goulding (2021) and Chaudhuri and Terrones (2024), who noted a growing emphasis on blending traditional and technology-mediated instruction. Finally, the strong focus on continuous professional learning illustrates librarians' self-directed engagement with emerging challenges, including AI literacy (Del Castillo & Kelly, 2025; Luo et al., 2025), positioning them as adaptable, future-ready educators.

In sum, the study reveals that IL instruction in Malaysian academic libraries is theoretically grounded, pedagogically diverse, and ethically informed. It moves beyond earlier notions of IL as purely procedural, offering a model that integrates theory and practice through tailored, holistic, and reflective approaches.

2) Exploring librarians' use of the TPACK Framework for IL instruction (RQ2)

The findings for Research Question 2 reveal that academic librarians demonstrate a practical, though varied, application of the Technological Pedagogical Content Knowledge (TPACK) framework in their information literacy (IL) instruction. Their practices reflect the integration of technology, pedagogy, and content in ways that move IL teaching beyond static, skills-based tutorials toward dynamic, learner-centred, and technology-enhanced experiences.

Librarians' *Technological Knowledge (TK)* was evident in their creative use of digital tools such as PowerPoint, Canva, Kahoot, Quizziz, and MOOC platforms, as well as social media applications like TikTok. These tools were leveraged to diversify delivery, sustain engagement, and make IL sessions more interactive. Their *Pedagogical Knowledge (PK)* emerged through the adoption of facilitation roles, collaborative learning, flipped classrooms, and hands-on activities that shifted instruction from passive delivery to active participation. Meanwhile, *Content Knowledge (CK)* was expressed through tailored modules addressing learners' academic and research needs, from foundational database searching to advanced topics such as reference management, plagiarism detection, and thesis formatting.

More importantly, librarians' integrative understanding of TPACK was reflected in their responsiveness to student feedback, adaptive pacing, and modification of approaches to suit different learning contexts. This feedback-driven adaptation demonstrates an implicit but effective blending of technological, pedagogical, and content dimensions. Collectively, these findings suggest that while theoretical awareness of TPACK may differ among librarians, their instructional practices reveal a functional and evolving mastery of its principles. This indicates a broader pedagogical transformation within Malaysian academic

libraries, where IL instruction is increasingly framed as a reflective, adaptive, and theory-informed practice.

The findings also demonstrate close alignment with the ACRL Framework for Information Literacy for Higher Education. Instruction on plagiarism detection and ethical citation embodies *Information Has Value*, while the focus on advanced search strategies aligns with *Searching as Strategic Exploration*. Collaborative activities and discussions reflect *Scholarship as Conversation*, and research-focused modules for postgraduates mirror *Research as Inquiry*. These connections suggest that librarians' integration of technology and pedagogy is not merely instrumental but grounded in ethical, disciplinary, and cognitive dimensions of learning articulated by the ACRL Framework.

From the lens of Constructivist Learning Theory, the shift from didactic instruction to facilitation and collaboration highlights librarians' emphasis on active, inquiry-driven learning. Flipped classrooms, group work, and peer engagement embody both cognitive and social constructivism, enabling students to construct knowledge through exploration and dialogue rather than passive reception.

Similarly, the findings align with Self-Directed Learning Theory, as librarians create conditions that foster learner autonomy and reflective engagement. By incorporating advanced tools, providing hands-on opportunities, and tailoring feedback, they encourage students to take ownership of their learning and develop metacognitive skills essential for lifelong inquiry.

Applying Cognitive Load Theory further clarifies the instructional logic underpinning these practices. The use of visual aids, structured scaffolding, and interactive

activities helps reduce extraneous load, manage intrinsic load, and support knowledge retention. Adjustments to teaching pace and feedback mechanisms also prevent cognitive overload, allowing students to process complex IL tasks more effectively.

Taken together, these practices illustrate that librarians' instruction is deeply theory-informed, integrating multiple frameworks to enhance both engagement and comprehension. Although the application of TPACK is often implicit, it is evident across instructional design, tool use, and pedagogical decision-making, showing that librarians act as reflective practitioners who adapt theory to context.

Comparatively, these findings both align with and extend previous scholarship. The incorporation of diverse digital tools echoes studies showing librarians' increasing integration of technology in IL instruction (Luo & Hostetler, 2020; Lo, 2024; Kang & Sinn, 2024). The use of blended and flipped approaches resonates with DeFrain et al.'s (2025) observation that active and scaffolded learning now dominates IL pedagogy. In contrast to earlier research reporting limited pedagogical preparation and reliance on "one-shot" sessions (Julien & Genuis, 2011), the current findings reveal a more sophisticated and student-focused pedagogical orientation likely a result of professional development and post-pandemic shifts in digital teaching (Campbell-Meier & Goulding, 2021). The integration of emerging tools such as TikTok for IL instruction also suggests experimentation with contemporary, student-friendly platforms that bridge formal and informal learning spaces.

Beyond existing literature, the findings extend understanding of TPACK by illustrating adaptive and feedback-driven practice, where librarians adjust instruction in real time based on learner input. This dynamic responsiveness goes beyond static models of tool

adoption and demonstrates how TPACK can be enacted fluidly to meet changing learner needs. Moreover, these practices resonate with recent discussions on AI-integrated learning environments, where adaptability, inquiry, and ethics are central to effective pedagogy (Harrison, 2025; Yan et al., 2023).

In sum, the findings portray academic librarians as reflective educators who dynamically integrate technology, pedagogy, and content knowledge in their IL instruction. Their work exemplifies how theory can inform practice in flexible, context-sensitive ways, leading to instruction that is technologically innovative, pedagogically sound, ethically grounded, and attuned to learner development.

3) Exploring librarians' use of the ACRL Framework to develop information-literate students (RQ3)

The analysis of RQ3 indicates that while librarians' theoretical familiarity with the ACRL Framework varied, their instructional practices reflected active application of its principles. Structured literacy modules aligned with learning outcomes demonstrated intentional scaffolding and systematic design, while a strong emphasis on search strategies, evaluation, and ethical use highlighted alignment with the frames *Searching as Strategic Exploration* and *Information Has Value.* Interactive, two-way engagement strategies fostered inquiry and collaboration, resonating with *Research as Inquiry* and *Scholarship as Conversation.* Assessment and feedback mechanisms further underscored outcome-based evaluation, and contextualisation of instruction across faculties, academic levels, and student backgrounds reflected application of *Authority is Constructed and Contextual.* Collectively, these practices suggest that the six frames of the ACRL Framework are embedded, though

to varying extents within IL instruction, supporting the development of information-literate students.

The findings for Research Question 3 reveal that academic librarians demonstrate varied levels of understanding and application of the *ACRL Framework for Information Literacy for Higher Education*, with clear evidence that its six frames are embedded in instructional practices, even when not explicitly referenced. Structured literacy modules aligned with learning outcomes reflected intentional scaffolding and systematic design, ensuring that instruction was outcome-driven and integrated within course syllabi. Emphasis on search strategies, evaluation, and ethical information use illustrated direct engagement with the frames *Searching as Strategic Exploration* and *Information Has Value*, reinforcing both technical and ethical dimensions of information literacy. Similarly, inquiry-based tasks, two-way discussions, and collaborative activities corresponded to *Research as Inquiry* and *Scholarship as Conversation*, encouraging students to think critically and participate in scholarly dialogue. The contextualisation of IL sessions across faculties and academic levels reflected the frame *Authority Is Constructed and Contextual*, ensuring responsiveness to diverse learner backgrounds. Collectively, these practices suggest that while theoretical familiarity with the ACRL Framework varies, librarians' instructional strategies are deeply informed by its principles, cultivating critical, ethical, and reflective learners.

The findings also show strong intersections with complementary theoretical models. From the perspective of the TPACK framework, librarians demonstrated the integration of *Technology, Pedagogy, and Content Knowledge* through the use of databases, plagiarism detection systems, and citation management tools; the adoption of facilitation and active learning approaches; and the design of modules targeting advanced IL competencies such as Boolean searching, referencing, and thesis formatting. Contextual adaptation like adjusting

content and delivery according to faculty or student level, illustrates authentic TPACK integration in practice, as librarians continuously align pedagogical and technological choices with instructional goals and learner needs.

These practices further reflect Constructivist Learning Theory, where structured modules and scaffolded outcomes support progressive knowledge building. The shift from lecture-based sessions to dialogic, participatory instruction demonstrates social constructivism in action, positioning learners as co-creators of knowledge. Similarly, Self-Directed Learning Theory is evident in librarians' encouragement of independent inquiry, keyword generation, and use of research tools such as Mendeley and EndNote, promoting learner autonomy and reflective practice. The integration of feedback mechanisms where librarians refine instruction based on student input also models continuous improvement and self-regulated learning.

Viewed through Cognitive Load Theory, librarians' structured and contextualised teaching approaches help manage learners' cognitive demands. Clear sequencing of learning outcomes reduces extraneous load, while step-by-step demonstrations and hands-on activities regulate intrinsic load by simplifying complex IL tasks. Contextualisation and pacing adjustments further prevent overload, while the integration of ethics and values fosters a supportive affective environment conducive to deeper comprehension and sustained engagement.

As a whole, these findings indicate that librarians' practices, though not always theoretically articulated, are underpinned by multiple complementary frameworks. The ACRL principles are enacted through TPACK-informed instruction, constructivist and self-directed approaches, and cognitive load management, demonstrating an increasingly sophisticated pedagogy that translates theory into practice. This integration positions

librarians as reflective educators who not only teach technical competencies but also nurture critical thinking, ethical reasoning, and lifelong learning dispositions.

In comparison with existing literature, the study both reinforces and extends prior findings. The emphasis on structured, outcome-based IL modules supports earlier calls for systematic design and curriculum mapping (Oakleaf, 2014) and confirms that librarians' focus on search strategies, plagiarism detection, and citation management aligns with the frames *Searching as Strategic Exploration* and *Information Has Value* (Saunders, 2018). The prominence of inquiry-based, student-centred engagement echoes *Research as Inquiry* and *Scholarship as Conversation* and is consistent with contemporary evidence that such approaches now dominate IL pedagogy (Julien & Barker, 2009; DeFrain et al., 2025). In contrast to earlier studies that described IL teaching as generic, skills-based, and rarely assessed (Julien & Pecoskie, 2009; Oakleaf, 2010), the current findings demonstrate outcome evaluation through KPIs, surveys, and feedback loops, addressing long-standing gaps in IL assessment.

The strong emphasis on contextualisation across disciplines and academic levels also diverges from earlier reports of uniform, one-size-fits-all delivery (Saunders, 2018). By tailoring IL instruction to specific faculty contexts and learner needs, librarians demonstrated how the frame *Authority Is Constructed and Contextual* can be operationalised in authentic, localised settings, an aspect rarely detailed in prior empirical research. Furthermore, the inclusion of systematic reflection and feedback loops extends Oakleaf's (2010) recommendations for evidence-based IL teaching, aligning with more recent calls for adaptive and data-informed instruction (Pinto et al., 2024).

Recent scholarship further supports the timeliness of these findings. Wetzel and Kani (2024) have shown that generative AI tools can be integrated into IL instruction through the

ACRL Framework, while Harrison (2025) emphasised the importance of adapting inquiry-based pedagogy in AI-rich learning environments. Dalal et al. (2025) similarly highlighted students' expectations for relevant, research-driven IL instruction. The librarians' feedback-oriented and reflective approaches in this study suggest that Malaysian academic libraries are already aligning with these global pedagogical trends, preparing to navigate the challenges of AI-enhanced higher education.

All in all, the findings confirm and extend existing scholarship by demonstrating how the ACRL Framework can be effectively embedded through contextualised, adaptive, and reflective teaching practices. The study highlights a maturing pedagogical landscape in which librarians integrate theory with practice, using structured design, ethical instruction, and continuous assessment to foster critical and information-literate learners. This evolution not only bridges the gap between theory and practice but also positions IL instruction in Malaysian academic libraries as a forward-looking, internationally aligned model of learning in the digital age.

4) Exploring the link between student engagement and completion rates in IL MOOCs (RQ4)

The analysis of RQ4 reveals that video duration alone did not strongly influence completion, as low completion rates persisted across both short and long modules, with only a moderate correlation between length and completion outcomes. In contrast, engagement behaviours emerged as far stronger predictors of success. Time spent on the platform was highly significant, with students who invested more time substantially more likely to complete the MOOC. Similarly, the number of learning activities and assessments attempted were both powerful predictors of completion, highlighting the critical role of active participation. Independent t-tests further confirmed significant differences between

completers and non-completers across all engagement metrics, reinforcing that higher engagement consistently aligned with successful completion. Collectively, these findings demonstrate that while video duration had limited impact, active engagement through time investment, activity attempts, and assessment participation was central to determining MOOC completion.

The findings for Research Question 4 demonstrate that learner engagement is the most decisive factor influencing course completion in the IL MOOC. Quantitative analysis revealed that while video duration showed only moderate to weak correlations with activity ($r = 0.627$) and assessment completion ($r = 0.304$), it was not a strong determinant of overall learner success. Instead, behavioural measures of engagement, specifically time spent on the platform and the number of activities and assessments attempted were the most powerful predictors of completion. Regression results confirmed that time spent was highly significant ($\beta = 0.826$, $p < 0.001$), while activity and assessment participation also strongly predicted completion outcomes. Independent t-tests further showed that completers spent significantly more time and attempted more learning tasks than non-completers. Collectively, these findings indicate that active participation, rather than content length, drives persistence and achievement in the IL MOOC.

These results reinforce the importance of active engagement as central to effective online learning. Although video materials serve as key instructional components, they function primarily as gateways to deeper learning rather than as the primary determinants of success. Learners who invested more time engaging with interactive tasks and assessments demonstrated higher persistence and completion rates, underscoring that engagement with applied activities fosters sustained motivation and cognitive involvement. This aligns with Constructivist Learning Theory, which posits that learning occurs through active

participation and knowledge construction rather than passive exposure. The pattern also resonates with Self-Directed Learning (SDL) principles, as students who consistently attempted activities and assessments exhibited self-regulation, persistence, and autonomy, hallmarks of self-directed learners.

Interpreted through Cognitive Load Theory (CLT), the limited role of video duration suggests that the quality of instructional design matters more than length. Effective segmentation, clear signaling, and scaffolded follow-up tasks likely reduced extraneous load and sustained learner focus, even for longer videos. Conversely, poorly structured content, regardless of brevity, can increase cognitive strain and reduce engagement. This supports the view that meaningful engagement arises when learners process content in manageable units and apply knowledge immediately through hands-on practice, rather than merely watching videos passively.

The findings also align closely with the TPACK framework, which highlights the importance of integrating technology, pedagogy, and content. In this study, activities and assessments were not merely technological add-ons but pedagogical tools through which IL content was actively applied, such as exercises in database searching, Boolean operations, or citation management. Their predictive power for course completion demonstrates that when pedagogical design and technology are effectively integrated, learners engage more deeply with IL content. This supports the notion that interactive assessments and embedded feedback mechanisms are core components of technology-enhanced pedagogy, not supplementary elements.

Connections to the ACRL Framework for Information Literacy for Higher Education are also evident. Learners who completed activities and assessments were actively enacting the frames *Searching as Strategic Exploration* and *Scholarship as Conversation*, as they

practiced iterative searching, critical evaluation, and engagement with information in authentic contexts. The strong relationship between behavioural engagement and completion reflects the Framework's emphasis on developing dispositions, such as persistence, curiosity, and ethical participation beyond procedural skill mastery. Thus, the MOOC's interactive components functioned as the primary channels through which theoretical IL principles were operationalised.

Overall, the findings show that IL MOOC success depends far more on active engagement behaviours than on content duration. This conclusion both aligns with and extends existing MOOC literature. Studies by Guo et al. (2014) and Hew et al. (2018) similarly found that completion is driven more by interaction and assessment participation than by video length. However, this study diverges slightly from Guo et al. (2014), who associated shorter videos with better engagement: here, moderately longer videos sometimes correlated with higher persistence, possibly because IL instruction requires detailed demonstrations of complex skills. These results align with Li and Baker (2018), who noted that time on task and participation metrics better predict learning outcomes than video consumption alone. In IL-specific contexts, DeFrain et al. (2025) likewise observed that inquiry-driven and activity-based learning fosters greater persistence than passive delivery.

In sum, the findings affirm that course completion in the IL MOOC is driven by behavioural engagement, reflective participation, and pedagogical integration, rather than video duration. The study extends prior work by quantifying how engagement metrics, such as time spent, activity attempts, and assessment participation predict success, demonstrating empirically that IL learning is strengthened through applied, feedback-driven, and scaffolded interaction. For IL MOOC design, this means that future instructional strategies should prioritise activity-rich modules, embedded assessment checkpoints, and learner analytics

that promote persistence and self-regulation. By combining principles from constructivism, SDL, CLT, TPACK, and the ACRL Framework, this study contributes a comprehensive understanding of how engagement functions as the pedagogical and behavioural core of successful IL MOOCs in higher education.

5) Examining the relationship between IL competency and MOOC competition rates (RQ5)

The analysis of RQ5 shows that information literacy skills competencies are strongly associated with MOOC completion, particularly in advanced areas such as Scholarship as Conversation and *Searching as Strategic Exploration,* which demonstrated the highest correlations with course success. In contrast, *Authority is Constructed and Contextual* displayed the weakest link, reflecting its more foundational role. Strong inter-unit correlations highlighted the interconnected nature of IL competencies, emphasizing the value of integrated course design. ANOVA results confirmed significant group differences across all units, with the largest disparities observed in Units 2, 5, and 6, suggesting that engagement with these areas plays a critical role in determining completion. Competency levels also varied, with learners reporting stronger development in *Authority is Constructed and Contextual* but weaker outcomes in *Scholarship as Conversation* and *Searching as Strategic Exploration*. Collectively, these findings indicate that while competency growth is uneven across the six frames, mastery of advanced IL skills is most influential in driving MOOC completion, underscoring the need for targeted support and balanced instructional design.

The findings for Research Question 5 reveal that learners' information literacy (IL) competency is closely tied to their likelihood of completing the IL MOOC. Correlation and ANOVA analyses show that higher competency levels correspond strongly with course

completion, particularly in advanced frames such as *Scholarship as Conversation* and *Searching as Strategic Exploration*. These frames demonstrated the strongest relationships with both activity and assessment completion ($r = .751$ and $r = .731$, respectively), while *Authority Is Constructed and Contextual* exhibited weaker associations, reflecting its foundational rather than performance-based nature. Significant between-group differences across units, especially in Units 2, 5, and 6, indicate that learners who persisted to completion developed more advanced IL competencies, while those who disengaged tended to remain at the "developing" stage. These results underscore that completion is not only a behavioural measure of persistence but also a reflection of deeper learning outcomes, where students who demonstrate mastery of complex IL skills are more likely to complete the course.

The inter-unit correlations further highlight the interconnectedness of IL skills. Strong links between *Information Creation as a Process* (Unit 2) and *Research as Inquiry* (Unit 4) suggest that competency growth in one frame reinforces development in others, supporting the ACRL Framework's view of IL as a network of interdependent practices rather than discrete abilities. Interestingly, learner self-reports indicated higher perceived importance for *Authority* awareness but lower recognition of *Scholarship* and *Searching* competencies, revealing a perception-performance gap. While students value foundational understanding, their successful completion appears driven by applied, inquiry-based, and dialogic competencies, which require them to frame their understanding through iterative searching, critical evaluation, and synthesis.

Viewed through the TPACK framework, the strongest predictors of completion correspond to units where content, pedagogy, and technology were most effectively integrated. The advanced IL competencies in Units 5 and 6 required students to engage with complex tasks such as citation, synthesis, and advanced database searching, supported by

guided inquiry, peer discussion, and interactive technological tools (e.g., citation managers, plagiarism detection systems, and automated quizzes). The significant ANOVA results across these units reflect the pedagogical and technological orchestration that enabled learners to progress from procedural understanding to conceptual mastery. Standardising these high-impact TPACK strategies, such as search planners, formative feedback cycles, and scaffolded synthesis tasks, could therefore strengthen overall competency and reduce disparities across learner groups.

From a Constructivist Learning Theory perspective, these patterns confirm that IL competency develops through active knowledge construction. The units most associated with completion required learners to formulate queries, test search strategies, evaluate sources, and engage in scholarly dialogue, i.e., activities that foster sense-making, reflection, and iterative refinement. The strong inter-unit relationships illustrate how constructing understanding in one frame (e.g., information creation) facilitates engagement in another (e.g., research inquiry), supporting the view that IL learning is cumulative and scaffolded.

The findings also resonate with Self-Directed Learning (SDL) Theory, as higher performance in advanced units reflects stronger self-regulation, persistence, and effort management. Learners who spent more time on activities and assessments exhibited SDL traits such as goal-setting and monitoring. Embedding reflective prompts, transparent progress indicators, and personalised feedback could further strengthen these behaviours by transforming engagement into metacognitive control and sustained motivation across units.

Cognitive Load Theory (CLT) offers additional insight into the observed differences in competency and completion. The high-performing units demanded multi-step, cognitively intensive tasks that required managing intrinsic load effectively through segmentation, guided examples, and structured pacing. When instructional design reduced extraneous load

through clear instructions, intuitive tool interfaces, and immediate practice after demonstrations, learners were better able to process and apply IL knowledge. Conversely, less structured materials or unclear expectations likely contributed to non-completion among lower-performing cohorts.

Taken together, these results present a coherent picture: IL MOOC completion reflects the successful enactment of the ACRL frames through TPACK-integrated, constructivist, and self-directed learning experiences that manage cognitive demands effectively. Learners progress when instruction moves beyond declarative understanding toward performative mastery, when they are guided to participate in scholarly conversations, construct searches iteratively, and apply IL principles in authentic, technology-supported contexts.

These findings both align with and extend prior research. They reinforce Latham et al.'s (2019) and Sung and Shumaker's (2015) conclusions that higher-order IL competencies predict academic success, while diverging from earlier studies (e.g., Saunders, 2018; Oakleaf, 2014) that emphasised foundational authority recognition as the central IL driver. The strong inter-unit integration observed here also contrasts with Julien and Pecoskie's (2009) portrayal of fragmented IL instruction, aligning instead with Delmond et al. (2024) and Pinto et al. (2024), who advocate for cohesive, evidence-based instructional sequencing. Moreover, the empirical identification of *Scholarship as Conversation* and *Searching as Strategic Exploration* as the most predictive frames contributes new quantitative evidence to the IL and MOOC literature, an area where such relationships are rarely measured. The results echo Zhao (2024) and Shokrpour et al. (2024), who found that higher IL competency correlates with engagement and satisfaction in online learning, and complement Dinh and

Phuong's (2024) observation that self-regulated learning behaviours underpin MOOC persistence.

In sum, the study extends existing scholarship by quantifying how IL competencies predict completion and by situating this relationship within integrated theoretical frameworks. It shows that completion in the IL MOOC is both a behavioural and cognitive achievement, dependent on active engagement, applied mastery, and scaffolded instructional design. By identifying *Scholarship as Conversation* and *Searching as Strategic Exploration* as key predictors, the findings provide an evidence-based foundation for future IL MOOC development in Malaysia, emphasising structured, feedback-rich, and reflective pathways that move learners from basic awareness toward advanced, transferable information literacy.

6) Examining Student Engagement across the Elements of the IL MOOC (RQ6)

The analysis of RQ6 shows that learner engagement with MOOC elements was uneven, with tutorial videos receiving the highest levels of attention, while further readings were largely overlooked, and assessments maintained only minimal but consistent interaction. A distinct pattern emerged in activity and assessment attempts: more than half of learners did not participate at all, while a smaller yet persistent group engaged repeatedly, often attempting tasks up to six times. This polarized trend suggests issues of accessibility, task difficulty, or motivation, with few learners engaging at intermediate levels. Importantly, ANOVA results confirmed that completion of both learning activities and assessments significantly influenced IL competency across all units, with Units 4, 5, and 6 showing the strongest effects. Collectively, these findings underscore that active engagement, particularly through repeated task attempts, is central to competency gains, while passive elements such as readings contribute little. Strengthening course design to emphasize

interactive and supported engagement is therefore key to improving participation and learning outcomes.

The analysis of student engagement across MOOC components reveals that information literacy (IL) competency is most powerfully shaped by active participation in interactive tasks and assessments rather than by passive exposure to content. Although tutorial videos attracted the most attention, and readings received minimal engagement, ANOVA results confirmed that completion of learning activities and assessments significantly predicted IL competency across all six units, particularly in Units 4, 5, and 6, where higher-order IL skills demanded sustained interaction. These findings highlight that engagement depth, rather than content format or duration, is the primary driver of competency growth. Within the Malaysian higher education context, this underscores the importance of embedding scaffolded, outcome-aligned activities that promote repeated practice, feedback, and reflection to translate engagement into measurable skill development.

Engagement analytics showed a polarized pattern: a majority of learners disengaged early, while a smaller, highly persistent group repeatedly attempted tasks (up to six times). This suggests that while some learners effectively internalized self-regulated learning behaviours, others struggled to transition from passive observation to active participation. Interpreted through Constructivist Learning Theory, persistent learners engaged in iterative sense-making, feedback incorporation, and refinement hallmarks of knowledge construction through practice. The absence of a "middle" engagement band implies limited scaffolding for intermediate learners who might benefit from graduated difficulty, clearer expectations, or motivational supports. Viewed through Self-Directed Learning (SDL), persistent learners exhibited autonomy, time management, and effort regulation, while disengaged learners may

have faced cognitive or motivational barriers. Designing visible and reward-based progress mechanisms, reflective prompts, and formative feedback could help bridge this divide by making persistence both achievable and recognized.

From the perspective of TPACK, the most effective units integrated technology, pedagogy, and content to create seamless learning pathways. Short videos served as conceptual entry points, but their instructional power emerged only when they were coupled with guided inquiry, immediate practice, and feedback mechanisms, transforming passive media into active learning tools. Units 4 (*Research as Inquiry*), 5 (*Scholarship as Conversation*), and 6 (*Searching as Strategic Exploration*) exemplified this alignment: they combined IL content (search, evaluation, and synthesis), pedagogy (staged tasks, rubrics, exemplars), and technology (databases, citation tools, quiz engines) to elicit authentic performances. These design features likely explain the significant between-group differences in competency, reinforcing that IL MOOCs are most effective when pedagogy and technology are deliberately orchestrated around applied practice.

Cognitive Load Theory (CLT) provides further insight into engagement behaviours. Learners spent minimal time on static readings, likely due to the higher extraneous load imposed by text-heavy materials disconnected from immediate application. In contrast, short, well-segmented videos with explicit cues and procedural demonstrations facilitated intrinsic load management and channelled cognitive resources toward germane processing. The high F-values in Units 4 to 6 suggest that well-scaffolded tasks supported schema construction for complex IL performances, whereas less structured materials may have overwhelmed working memory and discouraged sustained engagement. Integrating signaling, chunking, and immediate post-video tasks thus helps convert attention into learning while minimizing cognitive fatigue.

The results also align with the ACRL Framework for Information Literacy for Higher Education, particularly in showing that competencies develop through enacted rather than declarative learning. Activities linked to *Research as Inquiry*, *Scholarship as Conversation*, and *Searching as Strategic Exploration* fostered iterative searching, critical evaluation, and synthesis, processes central to the Framework's performance-based orientation. Conversely, limited engagement with readings may have hindered deeper engagement with frames such as *Authority Is Constructed and Contextual* or *Information Creation as a Process*, which rely on reflective and evaluative judgment. Embedding these frames within task-based designs rather than isolating them as readings would more effectively integrate ethical and contextual IL dimensions into active learning cycles.

Altogether, the findings reveal a coherent pattern, in which learners gravitate toward concise, visual demonstrations, but competency gains occur when these demonstrations are embedded in structured, feedback-driven practice. Engagement is most effective when Information Literacy (IL) MOOCs are structured as TPACK-integrated performance pathways, progressing from a short video to a guided activity, followed by feedback and a revised attempt. This design reflects Constructivist principles of learning-by-doing, encourages Self-Directed Learning (SDL) through persistence and learner autonomy, and aligns with Cognitive Load Theory (CLT) by optimizing mental processing for better understanding and retention. Empirically, completion of activities and assessments emerged as the strongest predictors of IL competency, a result that supports and extends prior research (Guo et al., 2014; Li & Baker, 2018; Zhao, 2024; Shokrpour et al., 2024). While earlier studies emphasized short videos as the main engagement driver (Guo et al., 2014), the current findings suggest that in IL contexts, longer, well-structured demonstrations may better sustain learning where conceptual depth and applied performance are required.

This study contributes new insights in three areas. First, it quantifies the predictive power of activity and assessment completion for IL competency, extending Oakleaf's (2010) call for outcome-based IL assessment into the MOOC environment. Second, it highlights the polarization of learner engagement, emphasizing the need for differentiated scaffolding to support intermediate participants. Third, it bridges IL theory with digital pedagogy by linking platform analytics to theoretical constructs from ACRL, TPACK, SDL, and CLT. In sum, the findings affirm that meaningful engagement, not media length or format, is the critical determinant of IL skill acquisition and course completion. For future IL MOOC design, prioritizing iterative practice, immediate feedback, and accessible scaffolding will ensure that learners not only stay engaged but also progress toward advanced, transferable information literacy competencies.

5.3 Implications

1) Examining the extent of theoretical integration in IL instruction (RQ1)

Theoretical implications

The findings for RQ1 confirm that IL instruction in Malaysian academic libraries incorporates constructivist, holistic, pedagogical, and lifelong learning theories. This directly addresses OBJ1 by demonstrating that theoretical underpinnings are not abstract but are operationalized in practice through tailored teaching approaches, integration of ethics and values, interactive pedagogy, and continuous professional development. The study therefore contributes to knowledge by showing that IL instruction is multi-theoretical, moving beyond a purely skills-based orientation to one that situates information use within broader educational, ethical, and developmental frameworks. This advances the theoretical discourse

by evidencing how librarians translate conceptual foundations into day-to-day teaching approaches.

Practical Implications

The practical implications of RQ1 highlight ways in which librarians can strengthen IL instruction to better reflect theoretical principles. In line with OBJ1, the study demonstrates the value of differentiated instruction to support learners at different academic stages, ensuring that teaching is scaffolded according to prior knowledge. The embedding of ethical and value-based content within IL sessions reflects the application of holistic educational theories, reinforcing that IL should cultivate not only technical skills but also integrity and resilience. Further, the emphasis on pedagogical training underscores the importance of equipping librarians with the skills to implement active, two-way learning strategies that engage students more effectively. These findings suggest that librarians should adopt continuous professional development as a reflective practice, ensuring their teaching remains aligned with evolving theories and best practices. For MOOC design, this means incorporating scaffolding, interactivity, and ethical dimensions into digital content, thereby extending theoretical principles into online learning environments.

Policy and Institutional Implications

At the policy and institutional level, RQ1 findings reinforce the need to embed theoretical grounding into IL at the structural level. Achieving OBJ1 requires university libraries to integrate IL into formal, tiered curricular modules that systematically build competencies across academic levels. Policies should emphasize pedagogical training and recognition for librarians, positioning them as educators within the academic ecosystem. Furthermore, ministries and professional bodies can institutionalize these practices by

embedding IL competencies, ethics, and academic integrity into national higher education frameworks and accreditation standards. This would standardize IL delivery across universities while allowing for contextual adaptation. By aligning IL instruction with theoretical models at both institutional and national levels, universities and ministries can ensure that IL is recognized not merely as a support service but as a core educational function that fosters critical, ethical, and lifelong learners.

2) Exploring librarians' use of the TPACK Framework for IL instruction (RQ2)

Theoretical implications

The findings from RQ2 enrich the theoretical discourse by illustrating how the Technological Pedagogical Content Knowledge (TPACK) framework is enacted in information literacy (IL) instruction. While librarians may not explicitly refer to TPACK in their work, their practices demonstrate an implicit yet meaningful integration of its domains. The use of diverse technological tools such as Kahoot, Quizziz, and MOOCs highlights their *Technological Knowledge (TK)***,** while their adoption of flipped classroom strategies and facilitation roles reflects *Pedagogical Knowledge (PK)* grounded in constructivist and student-centred learning theories. Similarly, the development of IL modules on advanced research skills, plagiarism detection, and reference management illustrates their *Content Knowledge (CK)* tailored to disciplinary and postgraduate needs. Importantly, the incorporation of feedback loops to adjust teaching pace and delivery shows the interplay between TPACK components, highlighting librarians' ability to translate theory into practice through reflective teaching. These insights advance knowledge by demonstrating that IL instruction is not confined to isolated skill sets but embodies a dynamic integration of technology, pedagogy, and content. This contributes to scholarship on IL pedagogy by

providing empirical evidence of how TPACK principles are applied in real-world instructional contexts.

Practical implications

The practical implications of RQ2 highlight concrete ways in which librarians can enhance the quality and impact of IL instruction. First, adopting blended and flipped learning models can create a balanced instructional environment that combines the strengths of both technology and face-to-face engagement. Second, the findings underscore the value of using interactive tools and digital platforms not as add-ons, but as integrated components of learning design that directly support IL outcomes. Third, librarians should continue to strengthen their facilitation and pedagogical skills, moving beyond lecture-based delivery toward collaborative, problem-solving, and inquiry-driven approaches. The focus on advanced IL competencies, such as Boolean searching, plagiarism detection, and reference management, also points to the importance of aligning content with learners' academic and research needs, particularly for postgraduate students. Furthermore, the active use of feedback mechanisms demonstrates how librarians can remain responsive to learners by adjusting the pace, mode, and focus of their teaching. For technology-enhanced environments such as IL MOOCs, these practices suggest that course design should integrate scaffolded content, interactivity, and adaptive features, ensuring that learners remain motivated and supported throughout their learning journey. Collectively, these practical insights show how the TPACK framework can be operationalized to improve engagement and deepen student learning.

Policy and institutional implications

At the institutional level, the findings point to the need for universities and libraries to formally recognize and support librarians as educators who apply complex theoretical frameworks in their teaching. Policies should prioritize professional development opportunities in TPACK, encompassing not only training in new technologies but also pedagogical design and curriculum integration. Allocating resources for continuous upskilling through workshops, benchmarking, and peer collaboration will enable librarians to refine their technological and pedagogical expertise. Universities should also move toward embedding IL instruction into formal curricula, ensuring that IL competencies are recognized as essential learning outcomes rather than optional support services. At the national and ministerial levels, there is an opportunity to strengthen IL instruction by establishing guidelines and standards that highlight TPACK as a model for effective teaching. Ministries and professional library associations could also facilitate the sharing of best practices, such as through centralized repositories of IL resources or collaborative training hubs. Embedding IL competencies, with explicit attention to technological, pedagogical, and content integration, into accreditation frameworks and graduate attributes would ensure consistency and quality across institutions. Taken together, these measures position IL instruction not only as a support function but as a core educational responsibility, ensuring that students acquire the critical, technological, and ethical literacies needed for academic and lifelong success.

3) Exploring librarians' use of the ACRL Framework to develop information-literate students (RQ3)

Theoretical implications

The findings from RQ3 contribute to theoretical discourse by showing how the ACRL Framework for Information Literacy for Higher Education is applied in practice, even when librarians' explicit familiarity with its principles varies. The design of structured IL modules aligned with learning outcomes reflects outcome-based learning theory, demonstrating librarians' awareness of the need for intentional scaffolding. The emphasis on search strategies, ethical information use, and evaluation highlights how the frames *Searching as Strategic Exploration* and *Information Has Value* are enacted in instruction, integrating both technical and moral dimensions of IL pedagogy. Likewise, the adoption of inquiry-based and two-way learning resonates with constructivist traditions underpinning the frames *Research as Inquiry* and *Scholarship as Conversation*. Finally, contextual adaptation of modules aligns with the frame *Authority is Constructed and Contextual*, underscoring the relational and situated nature of IL knowledge. Collectively, these findings extend knowledge by evidencing that the ACRL Framework is not merely theoretical but is embedded implicitly in librarians' practices, bridging the gap between abstract conceptual models and the realities of IL teaching.

Practical implications

The practical implications of RQ3 suggest actionable strategies for librarians to enhance IL instruction. First, the development of structured modules aligned with learning outcomes should remain central, ensuring that IL competencies are scaffolded across academic levels and disciplines. Second, librarians should continue to emphasise hands-on

practice in information search, evaluation, and ethical use, using tools such as Turnitin, Mendeley, and EndNote to cultivate transferable academic skills. Third, fostering two-way learning environments through collaborative activities, peer engagement, and inquiry-driven discussions can strengthen students' critical thinking and reflective learning, making IL instruction more engaging and participatory. Fourth, systematic outcome evaluation through surveys, KPIs, and feedback loops should be institutionalised, not only to measure effectiveness but also to inform continuous improvement of instructional strategies. Finally, librarians should embed contextualization and tailoring into their teaching, adapting content to students' faculties, academic levels, and backgrounds. These practices, aligned with the ACRL Framework, ensure that IL instruction is both conceptually grounded and practically relevant.

Policy and institutional implications

At the institutional level, the findings highlight the importance of embedding the ACRL Framework into formal IL instruction policies and curricula. Universities should ensure that all faculties integrate IL modules mapped to the six frames, making IL a compulsory and progressive component of students' academic journey. Libraries should invest in training programs that explicitly introduce the ACRL Framework, equipping librarians with both theoretical grounding and practical tools for applying it consistently. Recognition of librarians as educators, with roles in delivering outcomes-based IL instruction, should be reinforced through workload allocation, performance appraisal, and institutional acknowledgment. At the national and ministerial levels, professional bodies and accreditation agencies could adopt the ACRL Framework or a locally contextualised version as a benchmark for IL standards in higher education. Embedding IL competencies into

graduate attributes and accreditation requirements would ensure that IL instruction is standardised, theoretically robust, and aligned with global best practices. These measures would elevate IL from a support service to a strategic educational priority, ensuring that all students graduate with the critical and ethical information skills necessary for academic and lifelong success.

4) Exploring the Link between Student Engagement and Completion Rates in IL MOOCs (RQ4)

Theoretical implications

The findings advance theoretical understanding of learner engagement and completion dynamics in MOOCs, particularly within the domain of information literacy (IL). First, the results show that video duration alone is not a strong determinant of learning activity or assessment completion, challenging simplified assumptions in MOOC design literature that shorter videos inherently lead to higher engagement. Instead, engagement appears to be influenced by multiple factors, such as content complexity, learner motivation, and instructional design. This aligns with Cognitive Load Theory, suggesting that content relevance and manageability may matter more than duration. Second, the strong predictive value of time spent on the platform, number of learning activities attempted, and assessments completed reinforces constructivist and self-directed learning theories, which argue that deeper, sustained interaction with course materials facilitates better learning outcomes. Finally, the results provide empirical evidence that MOOC completion is a multifactorial process where engagement behaviors (time, activity attempts, assessments) are more theoretically significant predictors of success than video length, thereby enriching the body of knowledge on IL pedagogy and technology-mediated learning.

Practical Implications

From a practical perspective, the findings highlight several recommendations for improving IL MOOC design and delivery. First, rather than focusing primarily on video duration, designers should prioritize content quality, interactivity, and instructional strategies to sustain learner attention. Embedding quizzes, reflective prompts, and branching scenarios within or after videos can encourage active engagement. Second, the significant predictive power of learning activity and assessment attempts suggests that course designers should emphasize frequent, low-stakes activities and assessments, which encourage ongoing participation and provide students with feedback loops that reinforce learning. Third, to increase time-on-task and completion, MOOCs should incorporate motivational supports such as gamification elements, progress tracking dashboards, or peer discussion forums that encourage persistence. Finally, practical strategies such as modular pacing, adaptive release of content, and diverse activity formats can reduce drop-offs and cater to learners with different engagement patterns. Collectively, these practices can help transform IL MOOCs from passive content repositories into interactive learning ecosystems that actively support completion.

Policy and institutional implications

At the policy and institutional level, these findings suggest several actions for universities, libraries, and ministries. For universities and academic libraries, the evidence underscores the need to allocate resources for pedagogical and technological design support, enabling librarians to develop MOOCs that go beyond content delivery to embed interactive and assessment-driven learning. Policies should mandate the integration of engagement analytics into IL MOOCs, ensuring that data on time spent, activity attempts, and assessment completion is routinely monitored and used for continuous course improvement. At the

institutional level, IL MOOCs should be recognized not only as supplementary training but as a formally accredited component of the curriculum, tied to graduate attributes and learning outcomes. At the ministerial or national level, professional bodies could establish guidelines for digital IL instruction, emphasizing quality standards for video design, activity integration, and learner engagement mechanisms. Ministries may also support cross-institutional collaborations to create shared IL MOOC platforms, ensuring equitable access and consistency in digital IL education. These policy directions reinforce IL as a strategic educational priority, ensuring that engagement and completion are maximized across diverse learner groups.

5) Examining the Relationship between IL Competency and MOOC Completion Rates (RQ5)

Theoretical implications

The findings contribute to the theoretical understanding of information literacy (IL) competency development in MOOCs by showing how different ACRL frames are differentially related to course completion. The strong correlations of *Scholarship as Conversation* and *Searching as Strategic Exploration* with completion status underscore the pivotal role of higher-order, integrative IL competencies in driving student success. This aligns with constructivist learning theory, which emphasizes the value of collaborative inquiry and strategic exploration in constructing knowledge. Conversely, the relatively weaker association of *Authority is Constructed and Contextual* with completion suggests that foundational skills, while important, may not directly influence persistence in the same way as advanced competencies. The significant ANOVA results across units further highlight that IL competencies are not evenly acquired, but vary by group and completion status, supporting theories of learner variability and differentiated progression in digital

environments. The competency-level analysis also shows that most learners remain at the "developing" stage, particularly in complex frames like *Searching as Strategic Exploration*, reinforcing the need to view IL skill-building as a progressive and staged process rather than a uniform acquisition. Collectively, these results expand theoretical insights by evidencing the interplay between IL frameworks, MOOC engagement, and competency development, thereby bridging gaps between IL pedagogy, assessment, and digital learning scholarship.

Practical implications

Several practical recommendations emerge from the results. First, IL MOOC designers should prioritize units with strong predictive power for completion (e.g., *Scholarship as Conversation* and *Searching as Strategic Exploration*), ensuring that these units are designed with engaging, interactive, and scaffolded activities to maximize learning gains. At the same time, modules like *Authority is Constructed and Contextual* should be redesigned to highlight their relevance and integrated more effectively into later units, rather than standing in isolation. Second, the strong inter-unit correlations point to the importance of integrated curriculum design, modules should not be treated as discrete segments but as interconnected learning pathways that progressively reinforce competencies. Third, since learning activities and assessments strongly predict completion, the MOOC should embed frequent, well-aligned assessments and interactive exercises to encourage persistence. Providing timely feedback is critical to sustaining motivation and reducing dropout. Fourth, practical supports such as adaptive pacing, differentiated resources, and scaffolds for underperforming groups could address the disparities revealed in ANOVA results. Finally, given that most learners are at the "developing" level of IL skills, course designers and librarians should incorporate progressive competency milestones and self-reflective tasks to help learners track and advance their IL growth over time.

Policy and institutional implications

At the institutional level, these findings highlight the need for universities and libraries to formally recognize IL competency development as a staged, progressive **process** tied to curricular outcomes. Policies should mandate the integration of IL MOOCs into academic programs, with explicit alignment to the ACRL frames to ensure conceptual depth and transferability. Libraries should establish assessment systems that track IL competency growth across cohorts, using engagement analytics and competency outcomes as performance indicators. Institutions should also invest in professional development for librarians, equipping them with skills in digital pedagogy, learning analytics, and curriculum mapping to strengthen MOOC-based instruction. At the national or ministerial level, the findings suggest the need to develop standardized IL competency benchmarks (possibly adapted from the ACRL Framework) that define expected progression levels (developing, proficient, advanced) across higher education. Ministries and accreditation agencies could require universities to demonstrate how IL competencies, particularly advanced frames like *Scholarship as Conversation* and *Searching as Strategic Exploration* are embedded within graduate attributes. Finally, cross-institutional collaborations could be promoted to share best practices in IL MOOC design, delivery, and evaluation, ensuring that digital IL instruction is equitable, scalable, and conceptually grounded.

6) Examining Student Engagement across the Elements of the IL MOOC (RQ6)

Theoretical Implications

The findings provide important contributions to the theoretical understanding of information literacy (IL) pedagogy in MOOC environments. The data indicate that learner engagement is driven more by behavioral interaction with tasks than by content type or video

duration alone, reinforcing perspectives from constructivist and self-directed learning theories that emphasize the role of active participation in driving meaningful outcomes. The exceptionally high ANOVA results demonstrate that IL competencies are not evenly acquired across all frames, but rather vary significantly by completion status and learning unit. In particular, Units 5 *(Scholarship as Conversation)* and 6 *(Searching as Strategic Exploration)* emerged as critical predictors of success, suggesting that these advanced competencies may act as threshold concepts essential for student progression. At the same time, Unit 1 *(Authority is Constructed and Contextual)* displayed weaker correlations with completion, highlighting that foundational competencies, while necessary for scaffolding, may not directly influence persistence in the same way as more advanced frames. Furthermore, the bimodal pattern of engagement where large groups of learners either made no attempts or engaged persistently up to six times points to distinct learner archetypes that challenge traditional one-size-fits-all MOOC design. Taken together, these findings expand theoretical insights by demonstrating that IL competency development in MOOCs is a staged, frame-sensitive, and behaviorally mediated process that requires differentiated pedagogical responses.

Practical implications

From a practical standpoint, the findings highlight several strategies for improving IL MOOC design and delivery. Units with strong predictive power for completion, particularly *Scholarship as Conversation* and *Searching as Strategic Exploration*, should be prioritized and enriched with interactive, inquiry-based activities that engage students in authentic academic practices. Foundational units such as *Authority is Constructed and Contextual* should be explicitly linked to these later modules to make their relevance clear,

for example by embedding evaluation of authority within search and conversation tasks. Since time spent on the platform significantly predicts completion, course design should intentionally engineer structured opportunities for time-on-task, such as embedding questions within videos, branching scenarios, or short reflection prompts that sustain attention. The bimodal pattern of non-engagers versus strivers suggests the need for differentiated supports: early low-stakes activities and motivational nudges for hesitant learners, and mastery-based reattempt opportunities with targeted feedback for persistent learners. Assessment practices should emphasize frequent, low-stakes items with immediate and specific feedback, ensuring alignment with the ACRL frames and helping learners track their own competency development. Additionally, adaptive pacing, timely guidance, and diverse activity formats could reduce dropout rates and support learners with varying needs, thereby transforming the MOOC from a passive content repository into an interactive learning ecosystem.

Policy and institutional implications

At the institutional level, the findings underscore the need for universities and libraries to formally embed IL competency development as a progressive learning spine across academic programs. Policies should mandate the integration of IL MOOCs into curricula, ensuring that ACRL frames, particularly the advanced competencies most strongly tied to success are mapped to course and program learning outcomes. Libraries should adopt systematic learning analytics to monitor student engagement and outcomes, using indicators such as time on task, activity attempts, and assessment completion as benchmarks for instructional quality. Institutions should also recognize the instructional role of librarians by investing in professional development in digital pedagogy, instructional design, and learning

analytics, and by embedding IL teaching within workload and performance frameworks. At the national and ministerial level, the results suggest the need for standardized IL competency benchmarks aligned to the ACRL Framework, with defined progression levels from developing to proficient to advanced. Accreditation bodies could require evidence of competency achievement, particularly in higher-order frames such as inquiry and strategic exploration, as part of graduate attribute standards. Ministries and professional associations may also support collaborative IL MOOC platforms, resource sharing, and the development of national guidelines on assessment and engagement strategies. Such measures would elevate IL instruction from a supportive service to a strategic educational priority, ensuring that students graduate with the critical and ethical information skills required for academic and lifelong success.

5.4 Limitations of the Study

Despite offering valuable insights into information literacy (IL) instruction and the integration of theoretical frameworks within MOOC environments, several limitations of this study must be acknowledged. First, while interviews with academic librarians (RQ1-RQ3) provided rich qualitative insights, the findings are based on a relatively small sample size across selected universities. This may limit the generalizability of the results, as the perspectives captured might not represent the full diversity of practices or levels of theoretical understanding across all Malaysian higher education institutions.

Second, the interpretation of librarians' practices in relation to theoretical models such as the ACRL Framework, the TPACK model, and constructivist learning theory was often implicit rather than explicit. Many participants demonstrated alignment in practice without formally referencing the frameworks, which creates a limitation in terms of

confirming the depth of their theoretical knowledge. This makes it difficult to determine whether their practices were consciously grounded in these models or guided more by experiential knowledge.

Third, on the quantitative side (RQ4-RQ5), the analysis of student engagement and completion within the IL MOOC revealed strong statistical relationships between time on task, activity attempts, assessment completion, and competency development. However, the study design was limited by its reliance on platform-based analytics and completion metrics, which capture observable behaviors but do not fully account for underlying learner motivations, prior knowledge, or external factors such as workload, access to technology, or personal commitments. This means that while correlations and predictive relationships were identified, causal explanations remain tentative.

Fourth, certain findings highlight content- and design-related constraints in the MOOC itself. For example, video duration did not consistently predict completion rates, suggesting that other factors such as content quality, perceived relevance, or instructional design may have influenced engagement. Similarly, the bimodal distribution of attempts (with large groups of non-participants versus highly persistent learners) indicates that the MOOC design may not have adequately supported learners with moderate or fluctuating engagement patterns. These design limitations restrict the extent to which conclusions about learner behavior can be generalized to other MOOC settings or IL instruction contexts.

Finally, while the study identified significant competency gains in advanced ACRL frames such as *Scholarship as Conversation* and *Searching as Strategic Exploration*, most learners remained at the "developing" stage of IL competency. This raises questions about the short duration of the MOOC intervention and whether a longer or more embedded program might be necessary to foster progression to proficient and advanced levels.

Additionally, cultural and contextual factors unique to Malaysian higher education, such as language proficiency, disciplinary differences, and institutional priorities may limit the transferability of findings to other national or regional contexts.

5.5 Recommendations

Building on the limitations identified in this study, several avenues for future research are recommended. First, expanding the scope and scale of qualitative inquiry would strengthen the generalizability of findings. Future studies should involve a larger and more diverse pool of academic librarians across multiple universities and higher education systems, both within and outside Malaysia. This would provide a broader range of perspectives and enable comparisons across institutional types, disciplines, and cultural contexts.

Second, further work is needed to address the theory–practice gap observed in this study. While librarians' practices often aligned with theoretical models such as the ACRL Framework and the TPACK framework, explicit references were limited. Future research should therefore investigate how librarians can be more systematically trained to understand and apply these frameworks in a conscious, deliberate manner. Longitudinal or intervention studies that assess the impact of professional development programs on librarians' theoretical awareness and instructional practices would be particularly valuable.

Third, in relation to MOOC-based learning, future studies should incorporate mixed-methods approaches that combine platform analytics with learner surveys, interviews, or focus groups. This would help to capture not only observable behaviours but also the motivational, contextual, and affective factors influencing learner engagement and completion. For example, investigating the role of self-regulation skills, language

proficiency, or external commitments could provide richer explanations for the bimodal engagement patterns found in this study.

Fourth, future research should explore design innovations in IL MOOCs that directly address the limitations identified here. Experimental studies could compare different instructional designs, for instance, shorter versus longer videos with embedded quizzes, gamification strategies, or adaptive feedback systems to determine which approaches most effectively promote sustained engagement and competency growth. Similarly, investigating scaffolding techniques for "non-starters" or support pathways for learners with intermediate engagement levels could yield practical insights for improving completion rates.

Finally, future studies should consider longer-term interventions that move beyond a single-semester MOOC to track IL competency development over time. A longitudinal approach could examine whether learners progress from developing to proficient or advanced competency levels when IL instruction is integrated across multiple courses or academic years. Comparative studies across cultural and institutional contexts would also help to identify how local factors, such as language and educational traditions, influence both engagement and learning outcomes.

5.6 Contributions of the Study

This study makes several important contributions to the field of information literacy (IL) instruction, both conceptually and practically.

Theoretical contributions

The study extends knowledge on the theoretical foundations of IL pedagogy by demonstrating how multiple frameworks, the ACRL Framework for Information Literacy for Higher Education, the TPACK framework, and learning theories such as constructivism,

self-directed learning, and cognitive load theory are reflected in practice. The findings from RQ1–RQ3 illustrate that while librarians' theoretical awareness varies, their instructional approaches implicitly incorporate core principles of these frameworks through scaffolding, ethical integration, interactive pedagogy, and continuous learning. In addition, the MOOC-based findings (RQ4-RQ5) highlight that IL competency development is a staged and frame-sensitive process, with higher-order competencies such as *Scholarship as Conversation* and *Searching as Strategic Exploration* functioning as threshold concepts that strongly predict completion and success. This contributes to the broader theoretical discourse by evidencing how theory is operationalized in digital learning environments, and by emphasizing the behavioral dimensions of engagement, such as time on task, activity attempts, and assessment completion that mediate competency growth.

Practical contribution

Practically, the study provides actionable insights for librarians, universities, and policymakers. For librarians, the findings highlight the importance of differentiated instruction, explicit integration of ethics and values, interactive pedagogy, and continuous professional development. For IL MOOC designers, the results emphasize the value of designing interactive, scaffolded, and assessment-driven modules that move beyond passive content delivery. At the institutional level, the study reinforces the need to formally embed IL into curricula, allocate resources for librarian training, and adopt engagement analytics as part of quality assurance processes. At the national and ministerial level, the study contributes by recommending standardized IL benchmarks aligned with the ACRL Framework, and by highlighting the potential of cross-institutional collaborations to develop scalable IL MOOCs. These contributions underscore the role of IL instruction as not merely

a support service but a strategic educational priority for preparing critical, ethical, and lifelong learners in higher education.

5.7 Chapter Summary

This chapter has discussed and synthesized the findings of the study in relation to the five research questions (RQ1-RQ5), highlighting their theoretical, practical, and policy implications, as well as identifying the study's limitations, recommendations for future research, and overall contributions.

The discussion began with RQ1, which examined the extent to which theoretical concepts are incorporated into information literacy (IL) instruction. Findings revealed that librarians' practices, while often implicitly rather than explicitly linked to theory, reflected constructivist principles, ethical and holistic considerations, active learning strategies, and lifelong learning approaches. This shows that IL instruction is not purely technical, but is underpinned by diverse theoretical traditions that guide teaching practices.

RQ2 addressed how academic librarians understand and apply the TPACK framework in their IL instruction. The findings indicated a practical but varied application of technological, pedagogical, and *Content Knowledge (CK)*. Librarians demonstrated integration of diverse digital tools, active facilitation strategies, and advanced IL content, alongside feedback mechanisms to sustain engagement. This reinforces the operational relevance of TPACK in IL instruction and underscores the need for professional development to strengthen librarians' theoretical awareness.

RQ3 explored the extent to which librarians understand and apply the ACRL Framework. Results showed uneven familiarity with the framework, yet librarians' practices—such as structured module design, focus on search strategies and ethical use,

inquiry-based engagement, outcome-based assessment, and contextual adaptation—aligned with its six frames. This demonstrates that the ACRL Framework, even if not always consciously applied, is embedded in practice and contributes to developing students' IL competencies.

The quantitative phase (RQ4 and RQ5) focused on the IL MOOC developed for this study. RQ4 examined how learner engagement (time spent, video duration, learning activity and assessment attempts) relates to completion. The analysis revealed that video length alone did not strongly predict completion, but time spent, activity engagement, and assessment attempts were significant predictors of success. This finding highlights that engagement is a behavioral construct shaped more by interaction and persistence than by passive exposure to content. RQ5 investigated the relationship between IL competency development and MOOC completion. Strong correlations and ANOVA results showed that higher-order ACRL frames, especially *Scholarship as Conversation* and *Searching as Strategic Exploration*, were strongly associated with completion and competency gains. However, most learners remained at the "developing" stage of IL skills, suggesting that short-term interventions have limited impact on progression to advanced levels.

The implications of these findings were discussed in three dimensions. Theoretically, the study contributes by evidencing the integration of multiple frameworks (ACRL, TPACK, constructivism, self-directed learning, and cognitive load theory) into IL instruction, and by showing how engagement behaviors mediate competency development. Practically, the study offers clear recommendations for librarians and MOOC designers, including scaffolding instruction, embedding interactivity, aligning assessments with IL frames, and providing adaptive supports for diverse learners. At the policy and institutional level, the study emphasizes the need to embed IL into curricula, support professional development,

adopt learning analytics for quality assurance, and establish standardized IL competency benchmarks aligned to national graduate outcomes.

The chapter also acknowledged several limitations, such as the small sample size of librarians limiting generalizability; the implicit rather than explicit reference to theoretical frameworks; the reliance on platform analytics that capture behaviour but not deeper motivational or contextual factors; constraints in MOOC design that may have influenced engagement patterns; and contextual factors unique to Malaysian higher education that may limit transferability.

From these limitations, recommendations for future research were proposed. These include expanding the scope of qualitative inquiry to include more diverse institutional contexts, investigating the explicit application of theoretical models through librarian training, adopting mixed-methods approaches to capture both behavioural and motivational dimensions of MOOC engagement, testing design innovations such as gamification and adaptive supports, and conducting longitudinal studies to track IL competency development over time.

Finally, the study makes significant contributions. Theoretically, it demonstrates how IL instruction is grounded in and enriched by multiple frameworks, extending the discourse on framework integration in digital environments. Methodologically, it advances IL research through its mixed-methods design and novel use of learning analytics in MOOC evaluation. Practically and at the policy level, it offers actionable strategies for librarians, institutions, and ministries to strengthen IL instruction as a progressive, competency-based, and analytics-informed educational priority.

In summary, this chapter has shown that IL instruction, whether delivered through face-to-face modules or MOOCs, is both theoretically informed and practically impactful when effectively scaffolded, interactive, and systematically assessed. While challenges remain in scaling, sustaining, and advancing IL competencies, the findings of this study provide a strong foundation for improving IL pedagogy, strengthening institutional practices, and shaping national policies that prepare students to become critical, ethical, and lifelong learners in an information-rich society.

REFERENCES

Abang Mohtar, D. N., & Mohamad, F. S. (2023). Information literacy instructional practices among academic librarians within the Asia and Asia-Pacific region: A comparative analysis. *Proceedings of the 15th International Conference on Computer Supported Education (CSEDU 2023), 2,* 434-441.

Abdul Majid, M. A., Othman, M., Mohamad, S. F., Abdul Halim, S., & Yusof, A. (2017). Piloting for interviews in qualitative research: Operationalization and lessons learnt. *International Journal of Academic Research in Business and Social Sciences, 7*(4), 1073-1080.

Adam, S., (2004). Using learning outcomes. A consideration of the nature, role, application and implications for European education of employing 'learning outcomes' at the local, national and international levels", United Kingdom Bologna Seminar 2004, Edinburgh, Scotland.

Adle, M. M. (2023). Assessing the effectiveness of an information literacy instruction course in teaching additional skills. *Journal of Education for Library and Information Science, 64*(4), 404-416.

Adzei-Stonnes, P. G. (2023). *Exploring academic librarians' lack of experiential learning in teaching college freshmen information literacy skills: An interpretive phenomenological study* [Doctoral thesis, Liberty University]. Scholars Crossing. https://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=5354&context=doctoral

Agustini, K., Santyasa, I. W., & Ratminingsih, N. M. (2019). Analysis of competence on "TPACK": 21st century teacher professional development. *Journal of Physics: Conference Series, 1387*(1), 012035.

Aharony, N., Julien, H., & Nadel-Kritz, N. (2020). Journal of Librarianship and Information Science. *52*(4), 964-971.

Ahmad, N., Alias, F. A., & Abdul Razak, A. (2023). Understanding population and sample in research: Key concepts for valid conclusions. *Embrace e-learning diversity for future innovation trends* (pp.19-24). UiTM. Custom publication for SIG-e Learning@CS, Universiti Teknologi MARA.

Akun, J. C., & Mohamad, F. S. (2021). Technological pedagogical content knowledge (TPACK) and the teaching of science: Determiners for professional development. *Estudios de Economia Aplicada, 39*(1), 1-12.

Albelbisi, N. A., Al-Adwan, A. S., & Habibi, A. (2023). A qualitative analysis of the factors influencing the adoption of MOOC in higher education. *Turkish Online Journal of Distance Education, 24*(2), 217-231.

Alj, Z., & Bouayad, A. (2024). The impact of motivation on MOOC retention rates: A systematic review. *Emerging Science Journal, 8*(Special Issue), 118-146.

Ally, M. (2008). The impact of technology on education. *Open Journal of Social Sciences, 10*(2), 57-66.

Alotaibi, F. A. A., Johnson, F., & Rowley, J. (2023). Google Scholar or university digital libraries: A comparison of student perceptions and intention to use. *Journal of Librarianship and Information Science, 55*(4), 906-920.

AlQhtani, F. M. (2025). Knowledge management for research innovation in universities for sustainable development: A qualitative approach. *Sustainability, 17*(6), 2481.

Altinpulluk, H., Kilinc, H., Alptekin, G., Yildirim, Y., & Yumurtaci, O. (2023). Self-directed learning and intrinsic motivation levels in MOOCs. *Open Praxis, 15*(2), 149-161.

American Library Association. (2008). *Standards for proficiencies for instruction librarians and coordinators: A practical guide.* https://www.ala.org/sites/default/files/acrl/content/standards/profstandards.pdf

Anandhalli, G. (2018). Impact of information literacy skill on the academic achievement of the students: A case study of Anjuman Degree College, Vijayapura. *IMPACT: International Journal of Research in Humanities, Arts and Literature, 6*(3), 1-16.

An, Y., & Mindrila, D. (2020). Strategies and tools used for learner-centered instruction. International Journal of Technology in Education and Science. *4*(2), 133-143.

Applied Educational Systems (2019). What are 21st century skills? Retrieved from https://www.aeseducation.com/career-readiness/what-are-21st-century-skills

Arnold, M., Goldschmitt, M., & Rigotti, T. (2023). Dealing with information overload: A comprehensive review. *Frontiers in Psychology,* 1-28.

Artemchik, T., Bowman, K., Colbert, E., & Gaglio, S. R. V. (2024). Teaching to teach: Developing a collaborative instruction training program for MLIS interns. *College & Research Libraries News, 85*(2), 53.

ASEM Education. (2018). Chapter 1: Higher education system. *ASEM Education.* https://asem-education.org/compendiums/malaysia/

Association of College & Research Libraries. (2000). ACRL standards: Information literacy competency standards for higher education. *College & Research Libraries News, 61*(3), 207-215.

Association of College & Research Libraries. (2000). Information literacy competency standards for higher education. American Library Association. https://alair.ala.org/server/api/core/bitstreams/ce62c38e-971a-4a98-a424-7c0d1fe94d34/content

Association of College & Research Libraries. (2006). Framework for information literacy for higher education. American Library Association. http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/framework1.pdf

Association of College & Research Libraries. (2012). *Guidelines for instruction programs in academic libraries* (Approved by the ACRL Board of Directors, June 2003; revised October 2011). *College & Research Libraries News, 73*(4), 207-211.

Association of College & Research Libraries. (2016). Framework for information literacy for higher education. American Library Association. https://www.ala.org/acrl/standards/ilframework

Association of College and Research Libraries Instruction Section Research & Scholarship Committee. (2021). *Research agenda for library instruction and information literacy.* Association of College & Research Libraries.

Association of College & Research Libraries Planning and Review Committee. (2025). *2025 environmental scan.* Association of College & Research Libraries. https://acrl.ala.org/acrlinsider/2025-acrl-environmental-scan/

Augustini, K., Santyasa, I. W., & Ratminingsih, N. M. (2019). Analysis of competence on "TPACK": 21st century teacher professional development. *Journal of Physics: Conference Series, 1387*(2019), 1-9.

Aulia, H., Hafeez, M., Mashwani, H. U., Careemdeen, J. D., Mirzapour, M., & Syaharuddin. (2024). The role of interactive learning media in enhancing student engagement and academic achievement. *International Seminar on Student Research in Education, Science, and Technology, 1*(April 2024), 57-67.

Austin, T., & Bhandol, J. (2013). The academic librarian: Buying into, playing out, and resisting the teacher role in higher education. New Review of Academic Librarianship,*19*(1), 15-35.

Aziz, A. A., Aziz, A. A. A., Norwahi, N. A., Nordin, N. A., Zaini, N., Shaidin, S., & Azhar, S. B. H. J. (2022). TPACK readiness among English-language lecturers for open distance learning (ODL) adoption in a Malaysian public university. *Proceedings, 82*(1), 12.

Baer, A. (2021). Academic librarians' development as teachers: A survey on changes in pedagogical roles, approaches, and perspectives. Journal of Information Literacy, *15*(1), 26-53.

Bahrens, S. J. (1994). A conceptual analysis and historical overview of information literacy. *College & Research Libraries, 55*(4), 309-322.

Bajo, M. G. (2009). Liaison between librarians and lecturers regarding information literacy: A case study of some academic libraries. *Estudios sobre Educación, 17*, 45-61.

Bajracharya, J. R. (2021). Technology integration models and frameworks in teaching and training. *Journal of Training and Development, 6,* 3-11.

Bamgbose, A. A., Ibrahim, H. M., & Musa, S. (2024). Information literacy and learning in the emerging digital landscape: A theoretical review. *Library Philosophy and Practice,* 8125.

Banik, P., & Kumar, B. (2019). Impact of information literacy skill on students' academic performance in Bangladesh. *International Journal of European Studies, 3*(1), 27.

Bartol, T., Dolničar, D., Podgornik, B. B., Rodič, B., & Zoranović, T. (2018). A comparative study of information literacy skill performance of students in Agricultural Sciences. *Journal of Academic Librarianship, 44*(3), 374-382.

Bennett, S. (2009). Libraries and learning: A history of paradigm change. Libraries and the Academy, *9*(2), 181-197.

Berkman, R. (2016). ACRL's new information literacy framework: Why now and what did ACRL discover? Online Searcher, *40*(2), 46-49.

Boghossian, P. (2006). Behaviorism, constructivism, and Socratic pedagogy. *Educational Philosophy and Theory, 38*(6), 713-722.

Bonk, C. J., & Khoo, E. (2014). *Adding some TEC-VARIETY: 100+ activities for motivating and retaining learners online.* OpenWorldBooks.com.

Bradley-Ridout, G., Parker, R., Sikora, L., Quaiattini, A., Fuller, K., Nevison, M., Nekolaichuk, E. (2024). Exploring librarians' practices when teaching advanced searching for knowledge synthesis: Results from an online survey. *Journal of the Medical Library Association, 112*(3), 238-249.

Brame, C. J. (2016). Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE Life Sciences Education, 15*(4), 1-6.

Breland, M. V. (2022). What role do you play? Faculty perceptions of librarian-led information literacy instruction. *Journal of New Librarianship, 7*(1), 106-125.

Brooks, A. W. (2014). Information literacy and the flipped classroom: Examining the impact of a one-shot flipped class on student learning and perceptions. *Communications in Information Literacy, 8*(2), 225-235.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32-42.

Bruce, C. & Candy, P., Eds. (2015). Information literacy around the world: advances in programs and research. Wagga Wagga, Australia: Centre for Information Studies, Charles Sturt University.

Bryman, A. (2016). *Social research methods:* Oxford University Press.

Campbell-Meier, J., & Goulding, A. (2021). Evaluating librarian continuing professional development: Merging Guskey's framework and Vygotsky space to explore transfer of learning. *Librarian & Information Science Research, 43*(4), 101119.

Candy, P. C. (1991). *Self-direction for lifelong learning.* Jossey-Bass Publishers. https://journals.sagepub.com/doi/abs/10.1177/074171369204200307

Care, E., Kim, H., Vista, A., & Anderson, K. (2018). *Education system alignment for 21st century skills:Focus on assessment.* Brookings. https://www.brookings.edu/wp-content/uploads/2018/11/Education-system-alignment-for-21st-century-skills-012819.pdf

Center for Innovative Teaching and Learning. (2025). *Reflective journals and learning logs.* Nothern Illinois University. https://www.niu.edu/citl/resources/guides/instructional-guide/reflective-journals-and-learning-logs.shtml?

Centre for Teaching and Learning. (n.d.). *Planning an online course module.* Concordia University. https://www.concordia.ca/ctl/tech-tools/practices/design-your-course/module-design.html?

Chaiklin, S. (2003). *The zone of proximal development in Vygotsky's analysis of learning and instruction.* In A. Kozulin, B. Gindis, V. S. Ageyev, M. Miller (Eds.), *Vygotsky's educational theory in cultural context* (pp. 39-64). Cambridge University Press.

Chassie, K., Peck, J., & Mackie, C. (2023, January 6). Education in Malaysia. *World Education News + Reviews (WENR).* https://wenr.wes.org/2023/01/education-in-malaysia-2

Chaudhuri, J., & Terrones, L. (2024). Reshaping academic library information literacy programs in the advent of ChatGPT and other generative AI technologies. *Internet Reference Services Quarterly, 29*(1), 1-25.

Chi, M. T. H., & Wylie, R. (2014). The ICAP framework: Linking cognitive engagement to active learning outcomes. *Educational Psychologist, 49*(4), 219-243.

Chuang, S. (2021). The applications of constructivist learning theory and social learning theory on adult continuous development. *Performance Improvement, 60*(3), 6-14.

Chusniyah, T., Firmanto, A., Kuswandi, D., Jas Laile Suzana Binti Jaafar, Chaiwutikornwanich, A., & Mustapa, A. (2020). The importance of information literacy to face the challenges of the industrial revolution 4.0: Study of Indonesian,

Malaysian, and Thai students. *Advances in Social Science, Education and Humanities Research,* 395, 57-60.

Colosimo, A. L., Holder, S., & Lannon, A. (2012). Walking the walk, Talking the talk: learning-centered approach to the design of a workshop on teaching for McGill librarians. Practical Academic Librarianship: The International Journal of the SLA Academic Division, *2*(2), 18-35.

Cook, D. B. (2022). Is the library one-shot effective? A meta-analytic study. *College & Research Libraries, 83*(5), 739.

Cook, D. B., & Klipfel, K. M. (2015). How do our students learn? An outline of a cognitive psychological model for information literacy instruction. *Reference & User Services Quarterly, 55*(1), 34-41.

Coonan, E., Geekie, J., Goldstein, S., Jeskins, L., Jones, R., Macrae-Gibson, R., Secker, J., & Walton, G. (2018). CILIP definition of information literacy 2018. CILIP Information Literacy Group. https://infolit.org.uk/ILdefinitionCILIP2018.pdf

Corrall, S. (2008). Information literacy strategy development in higher education: An exploratory study. *International Journal of Information Management, 28*(1), 26-37.

Corrall, S. (2017). Crossing the threshold: Reflective practice in information literacy development. Journal of Information Literacy, *11*(1), 23-53.

Corrall, S., & Jolly, L. (2019). Innovations in learning and teaching in academic libraries: Alignment, collaboration, and the social turn. *New Review of Academic Librarianship, 25*(2-4), 113-128.

Cox, A. (2023). How artificial intelligence might change academic library work: Applying the competencies literature and the theory of the professions. *Journal of the Association for Information Science and Technology, 74*(3), 367-380.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th ed.). Sage.

Creswell, J. W. (2022). *Educational research: Planning, conducting, and evaluating quantitative.* Prentice Hall.

Creswell, J. W., & Clark, V. L. P. (2011). Designing And Conducting Mixed Methods Research (2nd ed.). SAGE Publications, Inc.

Dahlen, S. (2012). Seeing college students as adults: Learner-centered strategies for information literacy instruction. The Journal of the New Members Round Table, *3*(1), 1-18.

Dahlen, S. P. C. (2022). Assessing synthesis of information from sources. In A. Pappalardo (Ed.), *Proceedings of the 2022 Library Assessment Conference: Building Effective, Sustainable, Practical Assessment,* 1-13.

Dahlen, S. P. C., & Leuzinger, R. (2020). Impact of library instruction on the development of student skills in synthesis and source attribution: A model for academic program assessment. *The Journal of Academic Librarianship, 46*(6), 102254.

Dahlen, S. P. C., & Camp, J. H. (2025). Equity gaps in information literacy: A case study and methodological exploration. *The Journal of Academic Librarianship, 51*(5), 103119.

Dalal, H. A., Taylor, A., & Whitfield, S. (2025). Assessing students' information literacy: Attitudes and perceptions of college students across generations. *College & Research Libraries, 86*(2), 255.

Daniel, J. (2012). Making sense of MOOCs: Musings in a maze of myth, paradox and possibility. *Journal of Interactive Media in Education, 2012* (3), 18.

Davis, E. L., Lundstrom, K., & Martin, P. N. (2011). Librarian perceptions and information literacy instruction models. *Library Faculty & Staff Publications,* 106.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* Springer.

DeFrain, E. L., Sult, L., & Pagowsky, N. (2025). Effectiveness of academic library research guides for building college students' information literacy skills: A scoping review. *College & Research Libraries, 86*(5), 817-849.

Deja, M., Rak, D., & Bell, B. (2021). Digital transformation readiness: Perspectives on academia and library outcomes in information literacy. *The Journal of Academic Librarianship, 47*(5), 102403.

Del Castillo, M. S., & Kelly, H. Y. (2025). Can AI become an information literacy ally? A survey of library instructor perspectives on ChatGPT. *College & Research Libraries, 86*(5), 797.

Delmond, A. R., Weber, E. M., & Busch, H. S. (2024). An interdisciplinary assessment of information literacy instruction. *The Journal of Academic Librarianship, 50*(2024), 102944.

Denke, J., Jarson, J., & Sinno, S. (2020). Making the invisible visible: Enhancing information literacy and metacognition with a constructivist activity. *International Journal for the Scholarship of Teaching & Learning, 14*(2), Art. 7.

Dennen, V. P. (2004). *Cognitive apprenticeship in educational practice: Research on scaffolding, modeling, mentoring, and coaching as instructional strategies.* In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp.813-828). Lawrence Erlbaum Associates Publishers.

Detlor, B., Booker, L. D., Serenko, A., & Julien, H. (2012). Student perceptions of information literacy instruction: The importance of active learning. Education for Information, *29*(2), 147-161.

Dezuanni, M., & Osman, K. (2024). *IFLA trend report 2024: Facing the future of information with confidence.* https://www.ifla.org/wp-content/uploads/ifla-trend-report-2024.pdf

Dinh, C., & Phuong, H. (2024). MOOC learners' perspectives of the effects of self-regulated learning strategy intervention on their self-regulation and speaking performance. *Cogent Education, 11*(1), 1-24.

Do, H., Do., B. N., & Nguyen, M. H. (2023). How do constructivism learning environments generate better motivation and learning strategies? The design science approach. *Heliyon, 2023,* 22862.

Dow, M. J., & Hovious, A. S. (2024). Resilient practices in high impact information literacy learning: What and how to teach. *Kansas Library Association College and University Libraries Section Proceedings, 14*(1), Art.1.

Downey, A. (2016). Critical information literacy: foundations, inspiration, and ideas. Sacramento: Library Juice Press.

Dreisiebner, S. (2019). Content and instructional design of MOOCs on information literacy: A comprehensive analysis of 11 x MOOCs. *Information and Learning Sciences, 120*(3/4), 173-189.

Dreisiebner, S., Polzer, A. K., Robinson, L., Libbrecht, P., Boté-Vericad, J., Urbano, C., Mandl, T., Vilar, P., Žumer, M., Juric, M., Pehar, F., Stričević, I. (2021). Facilitation of information literacy through a multilingual MOOC considering cultural aspects. *Journal of Documentation, 77*(3), 777-797.

Drewes, K., & Hoffman, N. (2010). Academic embedded librarianship: An introduction. *Public Services Quarterly, 6,* 75-82.

Ducas, A., Michaud-Oystryk, N., & Speare, M. (2020). Reinventing ourselves: New and emerging roles of academic librarians in Canadian research-intensive universities. College & Research Libraries, *81*(1), 43-65.

Dzulkipli, M. R., Abu, R., & Shaifuddin, N. (2024). Practicing teaching librarian in public higher education: What is lacking in the profession? *Journal of Technology Management and Technopreneurship, 12*(1), 24-33.

Dzulkipli, M. R., Abu, R., & Shaifuddin, N. (2025). Competency need assessment for academic teaching librarians in higher learning institutions. *Journal of Information and Knowledge Management, 15*(1), 121-130.

edX. (2023). *About MOOCs.* Retrieved January 30, 2025, from https://www.mooc.org/

Edzan, N. N. (2008). Information literacy development in Malaysia: A review. Libri, *58*, 265-280.

Edzan, N. N., & Mohd Sharif Mohd Saad. (2005, April 6 - 8). Information literacy initiatives in Malaysia: A framework [Paper presentation]. PPM-LAS Commemorative Conference 2005, Kuala Lumpur, Malaysia. https://shorturl.at/M3xKg

Eke, H. N., Orji, D. I., & C., A. O. (2010). Quickies for the 21st century librarian. 1 – 7.

Elmborg, J. (2012). Critical information literacy: Definitions and challenges. In W.Wilkinson, & C. Bruch (Eds.), Transforming Information Literacy Programs: Intersecting Frontiers of Self, Library Culture, and Campus Community (pp. 75 95). The Association of College & Research Libraries, a division of the American Library Association.

ELM Learning. (2025). *Constructivist learning theory.* https://elmlearning.com/hub/learning-theories/constructivism/#:~:text=This%20educational%20theory%20leans%20in,actively%20construct%20meaning%20for%20themselves

Erlinger, A. (2018). Outcomes assessment in undergraduate information literacy instruction: A systematic review. *College & Research Libraries, 79*(4), 442-479.

Essa, E. K. (2023). The effectiveness of hybrid learning in enhancing academic mindfulness and deeper learning of university students. *International Journal of Research in Education and Science, 9*(1), 188-202.

Farrell, R., & Badke, W. (2015). Situating information literacy in the disciplines: A practical and systematic approach for academic librarians. Reference Services Review, *43*(2),319-340.

Fitzgerald, S. R., & Eustis, J. M. (2023). The changing functions of libraries in higher education. In R. J. Tierney, F. Rizvi, & K. Ercikan (Eds.), *International Encyclopedia of Education (4th ed.)*. Elsevier.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America, 111*(23), 8410-8415.

Fullard, A. (2016). Using the ACRL framework for information literacy to foster teaching and learning partnership. South African Journal of Libraries & Information Science, *82*(2), 46-56.

Gammons, R. W., & Inge, L. T. (2017). Using the ACRL framework to develop a student-centered model for program-level assessment. Communications in Information Literacy, *11*(1), 168-184.

Garmston, R., & Wellman, B. (1994). Insights from constructivist learning theory. *Educational Leadership, 15*(7), 84-85.

Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly, 48*(1), 18-33.

Ghanad, A. (2023). An overview of quantitative research methods. *International Journal of Multidisciplinary Research and Analysis, 6*(8), 3794-3803.

Gleason, K., Commodore-Mensah, Y., Wu, A. W., Kearns, R., Pronovost, P., Aboumatar, H., Himmelfarb, C. R. D. (2021). Massive Open Online Course (MOOC) learning builds capacity and improves competence for patient safety among global learners: A prospective cohort study. *Nurse Educ Today, 104,* 104984.

Goodman, L., & Royce, V. (2022). *Understanding cognitive load theory for better online course design.* Moodle. https://moodle.com/us/news/understanding-cognitive-load-theory-for-better-online-course-design/?

Graham, C. R., Burgoyne, N., Cantrell, P., Smith, L., Clair, L. S., & Harris, R. (2009). TPACK development in science teaching: Measuring the TPACK confidence of in-service science teachers. *TechTrends, 53*(5).

Grassian, E., & Kaplowitz, J. R. (2010). Information literacy instruction. *Education.*

Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation, 11*(1), 1-18.

Greenwood, A. (2023). Librarians as teachers: A reflection on practice, identity, and the TPACK framework to enhance professional practice. *Journal of the Australian Library and Information Association, 72*(2), 178-188.

Gross, M., Julien, H., & Latham, D. (2022). Librarian views of the ACRL framework and the impact of covid-19 on information literacy instruction in community colleges. *Library and Information Science Research, 44*(2022), 1-7.

Gross, M., & Latham, D. (2012). What's skill got to do with it? Information literacy skills and self views of ability among first-year college students. Journal of the American Society for Information Science and Technology, *63*(3), 574-583.

Gross, M., Latham, D., & Julien, H. (2018). What the framework means to me: Attitudes of academic librarians toward the ACRL framework for information literacy for higher education. Library & Information Science Research, *40*(3/4), 262-268.

Guder, C. (2010). Patrons and pedagogy: A look at the theory of connectivism. Public Services Quarterly, *6*(1), 36-42.

Guo, P. J., Kim, J., & Rubin, R. (2014). How video production affects student engagement: An empirical study of MOOC videos. In *Proceedings of the First ACM Conference on Learning @ Scale Conference,* (L@S 14), 41-50.

Hammons, J. (2024). Academic librarians as teachers and faculty developers: Exploring the potential of the "Teach the Teachers" model of information literacy, *College & Research Libraries, 85*(3), 378.

Harrison, A. (2025). Inquiry, AI, and pedagogy in the library classroom. *Virginia Libraries, 69*(1), 1-8.

Head, A. J., Bull, A. C., & MacMillan, M. (2019). Asking the right questions: Bridging gaps between information literacy assessment approaches. *Against the Grain,* 20-22.

Hebrang Grgic, I., & Spiranec, S. (2013). Information literacy of LIS students at the University of Zagreb: Pros or just average millennials. Presented in European Conference on Information Literacy, October 2013.

Hew, K. F., Qiao, C., & Tang, Y. (2018). Understanding student engagement in large-scale open online courses: A machine learning facilitated analysis of student's reflections in 18 highly rated MOOCs. *International Review of Research in Open and Distributed Learning, 19*(3), 69-93.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16,* 235-266.

Hodge, M. (2015). Pedagogy for librarians. VCU Libraries Faculty and Staff Publications, 1-16.

Hollands, F. M., & Tirthali, D. (2014, May). *MOOCs: Expectations and reality* (Full Report). Center for Benefit-Cost Studies of Education, Teachers College, Columbia University. https://files.eric.ed.gov/fulltext/ED547237.pdf

Hone, K. S., & El Said, G. R. (2016). Exploring the factors affecting MOOC retention: A survey study. *Computers & Education, 98*(July 2016), 157-168.

Hooper, M. D. W., & Scharf, E. (2017). Connecting and reflecting: Transformative learning in academic libraries. *Journal of Transformative Education, 15*(1), 79-94.

Hossain, M. A., & Sormunen, E. (2025). Empowering library and information science students as information literacy educators in librarianship professions: A study from Bangladesh. *Information and Learning Sciences, 126*(5/6), 315-334.

Hostetler, K., & Luo, T. (2021). Managing cognitive load in information literacy instruction. *Educational Technology and Research Development, 69*(2), 583-606.

Hoving, S. (2025). *Evolving roles of academic librarians adapting to change and new technologies.* SpringerNature. https://www.springernature.com/gp/librarians/the-link/technology-blogpost/academic-libraries-adapting-change/27738546

Hsieh, M. L., Dawson, P. H., & Yang, S. Q. (2021). The ACRL framework successes and challenges since 2016: A survey. *The Journal of Academic Librarianship, 47*(2), 102306.

Hua, M., Wang, L., & Li, Jun. (2024). The impact of self-directed learning experience and course experience on learning satisfaction of university students in blended learning environments: The mediating role of deep and surface learning approach. *Frontiers in Psychology,* 1-17.

Huba, M. E., & Freed, J. E. (2000). *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning.* Allyn and Bacon.

Hunter, J. L. (2008). Applying constructivism to nursing education in cultural competence: A course that bears repeating. *Journal of Transcultural Nursing, 19*(4), 354-362.

Igbinovia, M. O. (2017). Librarians' involvement in cross-disciplinary research and its implication for sustainable development goals (SDGs): The Nigerian experience. *Library Review, 66*(4/5), 251-265.

In, J. (2017)., Introduction of a pilot study. *Korean Journal of Anesthesiology, 70*(6), 601-605.

Iqbal, S. (2021). The assessment of information literacy instruction (IL) in university libraries of Pakistan. *Library Philosophy and Practice,* 5912.

Jabatan Pendidikan Tinggi. (2023). Massive open online courses (MOOCs). *Department of Higher Education, Ministry of Higher Education.* https://jpt.mohe.gov.my/index.php/en/students/massive-open-online-courses-moocs?

Jain, P. (2013). A paradigm shift in the 21st century academic libraries andlibrarians: Prospectus and opportunities. European Journal of Academic Research, *1*(3), 133-147.

Jonassen, D. (1999). *Designing constructivist learning environments.* In C. M. Reigeluth. (Ed.), *Instructional-design theories and models: A new paradigm of instructional theory (Vol.11)* (pp.215-239). Lawrence Erlbaum Associates.

Julien, H., & Barker, S. (2009). How high-school students find and evaluate scientific information: A basis for information literacy skills development. *Library & Information Science Research, 31*(1), 12-17.

Julien, H., & Genuis, S. K. (2011). Experiences of the teaching role: A national survey of librarians. *Library Information Science Research, 33*(2), 103-111.

Julien, H., & Pecoskie, J. (J. L.). (2009). Librarians' experiences of the teaching role: Grounded in campus relationships. *Library & Information Science Research, 31*(2009), 149-154.

Kaletski, G. (2017). Faculty perceptions of the framework for the information literacy for higher education. The Journal of the New Members Round Table, *8*(1), 26-35.

Kang, G., & Sinn, D. (2024). Technology education in academic libraries: An analysis of library workshops. *The Journal of Academic Librarianship, 50*(2), 102856.

Kaplowitz, J. R. (2012). Transforming information literacy instruction using learner-centered teaching. Facet Publishing.

Kasch, J., Van, R. P., & Kalz, M. (2021). Educational scalability in MOOCs: Analysing instructional designs to find best practices. *Computers & Education, 161,* 104054.

Katz, J. K., & Halpern, D. D. (2015). Can virtual museums motivate students? Toward a constructivist learning approach. *Journal of Science Education & Technology, 24*(6), 776-788.

Kelly, R. (2009). *A modular course design benefits online instructor and students.* Faculty Focus. https://www.facultyfocus.com/articles/online-education/online-course-design-and-preparation/a-modular-course-design-benefits-online-instructor-and-students/

Kempa, K. (2016). Why the ACRL framework for information literacy for higher education enhances information literacy instruction. *Journal of the Association of Christian Librarians, 59*(2), 238-243.

Kerimbayev, N., Umirzakova, Z., Shadiev, R., & Jotsov, V. (2023). A student-centered approach using modern technologies in distance learning: a systematic review of the lifetime. *Smart Learning Environments,* 1-28.

Khalil, H., Ebner, M., & Leitner, P. (2022). Using learning analytics to improve the educational design of MOOCs. *International Journal of Education and Learning, 4*(2), 100-108.

Kim, J. Guo, P. J., Seaton, D. T., Mitros, P., Gajos, K. Z., & Miller, R. C. (2014). Understanding in-video dropouts and interaction peaks in online lecture videos. *Proceedings of the First ACM Conference on Learning @ Scale Conference,* 31-40.

Kim Phaik Lim. (1998). Linking higher education to information literacy education in Malaysia : A focus on diversity. 2nd Asia Regional Literacy Forum. Retrieved 20 April 2024 from : http://www.literacyonline.org/products/ili/webdocs/kin.html

Kirker, M. J. (2022). "Am I a teacher because I teach?": A qualitative study of librarians' perceptions of their role as teachers. *portal: Libraries and the Academy, 22*(2), 335-354.

Kizilcec, R. F., Perez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in massive open online courses. *Computers & Education, 104*(2017), 18-33.

Knowles, M. (1975). *Self-directed learning: A guide for learners and teachers.* Follett Publishing Company.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, *9*(1), 60-70.

Koh, J. H. L., Chai, C. S., & Lim, W. Y. (2017). Teacher professional development for TPACK-21CL: Effects on teacher ICT integration and student outcomes. *Journal of Educational Computing Research, 55*(2), 172-196.

Kolb, D. A, (1984). *Experiential learning: Experience as the source of learning and development.* Prentice-Hall, Inc.

Koob, A. R., Olivia, K. S. I., Williamson, M., Lamont-Manfre, M., Hugen, A., & Dickerson, A. (2022). Tech tools in pandemic-transformed information literacy instruction: Pushing for digital accessibility. *Information Technology and Libraries,* December 2022, 1-32.

Kruger, D. (2020). Adaptive learning technology to enhance self-directed learning. In J. Olivier (Ed.), *Self-directed multimodal learning in higher education: Vol.5* (pp.93 -163). AOSIS.

Kuh, G. D., & Gonyea, R. M. (2003). The role of the academic library in promoting student engagement in learning. *College & Research Libraries, 64*(4), 256-282.

Lackmann, S., Léger, P., Charland, P., Aubé, C., & Talbot, J. (2021). The influence of video format on engagement and performance in online learning. *Brain Sciences, 11*(2), 128.

Lan, M., & Hew, K. F. (2020). Examining learning engagement in MOOCs: A self-determination theoretical perspective using mixed method. *International Journal of Educational Technology in Higher Education, 17*(2020), 1-24.

Lasmawan, I. W., & Budiarta, I. W. (2020). Vygotsky's zone of proximal development and the students' progress in learning (A Heutagogcal bibliographical review). *Jurnal Pendidikan Indonesia, 9*(4), 545-552.

Latham, D., Gross, M., & Julien, H. (2019). Implementing the ACRL framework: Reflections from the field. College &Research Libraries, *80*(3), 1-19.

Lau, J. (2006). Guidelines on information literacy for lifelong learning. IFLA.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge University Press.

Lee, T., & Pham, T. (2023). Uncovering the expectations of English as a foreign language students: Key to improving teacher expertise and technological pedagogical content knowledge mastery. *Journal of Contemporary Language Research, 2*(2), 84-92.

Li, Q., & Baker, R. (2018). The different relationships between engagement and outcomes across participant subgroups in massive open online courses. *Computers & Education, 127*, 41-65.

Li, H., Zhu, S., Wu, D., Yang, H. H., & Guo, Q. (2023). Impact of information literacy, self-directed learning skills, and academic emotions on high school students' online learning engagement: A structural equation modeling analysis. *Education and Information Technologies,* 1-20.

Libbrecht, P., Dreisiebner, S., Buchal, B., Polzer, A. (2021). Creating a multilingual MOOC content for information literacy: A workflow. In A. Botte, P. Libbrecht, &

M. Rittberger (Eds.), *Learning information literacy across the globe* (pp. 114-128). DIPF Leibniz-Institut für Bildungsforschung und Bildungsinformation.

Lo, L. S. (2024). Evaluating AI literacy in academic libraries: A survey study with a focus on U.S. employees. *College & Research Libraries, 85*(5), 635.

Lund, B., Wang, T., Widdersheim, M., & Fay, B. (2023). Interrogating shortcomings in instructional librarianship preparation: A comparison of perspectives of employers, LIS educators, and instructional librarians. *Journal of Education for Library and Information Science, 64*(2), 120-141.

Luo, T., & Hostetler, K. (2020). Making professional development more social: A systematic review of librarians' professional development through social media. *The Journal of Academic Librarianship, 46*(5), 102193.

Luo, Y., Liu, T., Pang, P. C., McKay, D., Chen, Z., Buchanan, G., & Chang, S. (2025). Enhanced Bloom's educational taxonomy for fostering information literacy in the era of large language models. *arXiv.* https://doi.org/10.48550/arXiv.2503.19434

Maria, M., Shahbodin, F., & Pee, N. C. (2018). Malaysian higher education system towards industry 4.0 - Current trends overview. AIP Conference Proceedings, *2016*(September), 0-7. https://doi.org/10.1063/1.5055483

Marsh, E. (2004). Seeking meaning: A process approach to library and information services (review). *Portal: Libraries and the academy, 4*(3), 440-441.

McKinny, P. A., & Wheeler, E. (2015). Are librarians teachers? Investigating academic librarians' perceptions of their own teaching skills. Journal of Information Literacy, *9*(2), 111-128.

McLeod, S. (2024). Jerome Bruner theory of cognitive development. *SimplyPsychology.* https://www.simplypsychology.org/zone-of-proximal-development.html?

McMillan, J. H. (1996). Educational research: Fundamentals for the consumer (2nd ed.). Harper Collins.

Meena, A. K. (2024). Information literacy programs: Assessing effectiveness and user engagement in academic libraries. *Journal of Global Research in Education and Social Science, 18*(1), 1-8.

Mellahi, K., & Harris, L. C. (2015). Response rates in business and management research: An overview of current practice and suggestions for future direction. *British Journal of Management, 1*, 1-12.

Mercado-Sierra, M. A., & Northam, S. H. (2023). Beyond reading and writing: Informational literacy in higher education for lifelong success. *Texas Journal of Literacy Education, 10*(1), 46-58.

Mighty Team. (2024). *Self-paced learning: All you need to know for 2005.* *https://www.mightynetworks.com/resources/self-paced-learning?*

Miller, K. A., Kaufmann, K., & Trnka, R. E. (2023). Measuring outcomes: Information literacyinstruction assessment in a cross-institutional study. *Faculty Scholarship and Creative Works, 49*(6).

Ministry of Education Malaysia. (2015). *Malaysia education blueprint 2015-2025* (Higher Education). Ministry of Education Malaysia. https://www.kooperation-international.de/uploads/media/3._Malaysia_Education_Blueprint_2015-2025__Higher_Education__.pdf?

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Mitrovic, S. (2024). *Adaptive learning technologies: Benefits, types, and future insights.* Create AI Course. https://createaicourse.com/adaptive-learning-technologies/?

Moldez, C., Crisanto, M. A., Cerdeña, M. G. R., Maranan, D. S., & Figueroa, R. (2024). Innovation in education: Developing and assessing gamification in the University of the Philippines Open University massive open online courses. *ASEAN Journal of Open and Distance Learning, 16*(1), 27-42.

Montgomery, M. (2015). Pedagogy for practical library instruction: What do we really need to know? Communications in Information Literacy, *9*(1), 19-23.

Morris, L., & McDermott, L. (2022). Improving information literacy and academic skills tuition through flipped online delivery. *Journal of Information Literacy, 16*(1), 172-480.

Morris, T. H., & Rohs, M. (2021). Digitization bolstering self-directed learning for information literate adults - A systematic review. *Computers and Education Open, 2*(December 2021), 100048.

Moskal, B. M. (2000). Scoring rubrics part 1: What and when. *ERIC/AE Digest,* ED446110.

Mullins, K., & Boyd-Byrnes, M. (2024). Academic librarians' contribution to information literacy instruction and learning. *College & Research Libraries, 85*(3), 423-441.

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. Evidence-Based Nursing, *18*(2), 34-35.

Norman Dunsah, M. I. H. S., & Tengku Azhar, T. A. (n.d.). The legal framework of education sector in Malaysia. https://www.azmilaw.com/insights/the-legal-framework-of-education-sector-in-malaysia/

Oakleaf, M. (2009). Using rubrics to assess information literacy: An examination of methodology and interrater reliability. Journal of the American Society for Information Science and Technology, *60*(5), 969-983.

Oakleaf, M. (2010). *The value of academic libraries: A comprehensive research review and report.* Association of College and Research Libraries (ACRL). https://www.ala.org/sites/default/files/2024-06/val_report.pdf

Oakleaf, M. (2010). Writing information literacy assessment plans: A guide to best practice. Communications in Information Literacy. *3*(2), 80-90.

Oakleaf, M. (2014). A roadmap for assessing student learning using the new framework for information literacy for higher education. *The Journal of Academic Librarianship, 40*(5), 510-514.

Okoli, D. O., Schnabel, N., Haas, M. R. C., & Santen, S. (2025). From the lecture hall to the cloud: Theoretical foundations for engaging virtual and hybrid didactics in emergency medicine. *AEM Education and Training, 9*(3), e70038.

Omarsaib, M. (2025). Integrating a digital pedagogy approach into online teaching: Are academic librarians at universities of technology in South Africa prepared? *Information and Learning Sciences, 126*(3/4), 192-213.

Organisation for Economic Co-operation and Development. (2025). *OECD teaching compass: Reimagining teachers as agents of curriculum change.* OECD. https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/05/oecd-teaching-compass_5688638f/8297a24a-en.pdf

Othman, L. (2015). *Penyelidikan kualitatif: Pengenalan kepada teori dan metode*: Universiti Pendidikan Sultan Idris.

Paisley, P. O., & Reeves, P. M. (2001). Qualitative research in counseling. In D. C. Locke, J. E. Myers, & E. L. Herr (Eds.), *The handbook of counseling* (pp.481-498). Sage.

Panakaje, N., Rahiman, H. U., Parvin, S. M. R., P. S., K. M., Yatheen, & Irfana, S. (2024). Revolutionizing pedagogy: Navigating the integration of technology in higher education for teacher learning and performance enhancement. *Cogent Education, 11*(1), 2308430.

Patil, S. G. (2019). Need of information literacy in higher education. *Library Herald, 57*(3), 353-363.

Peacock, R. (2025). Barriers to online library instruction in academic libraries: A qualitative study. *The Journal of Academic Librarianship, 51*(2025), 103021.

Pearson Online Academy. (2025). *What is personalized performance learning?* https://www.pearsononlineacademy.com/about-us/online-learning-program/?

Peele, D. (1984). Librarians as teachers: Some reality mostly myth. *Journal of Academic Librarianship, 10*(5), 267-270.

Percy, W. H., Kostere, K., & Kostere, S. (2015). Generic qualitative research in psychology. *The Qualitative Report, 20*(2), 76-85.

Perpustakaan Tun Abdul Razak. (2022). *Promoting IL MOOC to a group of UiTM students at Perpustakaan Tun Abdul Razak, Universiti Teknologi MARA, Kota Samarahan, Sarawak on 14th November 2022.* https://www.facebook.com/share/p/pAMqnGZbcYcA3Jzk/

Phade, S. P., & Chaudhari, A. P. (2025). Impact of MOOC courses on the accessibility of higher education: A comparative study with traditional learning models. *International Journal of Computer Research & Technology, 10*(1(i)), 2025.

PIAAC Literacy Expert Group. (2009). *PIAAC literacy: A conceptual framework (OECD Education Working Paper, No.34).* Organisation for Economic Co-operation and Development (OECD). https://www.oecd.org/content/dam/oecd/en/publications/reports/2009/11/piaac-literacy-a-conceptual-framework_g17a1d4c/220348414075.pdf

Piaget, J. (1952). *The origins of intelligence in children.* International University Press.

Pinto, M., Garcia-Marco, J. Caballero, D., Manso, R., Uribe, A., & Gomez, C. (2024). Assessing information, media and data literacy in academic libraries: Approaches and challenges in the research literature on the topic. *The Journal of Academic Librarianship, 50*(2024), 102920.

Pitts, W., & Lehner-Quam, A. (2019). Engaging the framework for information literacy for higher education as a lens for assessment in an ePortfolio Social Pedagogy Ecosystem for Science Teacher Education. International Journal of ePortfolio, *9*(1), 29-44.

Png, C. (2021, April 30). The types of education institutions. *Education Malaysia.* https://discover.educationmalaysia.gov.my/latest_news_post/the-types-of-education-institutions/

Polkinghorne, D. E. (2005). Language and meaning: Data collection in qualitative research. *Journal of Counselling Psychology, 52,* 137-145.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education, 93*(3), 223-231.

Priyamvada, S. (2018). Exploring the constructivist approach in education: Theory, practice, and implications. *International Journal of Research and Analytical Reviews, 5*(2), 716-725.

Radomski, N. (2000). Framing information literacy: the University of Ballarat experience, In: Information literacy around the world: advances in programs and research, edited by C. S. Bruce and P. C. Candy. (pp. 25-36). Wagga Wagga, NSW: Charles Sturt University.

Rahimi, A. R. (2024). A tri-phenomenon perspective to mitigate MOOCs' high droupout rates: the role of technical, pedagogical, and contextual factors on language learners' L2 motivational selves, and learning approaches to MOOC. *Smart Learning Environments, 2024,* 1-22.

Rao, K. N., & Babu, K. H. (2001). Role of librarian in internet and world wide web environment. *Information Sciences, 4*(1), 25-34.

Rinto, E. E. (2013). Developing and applying an information literacy rubric to student annotated bibliographies. Evidence Based Library and Information Practice, *8*(3), 5-18.

Robinson, K. P., & Jones-Edman, G. (2021). Teaching and assessing students of information literacy in a single session - The case of the University of the West Indies Mona Library. *Alexandria: The Journal of National and International Library and Information Issues, 31*(1-3), 23-41.

Robinson, R., Molenda, M., & Rezabek, L. (2007). Facilitating learning. In A. Januszewski, & M. Molenda (Eds.), Educational Technology: A definition with commentary (2nded., pp.15-48). Lawrence Erlbaum.

Rubin, R. E. (2016). *Foundations of library and information science* (4th ed.). American Library Association.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

Sanches, T., Lopes, C., & Antunes, M. L. (2022). Critical thinking in information literacy pedagogical strategies: New dynamics for higher education throughout librarians' vision. *8th International Conference on Higher Education Advances (HEAd'22),* (June 14-17, 2022), 489-496.

Saunders, L. (2012). Faculty perspectives on information literacy as a student learning outcomes. Journal of Academic Librarianship, *38*(4), 226-236.

Saunders, L. (2018). Information literacy in practice: Content and delivery of library instruction tutorials. *The Journal of Academic Librarianship, 44*(2), 269-278.

Schachter, D. (2018). Critical information literacy teaching in British Columbia academic libraries. *IFLA WLIC 2018: Transform Libraries, Transform Societies in Session 116*

Library Theory and Research with Information Literacy, Kuala Lumpur, Malaysia. https://library.ifla.org/id/eprint/2151/1/116-schachter-en.pdf

Schachter, D. (2020). Theory into practice: Challenges and implications for information literacyteaching. *IFLA Journal, 46*(2), 133-142.

Schulte, S. J., & Knapp, M. (2017). Awareness, adoption, and application of the Association of College & Research Libraries (ACRL) framework for information literacy in health sciences libraries. Journal of the Medical Library Association, *105*(4), 347-354.

Schweisfurth, M. (2011). Learner-centred education in developing country contexts: From solution to problem? International Journal of Educational Development, *31*, 425-432.

Seeber, K. P. (2015). This is really happening: Criticality and discussions of context in ACRL's framework for information literacy. *Communication in Information Literacy, 9*(2), 157-163.

Selamat, A., Alias, R. A., Hikmi, S. N., Puteh, M., & Tapsir, S. H. (2017). Higher Education 4.0: Current Status and Readiness in Meeting the Fourth Industrial Revolution Challenges. Ministry of Higher Education Malaysia, (August), 23-24.

Shahrzadi, L., Mansouri, A., Alavi, M., & Shabani, A. (2024). Causes, consequences, and strategies to deal with information overload: A scoping review. *International Journal of Information Management Data Insights, 4*(2024), 100261.

Shao, X., & Purpur, G. (2016). Effects of information literacy skills on student writing and course performance. *The Journal of Academic Librarianship, 42*(6), 670-678.

Shao, M., Hong, J., & Zhao, L. (2022). Impact of the self-directed learning approach and attitudeon online learning ineffectiveness: The mediating roles of internet cognitive fatigue and flow slate. *Frontiers in Public Health,* 1-11.

Shokrpour, N., Bijani, M., Bazrafcan, L., & Dadyar, Z. (2024). Relationship between information literacy and satisfaction with quality of virtual education in Iranian nursing students during the COVID-19. *BMC Research Notes, 17,* 341.

Skulmowski, A., & Xu, K. M. (2022). Understanding cognitive load in digital and online learning: A new perspective on extraneous cognitive load. *Educational Psychology Review, 34,* 171-196.

Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2024). *Unlocking the potential in a gamification-based MOOC: Assessing autonomous learning and self-directed learning behaviors.* The International Society for the Scholarship of Teaching and Learning, Inc. https://issotl.com/2024/07/15/unlocking-the-potential-in-a-gamification-based-mooc-assessing-autonomous-learning-and-self-directed-learning-behaviors/?utm_source=chatgpt.com

Smith, P. L., & Ragan, T. J. (2005). *Instructional design* (3rd ed.). John Wiley & Sons.

Sobel, K., & Grotti, M. G. (2013). Using the TPACK framework to facilitate decision making on instructional technologies. *Journal of Electronic Resources Librarianship, 25*(4), 255-262.

Sockman, B. R. (2015). Innovative teacher's perceptions of their development when creating learner-centered classrooms with ubiquitous computing. International Education Research, *3*(3), 26-48.

Stec, E. M. (2006). Using best practices: Librarians, graduate students and instructions. *Reference Services Review, 34*(1), 97-116.

Stellah, B., Namande, B., & Wabwire, J. (2022). Strategies used to impart information literacyskills among library users at the Catholic University of Eastern Africa, Kenya. *Scholars Journal of Arts, Humanities and Social Sciences, 10*(6), 249-254.

Stonebraker, I. R., Robertshaw, M. B., Kirkwood, H. P., & Dugan, M. (2012). Bring your own device in the information literacy classroom. *Indiana Libraries, 33*(2), 64-67.

StudyMalaysia.com. (2022, March 14). The Malaysian higher education system - an overview. *Study Malaysia.com.* https://studymalaysia.com/education/the-national-education-system/the-malaysian-higher-education-system-an-overview

Subramaniam, T. T., Suhaimi, N. A. D., Abdol Latif, L., Abu Kassim, Z., & Fadzil, M. (2019). MOOCs readiness: The scenario in Malaysia. *International Review of Research in Open and Distributed Learning, 20*(3).

Sung, U. K., & Shumaker, D. (2015). Student, Librarian, and Instructor Perceptions of Information Literacy Instruction and Skills in a First Year Experience Program: A CaseStudy. The Journal of Academic Librarianship, *41*(4), 449-456.

Swanson, R. A., & Holton, E. F. (2009). *Foundation of human resource development.* Berrett-Koehler Publishers.

Taylor, C., & DiGiacomo, D. K. (2023). Approaches to information literacy conceptualisation in primary, secondary, and higher education contexts: A review of current scholarly literature. *Journal of Information Literacy, 17*(1), 89-104.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research.* Sage Publications.

Tegos, S., Mavridis, A., & Demetriadis, S. (2021). Agent-supported peer collaboration in MOOCs. *Frontiers in Artificial Intelligence, 4,* 1-7.

Tewell, E. (2025). Two decades of critical information literacy: A review of the literature. *ACRL 2025: Democratizing knowledge + Access + Opportunity,* 483-497.

The Learning Accelerator. (n.d.). *Virtual personalized student learning plans: Choice-based personalized learning plans for virtual instruction.* https://practices.learningaccelerator.org/strategies/virtual-personalized-student-learning-plans?

Thorn, J. (2022). How librarian involvement enhances students' information literacy. *Nordic Journal of Information Literacy in Higher Education, 13*(1), 63-70.

Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., Hayek, S. E., Augereau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D., & Lubart, T. (2023). Creativity, critical thinking, communication, and collaboration: Assessment, certification, and promotion of 21st century skills for the future of work and education. *Journal of Intelligence, 11*(54), 1-32.

Tompkins, G., Campbell, R., Green, D., & Smith, C. (2014). Literacy for the 21st century, Pearson.

Trixa, J., & Kaspar, K. (2024). Information literacy in the digital age: Information sources, evaluation strategies, and perceived teaching competences of pre-service teachers. *Frontiers in Psychology,* 1-22.

Tshuma, T., & Chigada, J. (2018). Analysing information library practices at selected academic libraries in Zimbabwe. South African Journal of Information Management, *20*(1), a976.

Ucha, C. R. (2023). Role of course relevance and course content quality in MOOCs acceptance and use. *Computers and Education Open, 5*(2023), 100147.

Unegbu, M. C., Immaculata, O., & Emuchay, B. N. (2023). Information literacy and sustainable development goals implementation: The role of libraries and librarians. *International Journal of Social Science and Education Research Studies, 3*(1), 107-112.

United Nations. (n.d.). *Contributions of libraries to the SGDs.* Department of Economic and Social Affairs. https://sdgs.un.org/partnerships/contribution-libraries-sdgs

University of Michigan. (2020). *Microlearning goal setting workshop: How to use SMART goals. https://hr.umich.edu/working-u-m/professional-development/courses/microlearning-goal-setting-workshop-how-use-smart-goals*

Uzwyshyn, R. (2018). Academic libraries and technology: An environment scan towards future possibility. In G. J. Holbrook (Ed.), *Academic and digital libraries: Emerging directions and trends* (pp.63-86). Nova Publishers.

Virkus, S. (2003). Information literacy in Europe: A literature review. Information Research, *8*(4), 8-4.

Vong, S. (2016). A constructivist approach for introducing undergraduate students to special collections and archival research. *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage, 17*(2), 148-171.

Vossler, J., Horton, J., & Heady, C. (2023). The questionable efficacy of one-shot instruction for first-year students: A scoping review. *Forging the future: The proceedings of the ACRL 2023 conference,* 446-454. https://www.ala.org/sites/default/files/acrl/content/conferences/confsandpreconfs/2023/QuestionableEfficacy1.pdf

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Wahab, N. A., Othman, J., Kadar, R., & Warris, S. N. (2019). A review of MOOCs implementation in Malaysian higher education system. *Journal of Computing Research & Innovation (JCRINN), 4*(2), 1-14.

Walter, S. (2008). Librarians as teachers: A qualitative inquiry into professional identity. College & Research Libraries, *69*(1), 51-71.

Watkins, A. (2018). Teaching with threshold concepts and the ACRL framework in the art and design context. In P. Glassman & J. Dyki (Eds.), *The handbook of art and design* (pp.147-156). Facet.

Weightman et al. (2017). A systematic review of information literacy programs in higher education: Effects of face-to-face, online, and blended formats on student skills and views. Evidence Based Library and Information Practice, *2017*(12.3), 20-54.

Wetzel. D. A., & Kani, J. (2024). Enhancing information literacy through generative AI in the library classroom. *Pennsylvania Libraries: Research & Practice, 12*(2), 4-16.

Wheeler, T.R, Delgado, D., Albert, P. J., Maamar, S. B., & Oxley, P. R. (2022). Transforming and extending library services by embracing technology and

collaborations: A case study. *Health Information and Libraries Journal, 39*(3), 294-298.

Wijnen-Meijer, M., Brandhuber, T., Schneider, A., & Berberat, P. O. (2022). Implementing Kolb's experiential learning cycle by linking real experience case-based discussion and simulation. *Journal of Medical Education and Curricular Development, 9,* 1-5.

Wilson, M. W. (2016). *Librarians' use of instructional design methods in creating information literacy instruction* [Doctoral dissertation, Nova Southeastern University]. NSUWorks. https://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1071&context=fse_etd

Wilson, P. (1979). Librarians as teachers: The study of an organization fiction. *The Library Quarterly: Information, Community, Policy, 49*(2), 146-162.

Wishkoski, R. (2020). Semi-structured interviews: A team-based approach to design, implementation, and analysis. In L.A. Fullington, B.K. West, & F. Albarillo (Eds.), Reflections on Practitioner Research: A Practical Guide for Information Professionals (pp. 89-104). Chicago: Association of College & Research Libraries.

Wray, C. C., & Mulvihill, R. (2018). Framing up digital literacy: Reviewing and reframing information literacy. *The Reference Librarian, 59*(4), 195-204.

Xiong, Y., Li, H., Kornhaber, M. L., Suen, H. K., Pursel, B., & Goins, D. D. (2015). Examining the relation among student motivation, engagement, and retention in a MOOC: A structural equation modelling approach. *Global Education Review, 2,* 23-33.

Yale Poorvu Center for Teaching and Learning. (2017). *Formative and summative assessments.* https://poorvucenter.yale.edu/Formative-Summative-Assessments?

Yan, L., Sha, L., Zhao, L., Li, Y., Martinez-Maldonado, R., Chen, G., Li, X., Jin, Y., & Gašević, D. (2023). Practical and ethical challenges of large language models in education: A systematic scoping review. *arXiv.* https://doi.org/10.48550/arXiv.2303.13379

Yevelson-Shorsher, A., & Bronstein, J. (2018). Three perspectives on information literacy in academia: Talking to librarians, faculty, and students. *College & Research Libraries, 79*(4), 535-553.

York College. (2025). *Peer review and reflections: Adapting peer review for online spaces.* https://www.york.cuny.edu/english/faculty-resources/online-and-distance-teaching-/peer-review?

Yu, H., Abrizah, A., K, R. E. R., & Abdullah, S. N. M. (2018). Reinforcing information literacy development through a subject-focused resource-based project. Journal of Librarianship and Information Science. *50*(4), 386-398.

Zhao, J. (2024). The relationship between information literacy and online learning engagement: A moderated mediating model. *BMC Psychology, 12*(1), 791.

Zhu, M. (2021). Enhancing MOOC learners' skills for self-directed learning. *Distance Education, 42*(3), 441-460.

Zhu, M., Bonk, C. J., & Berri, S. (2022). Fostering self-directed learning in MOOCs: Motivation, learning strategies, and instruction. *Online Learning Journal, 26*(1), 153-173.

Zhu, M., Bonk, C. J., & Doo, M. Y. (2020). Self-directed learning in MOOCs: Exploring the relationships among motivation, self-monitoring, and self-engagement. *Educational Technology Research and Development, 68*(5), 2073-2093.

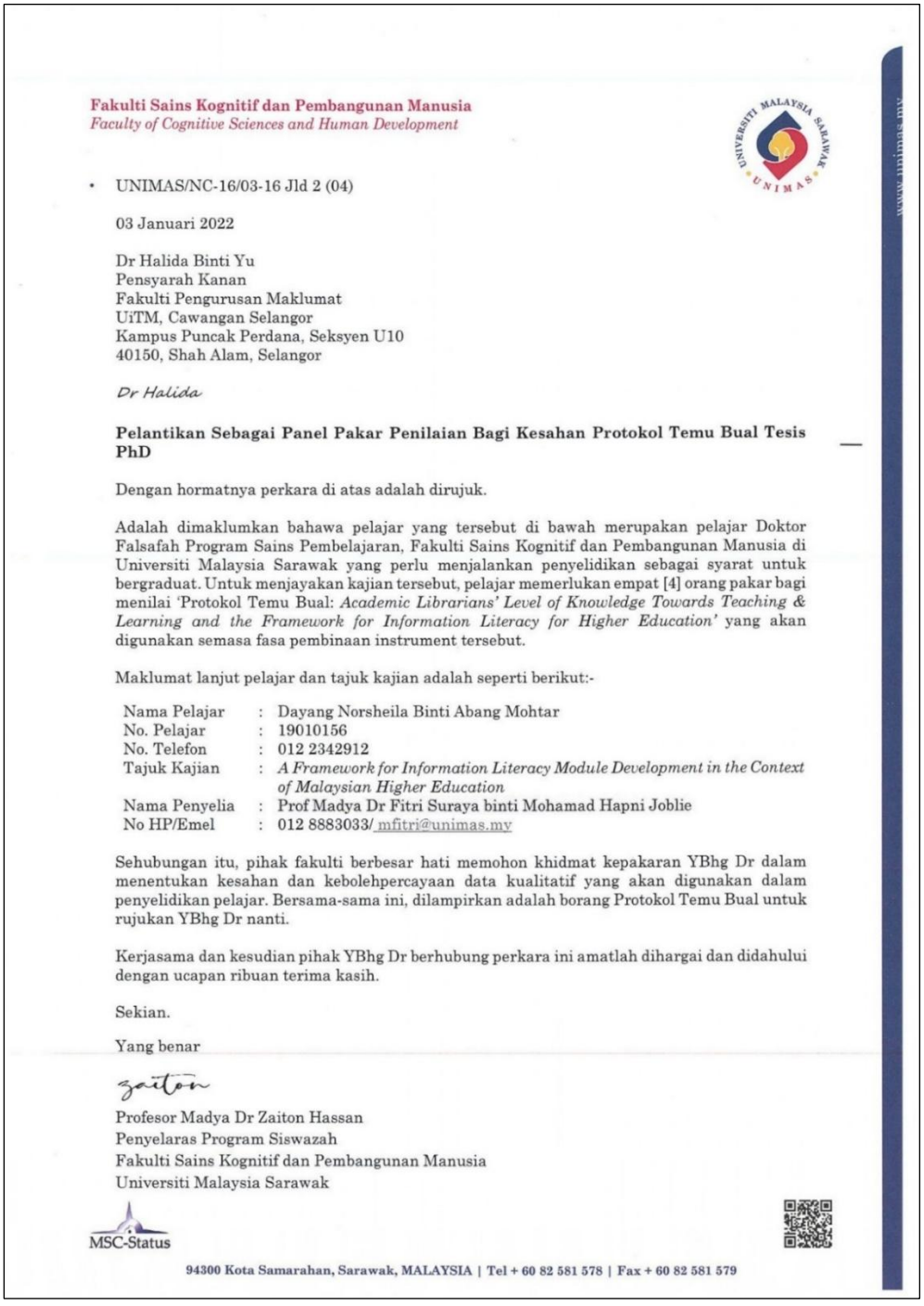
Zhu, M., Bonk, C. J., & Sari, A. R. (2018). Instructor experiences designing MOOCs in higher education: Pedagogical, resources, and logistical considerations and challenges. *Online Learning Journal, 22*(4), 203-241.

Zohrabi, M. (2013). Mixed method research: Instruments, validity, reliability and reporting findings. *Theory and Practice in Language Studies, 3*(2), 254-262.

Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: Trends, challenges, and innovations in technology integration. *Frontiers in Education,* 10: 1562391.

APPENDICES

Appendix A: Expert Panel Appointment Letter



Fakulti Sains Kognitif dan Pembangunan Manusia
Faculty of Cognitive Sciences and Human Development

UNIMAS/NC-16/03-16 Jld 2 (04)

03 Januari 2022

Dr Halida Binti Yu
Pensyarah Kanan
Fakulti Pengurusan Maklumat
UiTM, Cawangan Selangor
Kampus Puncak Perdana, Seksyen U10
40150, Shah Alam, Selangor

Dr Halida

Pelantikan Sebagai Panel Pakar Penilaian Bagi Kesahan Protokol Temu Bual Tesis PhD

Dengan hormatnya perkara di atas adalah dirujuk.

Adalah dimaklumkan bahawa pelajar yang tersebut di bawah merupakan pelajar Doktor Falsafah Program Sains Pembelajaran, Fakulti Sains Kognitif dan Pembangunan Manusia di Universiti Malaysia Sarawak yang perlu menjalankan penyelidikan sebagai syarat untuk bergraduat. Untuk menjayakan kajian tersebut, pelajar memerlukan empat [4] orang pakar bagi menilai 'Protokol Temu Bual: *Academic Librarians' Level of Knowledge Towards Teaching & Learning and the Framework for Information Literacy for Higher Education'* yang akan digunakan semasa fasa pembinaan instrument tersebut.

Maklumat lanjut pelajar dan tajuk kajian adalah seperti berikut:-

Nama Pelajar	:	Dayang Norsheila Binti Abang Mohtar
No. Pelajar	:	19010156
No. Telefon	:	012 2342912
Tajuk Kajian	:	*A Framework for Information Literacy Module Development in the Context of Malaysian Higher Education*
Nama Penyelia	:	Prof Madya Dr Fitri Suraya binti Mohamad Hapni Joblie
No HP/Emel	:	012 8883033/ mfitri@unimas.my

Sehubungan itu, pihak fakulti berbesar hati memohon khidmat kepakaran YBhg Dr dalam menentukan kesahan dan kebolehpercayaan data kualitatif yang akan digunakan dalam penyelidikan pelajar. Bersama-sama ini, dilampirkan adalah borang Protokol Temu Bual untuk rujukan YBhg Dr nanti.

Kerjasama dan kesudian pihak YBhg Dr berhubung perkara ini amatlah dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian.

Yang benar

zaiton

Profesor Madya Dr Zaiton Hassan
Penyelaras Program Siswazah
Fakulti Sains Kognitif dan Pembangunan Manusia
Universiti Malaysia Sarawak

MSC-Status

94300 Kota Samarahan, Sarawak, MALAYSIA | Tel + 60 82 581 578 | Fax + 60 82 581 579

Fakulti Sains Kognitif dan Pembangunan Manusia
Faculty of Cognitive Sciences and Human Development

UNIMAS/NC-16.03/13-01 (23)

9 November 2021

Dr Intan Safinaz bt Zainudin
Pensyarah Universiti
Pusat Kajian Bahasa & Linguistik [PBL]
Universiti Kebangsaan Malaysia
43600 Bangi, Selangor

YBhg Dr Intan Safinaz

Permohonan Perkhidmatan Sebagai Pakar Penilaian Protokol Temu Bual Penyelidikan Tesis PhD

Dengan hormatnya perkara di atas adalah dirujuk.

Adalah dimaklumkan bahawa pelajar yang tersebut di bawah merupakan pelajar Doktor Falsafah, Fakulti Sains Kognitif dan Pembangunan Manusia di Universiti Malaysia Sarawak yang perlu menjalankan penyelidikan sebagai syarat untuk bergraduat. Untuk menjayakan kajian tersebut, pelajar memerlukan empat orang pakar bagi menilai "Protokol Temu Bual: *Academic Librarians' Level of Knowledge Towards Teaching & Learning and the Framework for Information Literacy for Higher Education"* yang akan digunakan semasa fasa pembinaan instrumen tersebut.

Maklumat lanjut pelajar dan tajuk kajian adalah seperti berikut :-

Nama Pelajar	:	Dayang Norsheila binti Abang Mohtar
No. Pelajar	:	19010156
No. Telefon	:	012 2342912
Tajuk Kajian	:	*A Framework for Information Literacy Module Development in the Context of Malaysian Higher Education.*
Nama Penyelia	:	Prof Madya Dr Fitri Suraya binti Mohamad Hapni Joblie
No HP/Emel	:	012 8883033/ mfitri@unimas.my

Sehubungan itu, pihak fakulti berbesar hati melantik YBhg Dr sebagai Pakar Penilai Protokol Temu Bual bagi menentukan kesahan dan kebolehpercayaan data kualitatif yang akan digunakan dalam penyelidikan pelajar. Bersama-sama ini, dilampirkan borang Protokol Temu Bual untuk tujuan rujukan YBhg Dr nanti.

Besarlah harapan kami kiranya pihak YBhg Dr dapat memberikan kerjasama kepada pelajar ini untuk membolehkan pelajar mendapat maklumat yang diperlukan. Pihak Fakulti menjamin bahawa segala maklumat yang diperoleh hanya digunakan untuk tujuan akademik semata-mata dan dijamin akan kerahsiaannya.

Di atas kerjasama yang diberikan, kami dahului dengan ucapan ribuan terima kasih.

Sekian.

Yang benar

zaiton

Profesor Madya Dr Zaiton Hassan
Penyelaras Program Siswazah
Fakulti Sains Kognitif dan Pembangunan Manusia
Universiti Malaysia Sarawak
Emel: hzaiton@unimas.my

MSC-Status

Fakulti Sains Kognitif dan Pembangunan Manusia
Faculty of Cognitive Sciences and Human Development

www.unimas.my

UNIMAS/NC-16.03/13-01 (33)

7 Februari 2022

Encik Nurul Hafis Mohamed
Guru Bahasa Melayu
SMK Sheikh Hj. Othman Abdul Wahab
Jalan Matang Jaya
93050 Kuching, Sarawak

Tuan

Permohonan Perkhidmatan Sebagai Pakar Penilaian Protokol Temu Bual Penyelidikan Tesis PhD

Dengan hormatnya perkara di atas adalah dirujuk.

Adalah dimaklumkan bahawa pelajar yang tersebut di bawah merupakan pelajar Doktor Falsafah, Fakulti Sains Kognitif dan Pembangunan Manusia di Universiti Malaysia Sarawak yang perlu menjalankan penyelidikan sebagai syarat untuk bergraduat. Untuk menjayakan kajian tersebut, pelajar memerlukan empat orang pakar bagi menilai "Protokol Temu Bual: *Academic Librarians' Level of Knowledge towards Teaching & Learning and the Framework for Information Literacy for Higher Education"* yang akan digunakan semasa fasa pembinaan instrumen tersebut.

Maklumat lanjut pelajar dan tajuk kajian adalah seperti berikut :-

Nama Pelajar	:	Dayang Norsheila binti Abang Mohtar
No. Pelajar	:	19010156
No. Telefon	:	012 2342912
Tajuk Kajian	:	*A Framework for Information Literacy Module Development in the Context of Malaysian Higher Education*
Nama Penyelia	:	Prof Madya Dr Fitri Suraya binti Mohamad Hapni Joblie
No HP/Emel	:	012 8883033/ mfitri@unimas.my

Sehubungan itu, pihak fakulti berbesar hati melantik Tuan sebagai Pakar Penilai Protokol Temu Bual bagi menentukan kesahan dan kebolehpercayaan data kuantitatif yang akan digunakan dalam penyelidikan pelajar. Bersama-sama ini, dilampirkan borang soal selidik untuk tujuan rujukan Tuan nanti.

Besarlah harapan kami kiranya pihak Tuan dapat memberikan kerjasama kepada pelajar ini untuk membolehkan pelajar mendapat maklumat yang diperlukan. Pihak Fakulti menjamin bahawa segala maklumat yang diperoleh hanya digunakan untuk tujuan akademik semata-mata dan dijamin akan kerahsiaannya.

Di atas kerjasama yang diberikan, kami dahului dengan ucapan ribuan terima kasih.

Sekian.Yang benar

Profesor Madya Dr Zaiton Hassan
Penyelaras Program Siswazah
Fakulti Sains Kognitif dan Pembangunan Manusia
Universiti Malaysia Sarawak
Emel: hzaiton@unimas.my

MSC-Status

94300 Kota Samarahan, Sarawak, MALAYSIA | Tel + 60 82 581 578 | Fax + 60 82 581 579

Appendix B: Expert Verification Form

BORANG PENGESAHAN PAKAR

(Maklumat Diri Pakar)

Nama: Dr Halida Binti Yu

Jawatan: Pensyarah Kanan

Organisasi/ Institusi: Fakulti Pengurusan Maklumat, UiTM Kampus Puncak Perdana

Kelayakan Tertinggi: PhD (Information Management)

Tempoh dan Pengalaman Bekerja: Guru (10 tahun), Pensyarah (21 tahun)

Bidang Kepakaran: Information Literacy

Ulasan:

Secara keseluruhan, protokol temu bual ini menunjukkan penjajaran yang jelas dengan objektif penyelidikan dan mempunyai asas yang kukuh untuk meneroka pengalaman peserta. Bahagian pengenalan menetapkan nada yang sesuai dengan menerangkan tujuan temu bual serta memastikan pertimbangan etika seperti persetujuan dan kerahsiaan dipatuhi. Soalan bersifat terbuka dan disusun dengan baik, yang menggalakkan jawapan yang mendalam dan bermakna. Walau bagaimanapun, beberapa soalan perlu disemak semula untuk mengelakkan penggunaan Bahasa (jargon) yang boleh mempengaruhi jawapan dan memastikan semua istilah dijelaskan dengan jelas kepada peserta yang mungkin tidak biasa dengan istilah akademik.



Tandatangan

HALIDA BINTI YU

BORANG PENGESAHAN PAKAR

(Maklumat Diri Pakar)

Nama: Dr. Intan Safinaz Zainudin

Jawatan: Pensyarah Kanan

Organisasi/ Institusi: Pusat Kajian Bahasa dan Linguistik, Fakulti Sains Sosial dan Kemanusiaan, Universiti Kebangsaan Malaysia.

Kelayakan Tertinggi: PhD (Linguistik)

Tempoh dan Pengalaman Bekerja: 27 tahun

Bidang Kepakaran: Pengajian Terjemahan, Leksikografi Dwibahasa dan Kajian Korpus Linguistik

Ulasan:

Saya telah menyemak borang protokol temubual untuk kegunaan penyelidikan pelajar. Pelajar perlu membaiki bahasa dan terjemahan dalam borang tersebut. Mohon rujuk komen yang saya berikan dalam dokumen yang saya lampirkan bersama.



Tandatangan & Cop

INTAN SAFINAZ BINTI ZAINUDIN

BORANG PENGESAHAN PAKAR

(Maklumat Diri Pakar)

Nama: Nurul Hafis bin Mohamed

Jawatan: Guru Akademik (Bahasa Melayu)

Organisasi/ Institusi: SMK Agama Shiekh Hj Othman Abdul Wahab

Kelayakan Tertinggi: Bac Pengajian Pendidikan Bahasa Melayu Sebagai Bahasa Pertama

Tempoh dan Pengalaman Bekerja: 9 Tahun

Bidang Kepakaran: Bahasa Melayu & Sastera

Ulasan:

Secara keseluruhan, protocol temubual (interview protocol) yang dihasilkan dibina secara terarah, berfokus dan tidak keluar daripada permasalahan kajian yang dijalankan. Dengan ini, pengumpulan data dalam kajian terutamanya dalam kajian kualitatif akan lebih tepat dan mudah.

(NURUL HAFIS BIN MOHAMED)

Appendix C: Interview Consent Form

Faculty of Cognitive Sciences and Human Development
Universiti Malaysia Sarawak,
Jalan Datuk Muhammad Musa,
94300 Kota Samarahan, Sarawak

YBhg. Prof/ Associate Prof/ Dr/ Sir/ Madam,

This interview protocol is intended to obtain consent and validation from experts on the items constructed for *Academic Librarians' Level of Knowledge towards Teaching & Learning and the Framework for Information Literacy for Higher Education* instrument development and validation. This interview protocol is divided into 6 sections:

1. Section A: Professional Background of Librarian
2. Section B: General Data on Information Literacy Instruction
3. Section C: Awareness on Technological Knowledge
4. Section D: Awareness on Pedagogical Knowledge
5. Section E: Awareness on Content Knowledge
6. Section F: Knowledge on ACRL's Framework for Information Literacy for Higher Education

All feedback provided will be treated CONFIDENTIAL and will only be used for the purpose of this study and all related publications. Your cooperation and idea contribution are highly appreciated in an effort to improve or enhance the instructional delivery methods in teaching Information Literacy among Malaysian academic librarians especially in today's information age.

Thank you for your cooperation in making this study a success. For further inquiries, you may contact the researcher at 012-2342912 or email to 19010156@siswa.unimas.my

Thank you.

DAYANG NORSHEILA BINTI ABANG MOHTAR (19010156)
Doctoral student
Faculty of Cognitive Sciences and Human Development
Universiti Malaysia Sarawak

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1. Title *Gelaran*	Professor Dr/ *Profesor Dr*	[	]
	Associate Professor Dr/ *Prof Madya Dr*	[	]
	Dr	[	]
	Mr/ *Encik*	[√	]
	Ms/ *Puan / Cik*	[	]

2. Full Name
3. *Nama Penuh*

SHAHRUL MD RIZAL BIN SHAMSHURI

4. Gender/ *Jantina*	Male/ *Lelaki*	[√	]
	Female/ *Perempuan*	[	]

5. Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[	]
	6 to 10 years/ *6 hingga 10 tahun*	[	]
	11 to 15 years/ *11 hingga 15 tahun*	[√	]
	16 to 20 years/ *16 hingga 20 tahun*	[	]
	More than 20 years/ *Lebih dari 20 tahun*	[	]

6. Name of Library & University (current employment):
   Nama Perpustakaan & Universiti (pekerjaan semasa):

   PERPUSTAKAAN TUNKU TUN AMINAH (PTTA), UNIVERSITI TUN HUSSIEN ONN MALAYSIA

7. Current position/ *Jawatan semasa:*

   PUSTAKAWAN KANAN

8. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. SARJANA MUDA PENGURUSAN SISTEM MAKLUMAT, UiTM

ii. DIPLOMA PENGAJIAN MAKLUMAT, UiTM

iii. _____

iv. _____

v. _____

vi. _____

9. Specific area of expertise/ *Bidang kepakaran:*

i. PERKHIDMATAN PENDIDIKAN PELANGGAN

ii. PERKHIDMATAN PENGGUNA PERPUSTAKAAN

j. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

_____

k. Job responsibilities/ *Tanggungjawab kerja:*

i. MENGETUAI UNIT PENDIDIKAN PELANGGAN

ii. LITERASI MAKLUMAT

iii. PINJAMAN ANTARA PERPUSTAKAAN

[√] I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : 

Date/ *Tarikh* : 27 MAC 2022

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1. Title	Professor Dr/ *Profesor Dr*	[	]
Gelaran	Associate Professor Dr/ *Prof Madya Dr*	[	]
	Dr	[/	]
	Mr/ *Encik*	[	]
	Ms/ *Puan / Cik*	[	]
2. Full Name	Mazni Md Yusof		
3. *Nama Penuh*	_____		
4. Gender/ *Jantina*	Male/ *Lelaki*	[	]
	Female/ *Perempuan*	[/	]
5. Year of Service	Less than 5 years/ *Kurang dari 5 tahun*	[	]
Tempoh Perkhidmatan	6 to 10 years/ *6 hingga 10 tahun*	[	]
	11 to 15 years/ *11 hingga 15 tahun*	[	]
	16 to 20 years/ *16 hingga 20 tahun*	[	]
	More than 20 years/ *Lebih dari 20 tahun*	[/	]

6. Name of Library & University (current employment):
   Nama Perpustakaan & Universiti (pekerjaan semasa):

   Perpustakaan Tun Seri Lanang UKM
7. Current position/ *Jawatan semasa:*

   Penolong Ketua Pustakawan

8. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

   i. Ijazah Sarjana Ilmu Perpustakaan (Universitas Indonesia)

   ii. M.A Information and Library Management (Loughborough University, UK)

   iii. Doctor in Information Science (Robert Gordon University, Aberdeen Scotland, UK)

   iv. _____

   v. _____

   vi. _____

9. Specific area of expertise/ *Bidang kepakaran:*

   Academic library management and strategy

10. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

    Tiada

11. Job responsibilities/ *Tanggungjawab kerja:*

    Ketua Unit Pendidikan Pelanggan

☑ I hereby agree to participate in this study

Saya *dengan ini bersetuju untuk mengambil bahagian dalam kajian ini*

Signature/ *Tandatangan* : *mazni*

Date/ *Tarikh* : 4/4/2022

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1.	Title *Gelaran*	Professor Dr/ *Profesor Dr*	[ ]
		Associate Professor Dr/ *Prof Madya Dr*	[ ]
		Dr	[ ]
		Mr/ *Encik*	[ ]
		Ms/ *Puan / Cik*	[/]
2.	Full Name *Nama Penuh*	Affida Abu Bakar	
3.	Gender/ *Jantina*	Male/ *Lelaki*	[ ]
		Female/ *Perempuan*	[/]
4.	Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[ ]
		6 to 10 years/ *6 hingga 10 tahun*	[ ]
		11 to 15 years/ *11 hingga 15 tahun*	[/]
		16 to 20 years/ *16 hingga 20 tahun*	[ ]
		More than 20 years/ *Lebih dari 20 tahun*	[ ]

5. Name of Library & University (current employment):
   Nama Perpustakaan & Universiti (pekerjaan semasa):

   Perpustakaan Universiti Malaysia Pahang

6. Current position/ *Jawatan semasa:*

   Pustakawan (S44)

7. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. Sarjana Sains Pengurusan Maklumat (UiTM)

ii. Ijazah Sarjana Muda Pengurusan Perpustakaan Dan Maklumat (UiTM)

iii. Diploma Pengurusan Maklumat

iv. _____

v. _____

vi. _____

8. Specific area of expertise/ *Bidang kepakaran:*

Literasi Maklumat, Pengurusan Perpustakaan

9. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

-tiada

10. Job responsibilities/ *Tanggungjawab kerja:*

Merancang dan melaksana aktiviti perkhidmatan pendidikan pengguna, perkhidmatan rujukan, perundingan dan penyelidikan maklumat yang diperlukan oleh pengguna perpustakaan.

☑ I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : *Affida*

Date/ *Tarikh* : 26 Mei 2022

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1. Title *Gelaran*	Professor Dr/ *Profesor Dr*	[	]
	Associate Professor Dr/ *Prof Madya Dr*	[	]
	Dr	[	]
	Mr/ *Encik*	[	]
	Ms/ *Puan/ Cik*	[/	]
2. Full Name *Nama Penuh*	WAN SALWATI BINTI WAN SALLEH		
3. Gender/ *Jantina*	Male/ *Lelaki*	[	]
	Female/ *Perempuan*	[/	]
4. Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[	]
	6 to 10 years/ *6 hingga 10 tahun*	[	]
	11 to 15 years/ *11 hingga 15 tahun*	[	]
	16 to 20 years/ *16 hingga 20 tahun*	[/	]
	More than 20 years/ *Lebih dari 20 tahun*	[	]

5. Name of Library & University (current employment):
Nama Perpustakaan & Universiti (pekerjaan semasa):

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA (IIUM)

6. Current position/ *Jawatan semasa:*

SENIOR LIBRARIAN

7. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. MASTER OF LIBRARY AND INFORMATION SCIENCE (MLIS), IIUM

ii. _____

iii. _____

iv. _____

v. _____

vi. _____

8. Specific area of expertise/ *Bidang kepakaran:*

INFORMATION LITERACY, REPOSITORY

_____

9. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

NA

_____

10. Job responsibilities/ *Tanggungjawab kerja:*

INFORMATION SERVICES AND COORDINATOR FOR INFORMATION LITERACY PROGRAMME

[/] I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : Wanti

Date/ *Tarikh* : 06/04/2022

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1.	Title *Gelaran*	Professor Dr/ *Profesor Dr*	[ ]
		Associate Professor Dr/ *Prof Madya Dr*	[ ]
		Dr	[ ]
		Mr/ *Encik*	[ ]
		Ms/ *Puan/ Cik*	[/]
2.	Full Name *Nama Penuh*	**Nurulain binti Ismail**	
3.	Gender/ *Jantina*	Male/ *Lelaki*	[ ]
		Female/ *Perempuan*	[/]
4.	Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[ ]
		6 to 10 years/ *6 hingga 10 tahun*	[ ]
		11 to 15 years/ *11 hingga 15 tahun*	[/]
		16 to 20 years/ *16 hingga 20 tahun*	[ ]
		More than 20 years/ *Lebih dari 20 tahun*	[ ]

5. Name of Library & University (current employment):
Nama Perpustakaan & Universiti (pekerjaan semasa):

Universiti Malaysia Sabah Library

6. Current position/ *Jawatan semasa:*

Senior Librarian

7. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. **Diploma in Information Management - UiTM**

ii. **Bsc. Information Studies (Library & Information Management)- UiTM**

iii. _____

iv. _____

v. _____

vi. _____

8. Specific area of expertise/ *Bidang kepakaran:*

Acquisition, reference services & information literacy

_____

9. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

-

_____

10. Job responsibilities/ *Tanggungjawab kerja:*

Responsible for managing the reference services, library promotion, and program.

[/] I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : _____

Date/ *Tarikh* : **13 September 2022**

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1.	Title *Gelaran*	Professor Dr/ *Profesor Dr*	[ ]
		Associate Professor Dr/ *Prof Madya Dr*	[ ]
		Dr	[ ]
		Mr/ *Encik*	[ ]
		Ms/ *Puan/ Cik*	[√]
2.	Full Name *Nama Penuh*	RUSNIAH SAYUTI	
3.	Gender/ *Jantina*	Male/ *Lelaki*	[ ]
		Female/ *Perempuan*	[√]
4.	Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[ ]
		6 to 10 years/ *6 hingga 10 tahun*	[ ]
		11 to 15 years/ *11 hingga 15 tahun*	[ ]
		16 to 20 years/ *16 hingga 20 tahun*	[√]
		More than 20 years/ *Lebih dari 20 tahun*	[ ]

5. Name of Library & University (current employment):
Nama Perpustakaan & Universiti (pekerjaan semasa):

PERPUSTAKAN SULTAN ABDUL SAMAD, UNIVERSITI PUTRA MALAYSIA

6. Current position/ *Jawatan semasa:*

   PUSTAKAWAN KANAN

7. Programme (qualification) and university/ universities you graduated from:
   Program (kelayakan) dan universiti anda bergraduat:

   i. MASTER PERPUSTAKAAN & SAINS MAKLUMAT, UIAM

   ii. SARJANA MUDA ILMU WAHYU & WARISAN ISLAM, UIAM

   iii. _____

   iv. _____

   v. _____

   vi. _____

8. Specific area of expertise/ *Bidang kepakaran:*

   Pengkatalogan bahan dan konsultasi maklumat

9. Most current research in related field (indicate only one if any) and year of study:
   Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:
   -
   _____

10. Job responsibilities/ *Tanggungjawab kerja:*

    Tanggung jawab utama adalah memberi khidmat nasihat dan konsultasi berkaitan sumber dan pencarian maklumat kepada warga universiti dan mengajar dalam Program Literasi Maklumat

☑ I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : RusniahSayuti

Date/ *Tarikh* : 1.4.2022

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1. Title *Gelaran*	Professor Dr/ *Profesor Dr*	[	]
	Associate Professor Dr/ *Prof Madya Dr*	[	]
	Dr	[/	]
	Mr/ *Encik*	[	]
	Ms/ *Puan / Cik*	[	]

2. Full Name / *Nama Penuh*: ROSNANI BINTI AHMAD

3. Gender/ *Jantina*	Male/ *Lelaki*	[	]
	Female/ *Perempuan*	[/	]

4. Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[	]
	6 to 10 years/ *6 hingga 10 tahun*	[	]
	11 to 15 years/ *11 hingga 15 tahun*	[/	]
	16 to 20 years/ *16 hingga 20 tahun*	[	]
	More than 20 years/ *Lebih dari 20 tahun*	[	]

5. Name of Library & University (current employment):
Nama Perpustakaan & Universiti (pekerjaan semasa):

PERPUSTAKAAN HAMZAH SENDUT, UNIVERSITI SAINS MALAYSIA

6. Current position/ *Jawatan semasa:*

PUSTAKAWAN KANAN

7. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. Doctor of Philosophy in Information Management (Faculty of Information Management), UiTM

ii. Master of Science in Information Management (Faculty of Information Management), UiTM

iii. Bachelor of Science (Hons.) in Information Management), UiTM

iv. _____

8. Specific area of expertise/ *Bidang kepakaran:*

Knowledge Management (KM), Information Literacy, Research Support Services,

Bibliometric Analysis, Authentic Personal Branding, and Corporate Social Responsibility (CSR).

9. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

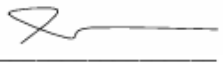
Reaching the end-users and the continuity of academic library services during covid-19 pandemic: the experience of USM Library

10. Job responsibilities/ *Tanggungjawab kerja:*

Merancang, menyedia, mengurus, melaksana dan memantau (i) Perkhidmatan Rujukan dan Konsultansi; (ii) Perkhidmatan Pembekalan Dokumen (Artikel) dan; (iii) Perkhidmatan Pendidikan Pengguna agar berjalan lancar dan bagi memastikan matlamat serta objektif Bahagian tercapai selaras dengan misi dan visi Perpustakaan. Tanggungjawab bagi setiap Perkhidmatan tersebut merangkumi perancangan, penyediaan jadual, pelaksanaan dan pemantauan tugasan, pengendalian pertanyaan (Perkhidmatan Rujukan dan Konsultansi), perancangan serta pengendalian jenis Perkhidmatan Pembekalan Dokumen (Artikel) yang merangkumi Pembekalan Dokumen secara 'Pay Per View', perancangan, penyediaan jadual dan modul, pelaksanaan dan pemantauan tugasan bagi Perkhidmatan Pendidikan Pengguna, perancangan, penyediaan

jadual dan modul serta penyediaan juga pemantauan tugasan melibatkan pengurusan statistik/kualiti untuk memastikan pelanggan mendapat maklumbalas serta maklumat yang diperlukan mengikut tempoh masa yang telah ditetapkan di dalam Objektif Kualiti Bahagian.

☑ I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : 

Date/ *Tarikh* : 22 APRIL 2022

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you / *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1.	Title *Gelaran*	Professor Dr/ *Profesor Dr*	[ ]
		Associate Professor Dr/ *Prof Madya Dr*	[ ]
		Dr	[√]
		Mr/ *Encik*	[√]
		Ms/ *Puan / Cik*	[Puan √]
2.	Full Name *Nama Penuh*	NORAZLINA BT ABDUL RAHMAN	
3.	Gender/ *Jantina*	Male/ *Lelaki*	[√]
		Female/ *Perempuan*	[/]
4.	Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[√]
		6 to 10 years/ *6 hingga 10 tahun*	[ ]
		11 to 15 years/ *11 hingga 15 tahun*	[√]
		16 to 20 years/ *16 hingga 20 tahun*	[/ √]
		More than 20 years/ *Lebih dari 20 tahun*	[√]

5. Name of Library & University (current employment):
Nama Perpustakaan & Universiti (pekerjaan semasa):
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY), UNIMAS

6. Current position/ *Jawatan semasa:*
Pustakawan Kanan

7. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. Bachelor Science Information Studies (Library and information management) with Honours, Faculty Information Management, Universiti Teknologi Mara, Shah Alam

ii. Master of Science in Information Management, Faculty Information Management Universiti Teknologi Mara, Shah Alam

iii. _____

8. Specific area of expertise/ *Bidang kepakaran:*

Literasi maklumat, pengkatalogan dan sirkulasi

_____

_____

9. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

_____

10. Job responsibilities/ *Tanggungjawab kerja:*

Menguruskan bahagian perkhidmatan, mengendalikan literasi maklumat dan menyediakan perkhidmatan maklumat seperti Pinjaman Antara Perpustakaan.

[/] I hereby agree to participate in this study

Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : 

Date/ *Tarikh* : 05 Julai 2022

Appendix D: Interview Protocol

Faculty of Cognitive Sciences and Human Development

Universiti Malaysia Sarawak,

Jalan Datuk Muhammad Musa,

94300 Kota Samarahan, Sarawak

YBhg. Prof/ Associate Prof/ Dr/ Sir/ Madam,

This interview protocol is intended to obtain consent and validation from experts on the items constructed for *Academic Librarians' Level of Knowledge towards Teaching & Learning and the Framework for Information Literacy for Higher Education* instrument development and validation. This interview protocol is divided into 6 sections:

1. Section A: Professional Background of Librarian
2. Section B: General Data on Information Literacy Instruction
3. Section C: Awareness on Technological Knowledge
4. Section D: Awareness on Pedagogical Knowledge
5. Section E: Awareness on Content Knowledge
6. Section F: Knowledge on ACRL's Framework for Information Literacy for Higher Education

All feedback provided will be treated CONFIDENTIAL and will only be used for the purpose of this study and all related publications. Your cooperation and idea contribution are highly appreciated in an effort to improve or enhance the instructional delivery methods in teaching Information Literacy among Malaysian academic librarians especially in today's information age.

Thank you for your cooperation in making this study a success. For further inquiries, you may contact the researcher at 012-2342912 or email to 19010156@siswa.unimas.my

Thank you.

DAYANG NORSHEILA BINTI ABANG MOHTAR (19010156)
Doctoral student
Faculty of Cognitive Sciences and Human Development
Universiti Malaysia Sarawak

SECTION A: PROFESSIONAL BACKGROUND OF LIBRARIAN

SEKSYEN A: LATAR BELAKANG PROFESION PUSTAKAWAN

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you./ *Sila isi maklumat peribadi anda. Sila tandakan (√) pada kurungan yang berkenaan. Terima kasih.*

1. Title *Gelaran*	Professor Dr/ *Profesor Dr*	[	]
	Associate Professor Dr/ *Prof Madya Dr*	[	]
	Dr	[	]
	Mr/ *Encik*	[	]
	Ms/ *Puan / Cik*	[	]

2. Full Name _____
   Nama Penuh _____

3. Gender/ *Jantina*	Male/ *Lelaki*	[	]
	Female/ *Perempuan*	[	]

4. Year of Service *Tempoh Perkhidmatan*	Less than 5 years/ *Kurang dari 5 tahun*	[	]
	6 to 10 years/ *6 hingga 10 tahun*	[	]
	11 to 15 years/ *11 hingga 15 tahun*	[	]
	16 to 20 years/ *16 hingga 20 tahun*	[	]
	More than 20 years/ *Lebih dari 20 tahun*	[	]

5. Name of Library & University (current employment):
   Nama Perpustakaan & Universiti (pekerjaan semasa):

   _____

6. Current position/ *Jawatan semasa:*

   _____

7. Programme (qualification) and university/ universities you graduated from:
Program (kelayakan) dan universiti anda bergraduat:

i. _____

ii. _____

iii. _____

iv. _____

v. _____

vi. _____

8. Specific area of expertise/ *Bidang kepakaran:*

_____

_____

9. Most current research in related field (indicate only one if any) and year of study:
Penyelidikan terkini dalam bidang berkaitan (nyatakan satu sahaja jika ada) dan tahun pengajian:

_____

_____

10. Job responsibilities/ *Tanggungjawab kerja:*

_____

_____

☐ I hereby agree to participate in this study
Saya dengan ini bersetuju untuk mengambil bahagian dalam kajian ini

Signature/ *Tandatangan* : _____

Date/ *Tarikh* : _____

SECTION B: GENERAL DATA ON INFORMATION LITERACY INSTRUCTION

SEKSYEN B: DATA AM BAGI PENGAJARAN LITERASI MAKLUMAT

No.	Question/ *Soalan*
1	i.) What is the academic level of students that you teach information literacy instruction to? *Apakah tahap akademik pelajar yang menyertai sesi pengajaran literasi maklumat anda?* Other questions which might be relevant: *Soalan-soalan lain yang mungkin berkaitan:* ▪ What type of information literacy modules do you teach? (e.g. Searching resources, Citations, etc.) *Apakah jenis modul literasi maklumat yang anda ajar? (contoh: pencarian sumber, sitasi, dll.)* ▪ Why is it important for students to be information literate or why is information literacy competencies important for students? (e.g. Improve problem solving skills, improve thinking skills, improve information searching skills, help students in their learning process, etc.) *Mengapa pentingnya untuk pelajar menjadi celik maklumat atau mengapakah kecekapan literasi maklumat penting untuk pelajar? (Meningkatkan kemahiran menyelesaikan masalah, meningkatkan kemahiran berfikir, meningkatkan kemahiran pencarian maklumat, membantu pelajar dalam proses pembelajaran mereka, dan sebagainya).*
2	i.) How long have you been teaching information literacy instruction in the context of academic library? *Berapa lamakah tempoh penyampaian pengajaran literasi maklumat anda dalam konteks perpustakaan akademik?* ii.)Do you receive any training to teach information literacy? *Adakah anda menerima sebarang latihan untuk mengajar literasi maklumat?* Other questions which might be relevant: *Soalan-soalan lain yang mungkin berkaitan:* ▪ How many librarians are teaching IL classes? *Berapakah bilangan pustakawan yang mengajar kelas literasi maklumat?* ▪ How frequent are the classes conducted? *Berapakah kekerapan kelas literasi maklumat dijalankan?*

3	i.) On average, how many information literacy instruction sessions are you required to teach in an academic year? *Secara purata, berapakah jumlah sesi literasi maklumat yang anda perlu ajar dalam tempoh setahun sesi akademik?* ii.)How many students are there participating in one information literacy session? *Berapakah bilangan pelajar yang menyertai satu sesi literasi maklumat dalam satu masa?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> ▪ Are the classes conducted as scheduled by faculties, librarians, or based on requests from faculties and lecturers? *Adakah kelas dijalankan mengikut jadual yang disediakan oleh pihak fakulti, pustakawan atau berdasarkan permintaan daripada fakulti dan pensyarah?* ▪ What do you usually prepare before teaching information literacy module? (e.g. lesson plan, learning activities, etc.) *Apakah yang anda biasa sediakan sebelum mengajar modul literasi maklumat? (contoh: rancangan pengajaran, aktiviti pembelajaran, dan sebagainya)*
4	On average, how many information literacy modules are you required to develop in an academic year? *Secara purata, berapakah jumlah modul literasi maklumat yang perlu anda bangunkan dalam tempoh setahun sesi akademik?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> Are your information literacy modules designed based on any specific model or theory? Kindly explain further. (e.g. Big 6, ACRL standards or framework, based on previous practices, based on education level (foundation, diploma, undergraduate, postgraduate) *Adakah modul literasi maklumat anda direka berdasarkan model atau teori tertentu? Mohon penjelasan yang lebih lanjut (contoh: Big 6, standard atau kerangka ACRL, berdasarkan amalan terdahulu, berdasarkan peringkat pengajian (asasi, diploma, prasiswazah, pascasiswazah)*
5	Besides students, do you provide information literacy instruction to other groups? Who are they? *Selain pelajar, adakah anda menyediakan pengajaran literasi maklumat kepada kumpulan lain? Siapakah mereka?*

SECTION C: AWARENESS OF TECHNOLOGICAL KNOWLEDGE

SEKSYEN C: KESEDARAN TENTANG PENGETAHUAN TEKNOLOGI

No.	**TECHNOLOGICAL KNOWLEDGE/ *PENGETAHUAN TEKNOLOGI***
	Questions/ *Soalan*
1	Technological Knowledge refers to teacher knowledge about traditional and new technologies that can be integrated into curriculum. Technological tools are an electric, digital or physical tool that can expand the human ability for performing tasks or generating products. For example, word processor, presentation programme, web design programmes, online learning platforms, etc. *Pengetahuan Teknologi merujuk kepada pengetahuan guru tentang teknologi tradisional dan baharu yang boleh disepadukan ke dalam kurikulum.* *Peralatan teknologi merupakan alat elektrik, digital atau fizikal yang boleh memperkembangkan keupayaan manusia dalam melaksanakan tugas atau menjana produk. Contohnya, word processor, program pembentangan, program reka bentuk laman web, platform pembelajaran dalam talian, dan sebagainya.* --- What are the technological tools used in the content delivery of every information literacy module? (e.g. Powerpoint, library website, Kahoot, Slideshare, etc.) *Apakah peralatan teknologi yang digunakan dalam penyampaian kandungan setiap modul literasi maklumat? (contoh: Powerpoint, laman web perpustakaan, Kahoot, Slideshare, dll.)* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> How does each tool function for every information literacy module? *Bagaimanakah setiap peralatan berfungsi untuk setiap modul literasi maklumat?*
2	i.) Do you use the technological tools for yourself to teach information literacy modules? How? *Adakah anda menggunakan peralatan teknologi untuk tujuan pengajaran modul literasi maklumat? Bagaimana?* ii.)Do students use the technological tools in information literacy sessions as well? How? *Adakah pelajar juga menggunakan peralatan teknologi dalam sesi literasi maklumat? Bagaimana?*

	Other questions which might be relevant: *Soalan-soalan lain yang mungkin berkaitan:* ▪ Can you explain your experience in using technological tools? *Bolehkah anda menerangkan pengalaman anda menggunakan peralatan teknologi?* ▪ What kind of problems do you face when using the technological tools? (e.g. time consuming, inconvenient for students, technical problems, etc.) *Apakah masalah yang anda hadapi semasa menggunakan peralatan teknologi? (contoh: memakan masa, tidak atau kurang sesuai untuk pelajar, masalah teknikal, dan sebagainya)* ▪ How do the technological tools help in teaching information literacy? *Bagaimanakah peralatan teknologi membantu dalam pengajaran literasi maklumat?*
3	i.) How did you start using technological tools in teaching information literacy modules? *Bagaimanakah anda mula menggunakan peralatan teknologi dalam pengajaran modul literasi maklumat?* ii.)How did you start the implementation of technological tools among students during information literacy sessions? *Bagaimanakah anda memulakan penggunaan peralatan teknologi dalam kalangan pelajar semasa sesi literasi maklumat?* Other questions which might be relevant: *Soalan-soalan lain yang mungkin berkaitan:* ▪ Why do you use technological tools in your information literacy module? *Mengapa anda menggunakan peralatan teknologi dalam modul literasi maklumat anda?* ▪ Did you attend any relevant trainings before the tools are applied in the information literacy modules? *Adakah anda menghadiri sebarang latihan yang berkaitan sebelum peralatan teknologi digunakan dalam modul literasi maklumat?* ▪ How did the idea of the current tools' implementation start? Did it come from yourself, based on your readings, based on what other libraries did or is it the latest trend in the library world? (e.g. from seminar, conference, librarian's own reading, through benchmarking, librarian's innovative idea, instruction from the management, etc.) *Bagaimanakah idea pelaksanaan peralatan teknologi semasa bermula? Adakah ia datang daripada diri anda sendiri, berdasarkan pembacaan anda, berdasarkan apa yang perpustakaan lain lakukan, atau adakah ia merupakan trend terkini dalam dunia perpustakaan? (contoh: dari seminar, persidangan, pembacaan pustakawan sendiri, melalui penandaarasan, idea inovatif pustakawan, arahan daripada pihak pengurusan, dan sebagainya)*

4	i.) What do you think about the implementation of technological tools for your information literacy teaching input compared to the traditional method? *Apakah pendapat anda tentang pelaksanaan peralatan teknologi dalam input pengajaran literasi maklumat anda berbanding dengan kaedah tradisional?* ii.)What do you think about the implementation of technological tools among students during their information literacy sessions? *Apakah pendapat anda tentang pelaksanaan alat teknologi dalam kalangan pelajar semasa sesi literasi maklumat?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> ▪ Are you skillful or knowledgeable enough in using the current technological tooks applied in the information literacy modules? What made you say so? *Adakah anda berkemahiran atau cukup berpengetahuan dalam menggunakan peralatan teknologi semasa yang digunakan dalam modul literasi maklumat? Apakah yang membuatkan anda berkata sedemikian?* ▪ Can you name any other technological tools that you can think of which would be suitable for any information literacy module? *Bolehkah anda nyatakan nama-nama peralatan teknologi lain yang anda boleh fikirkan dan yang sesuai untuk mana-mana modul literasi maklumat?* ▪ Do you think that librarians need to enhance their knowledge and understanding in using technological tools in order to be able to recognise the types of tools that can be used in their information literacy modules? Why? *Pada pendapat anda, adakah perlu bagi pustakawan meningkatkan pengetahuan dan kefahaman mereka dalam menggunakan peralatan teknologi supaya dapat mengenali jenis peralatan yang boleh digunakan dalam modul literasi maklumat mereka? Mengapa?*

SECTION D: AWARENESS OF PEDAGOGICAL KNOWLEDGE

SEKSYEN D: KESEDARAN TENTANG PENGETAHUAN PEDAGOGI

No.	**PEDAGOGICAL KNOWLEDGE/ *PENGETAHUAN PEDAGOGI***
	Questions/ *Soalan*
1	Pedagogical Knowledge refers to teacher knowledge about a variety of instructional practices, strategies, and methods to promote students' learning. *Pengetahuan Pedagogi merujuk kepada pengetahuan guru tentang pelbagai amalan pengajaran, strategi dan kaedah untuk menggalakkan pembelajaran pelajar.* --- What is the teaching method used in every information literacy module? Does the teaching method differ from one information literacy module to another? (e.g. collaborative learning, lecture, facilitate, etc.) *Apakah kaedah pengajaran yang digunakan dalam setiap modul literasi maklumat? Adakah kaedah pengajaran berbeza antara satu modul literasi maklumat dengan modul yang lain? (contoh: pembelajaran kolaboratif, kuliah, pustakawan sebagai fasilitator, dan sebagainya)* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> ▪ Does every librarian have the same teaching skills or methods? *Adakah setiap pustakawan mempunyai kemahiran atau kaedah pengajaran yang sama?* ▪ Does every librarian have the same approach in handling students' enquiries during their information literacy class? *Adakah setiap pustakawan mempunyai pendekatan yang sama dalam mengendalikan pertanyaan pelajar semasa kelas literasi maklumat mereka?*
2	i.) How do you decide what to teach? *Bagaimanakah anda memutuskan apa yang hendak diajar?* ii.)How do you plan your session? What is the most important? *Bagaimanakah anda merancang sesi pengajaran anda? Apakah perkara yang paling penting?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> ▪ How do you plan? *Bagaimanakah anda merancang?* ▪ How do you improvise? *Bagaimanakah anda membuat penyesuaian?*

	▪ How do you upgrade knowledge? *Bagaimanakah anda meningkatkan pengetahuan?* ▪ Did you attend any training courses? *Adakah anda menghadiri mana-mana kursus latihan?* ▪ Do you change your teaching strategies after getting feedback from the students? *Adakah anda mengubah strategi pengajaran anda setelah mendapat maklum balas daripada pelajar?* ▪ What kind of feedback do you usually receive and how do you change their teaching strategies? *Apakah jenis maklum balas yang biasa anda diterima?* ▪ Have you ever discussed or asked opinion from the students on how you can improve your teaching skills or strategies? *Pernahkah anda berbincang atau bertanya pendapat daripada pelajar tentang bagaimana anda boleh meningkatkan kemahiran atau strategi pengajaran anda?* ▪ In your opinion, what do you think librarians can do in order to cater to the best practices for Higher Education learners in terms of content delivery of each information literacy module? *Pada pendapat anda, apakah yang boleh dilakukan oleh pustakawan untuk memenuhi amalan terbaik untuk pelajar pengajian tinggi dari segi penyampaian kandungan setiap modul literasi maklumat?*
3	i.) How long have you been implementing the current information literacy teaching skills or strategies *Berapa lamakah anda melaksanakan kemahiran atau strategi pengajaran literasi maklumat semasa?* ii.)Are your teaching skills the same for all modules? *Adakah kemahiran mengajar anda sama untuk semua modul?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> ▪ Can you explain your experiences in applying your teaching strategies? *Bolehkah anda menerangkan pengalaman anda dalam mengaplikasikan strategi pengajaran anda?* ▪ Are there any activities conducted for every module? What kind of activities? *Adakah terdapat aktiviti yang dijalankan untuk setiap modul? Apakah jenis aktiviti tersebut.*

4	Do you think that your information literacy teaching skills/ strategies are effective for the students? How do you rate yourself? *Pada pendapat anda, adakah kemahiran atau strategi pengajaran literasi maklumat anda berkesan untuk pelajar? Bagaimanakah anda menilai diri anda?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> How aware are you in terms of your teaching methods or strategies in delivering the content of information literacy module? Do they meet the students' learning styles? *Sejauh manakah anda sedar akan kaedah atau strategi pengajaran anda dalam menyampaikan kandungan modul literasi? Adakah mereka memenuhi cara pembelajaran pelajar?*

SECTION E: AWARENESS OF CONTENT KNOWLEDGE

SEKSYEN E: KESEDARAN TENTANG PENGETAHUAN KANDUNGAN

No.	**CONTENT KNOWLEDGE/** ***PENGETAHUAN KANDUNGAN***
	Question/ *Soalan*
1	Content Knowledge refers to any subject-matter knowledge that a teacher is responsible for teaching. *Pengetahuan Kandungan merujuk kepada apa-apa pengetahuan guru tentang tanggungjawab mereka ketika mengajar.* ---------- Can you share the module contents being taught at your university? *Bolehkah anda berkongsi kandungan modul yang diajar di universiti anda?*
2	How do you structure the content of each existing information literacy module? *Bagaimanakah anda menyusun kandungan setiap modul literasi maklumat yang sedia ada?* <u>Other questions which might be relevant:</u> <u>*Soalan-soalan lain yang mungkin berkaitan:*</u> ▪ How do you come up with the information literacy modules? Are the information literacy modules structured based on your reading or discussion among librarians, or based on practices by other libraries? *Bagaimanakah anda menghasilkan modul literasi maklumat? Adakah struktur modul literasi maklumat berdasarkan hasil pembacaan atau perbincangan dalam kalangan pustakawan atau berdasarkan amalan oleh perpustakaan lain?* ▪ What do you think about your level of understanding or knowledge on the content of each information literacy module? *Apakah pendapat anda tentang tahap pemahaman atau pengetahuan anda tentang kandungan setiap modul literasi maklumat?*
3	How long does it take for you to structure the content for each information literacy module? *Berapakah masa yang anda perlukan untuk menyusun kandungan setiap modul literasi maklumat?*

	Other questions which might be relevant: *Soalan-soalan lain yang mungkin berkaitan:* ▪ What do you consider important when you plan for each module? *Apakah yang anda anggap penting dalam perancangan setiap modul?* ▪ What are the examples you use and materials available? *Apakah contoh dan bahan yang anda gunakan?*
4	What do you think about the current content for each information literacy module? *Apakah pendapat anda mengenai kandungan semasa untuk setiap modul literasi maklumat?* Other questions which might be relevant: *Soalan-soalan lain yang mungkin berkaitan:* ▪ What are the changes in the content of information literacy modules over the past years? *Apakah perubahan dalam kandungan modul literasi maklumat dalam tempoh beberapa tahun yang lepas?* ▪ What causes the changes? *Apakah penyebab perubahan tersebut?* ▪ What is the focus of the current information literacy modules? *Apakah fokus modul literasi maklumat semasa?* ▪ What are the weaknesses or limitations that you need to improve? *Apakah kelemahan atau batasan yang perlu anda perbaiki?* ▪ Are the current information literacy module content still sufficient for students? Why? How satisfied are you? *Adakah kandungan modul literasi maklumat semasa mencukupi untuk pelajar? Mengapa? Sejauh mana anda berpuas hati?* ▪ Which current information literacy module do you think still has a lot to be improved? Why and in what sense? *Modul literasi maklumat manakah yang anda fikir masih banyak yang perlu diperbaiki? Mengapa dan dalam aspek apa?* ▪ Do you take the initiative to reconstruct the information literacy modules based on students' feedback? *Adakah anda mengambil inisiatif untuk membina semula modul literasi maklumat berdasarkan maklum balas pelajar?* ▪ What kind of feedback do you usually receive? *Apakah jenis maklum balas yang biasa anda terima?* ▪ How do you reconstruct your modules? *Bagaimanakah anda membina semula modul anda?*

	▪ What kind of changes have you made on the content of information literacy modules so far? *Apakah jenis perubahan yang telah anda lakukan pada kandungan modul literasi maklumat setakat ini?* ▪ How frequent do you update the content of information literacy modules? *Berapa kerapkah anda mengemas kini kandungan modul literasi maklumat?* ▪ Should there be new modules to be added together with the current ones? What modules would they be and how important are they for the students? *Perlukah modul baharu ditambah bersama-sama dengan modul yang sedia ada? Apakah modul tersebut dan pentingkah modul tersebut untuk pelajar?* ▪ Does the content of information literacy modules meet or still relevant to the students' needs? *Adakah kandungan modul literasi maklumat memenuhi atau masih relevan dengan keperluan pelajar?*

SECTION F: KNOWLEDGE ON THE ACRL FRAMEWORK FOR INFORMATION LITERACY FOR HIGHER EDUCATION

SEKSYEN F: PENGETAHUAN MENGENAI KERANGKA ACRL BAGI LITERASI MAKLUMAT DALAM PENGAJIAN TINGGI

No.	GENERAL/ *UMUM*
	Question/ *Soalan*
1	 This framework is formed as a result of a belief that information literacy as an educational reform movement will realise its potential only through richer, more complex set of core ideas. Students have a greater role and responsibility in creating new knowledge, in understanding the contours and the changing dynamics of the world of information, and using information, data, and scholarship ethically. This framework is called a framework intentionally because it is based on a cluster of interconnected core concepts, with flexible options implementation, rather than on a set of standards or learning outcomes, or any prescriptive enumeration skills. At the heart of this framework are conceptual understandings that organise many other concepts and ideas about information research, and scholarship into a coherent whole. *Kerangka ini dibentuk sebagai hasil daripada kepercayaan bahawa literasi maklumat sebagai gerakan pembaharuan pendidikan akan merealisasikan potensinya hanya melalui set idea teras yang lebih kaya dan lebih kompleks. Pelajar mempunyai peranan dan tanggungjawab yang lebih besar dalam mencipta pengetahuan baharu dalam memahami kontur dan perubahan dinamik dunia maklumat, dan menggunakan maklumat, data, dan kesarjanaan secara beretika.*

	Kerangka ini dipanggil kerangka kerja kerana ia adalah berdasarkan gugusan konsep teras yang saling berkaitan, dengan pelaksanaan pilihan yang fleksibel dan bukannya pada set standard atau hasil pempelajaran atau sebarang kemahiran penghitungan preskriptif. *Di tengah-tengah kerangka kerja ini merupakan pemahaman konsep yang mengatur banyak konsep dan idea lain tentang penyelidikan maklumat dan kesarjanaan ke dalam satu keseluruhan yang koheren.* Are you aware of the ACRL's Framework for Information Literacy for Higher Education? *Adakah anda mengetahui tentang Kerangka ACRL bagi Literasi Maklumat dalam Pengajian Tinggi?*
2	If yes, what do you think of the framework in general? *Jika ya, apakah pendapat anda mengenai kerangka tersebut secara umum?* If no, which framework or model do you think would be useful or appropriate for information literacy teaching? *Jika tidak, kerangka atau model manakah yang anda rasa berguna atau sesuai untuk pengajaran literasi maklumat?*
3	Could you share why you think the framework or module is suitable or unsuitable for academic libraries in Malaysia? *Bolehkah anda berkongsi mengapa anda menganggap sama ada kerangka atau modul tersebut adalah sesuai atau tidak sesuai untuk perpustakaan akademik di Malaysia?*

No.	FRAMEWORK CONSTRUCTS/ *KONSTRUK KERANGKA*
	Question/ *Soalan*
1	**AUTHORITY IS CONSTRUCTED AND CONTEXTUAL** ***AUTORITI (PENGARUH) DIBINA DAN DIKONTEKSTUAL*** Information is judged in part based on its creator's credibility and is applied in context. Authority or expertise if constructed, so it is built over time, and it is contextual, so it works inside a specific context. For example, somebody who is fundamentally good in a business setting might not make the best politician, or someone who is a good cook at home might not be as good as a professional chef when in an industrial context. *Sebahagian maklumat dinilai berdasarkan kredibiliti penciptanya dan digunakan dalam konteks. Jika kuasa atau kepakaran dibina, ia dibina dari semasa ke semasa, dan ia adalah kontekstual. Oleh itu ia berfungsi dalam konteks tertentu. Contohnya, seseorang yang pada asasnya bagus dalam suasana perniagaan mungkin tidak menjadi ahli politik yang terbaik, atau seseorang yang mahir memasak di rumah mungkin tidak sebaik chef professional apabila dalam konteks industri.* <u>Question:</u> Please share your understanding of the need to determine and validate the information created by different authority, ability or knowledge *Sila kongsikan pemahaman anda tentang keperluan untuk menentukan dan mengesahkan maklumat yang dibuat oleh berlainan pihak berkuasa, kemampuan atau pengetahuan*
2	**INFORMATION CREATION AS A PROCESS** ***PENCIPTAAN MAKLUMAT SEBAGAI PROSES*** Research is a unique iterative process which is reflected in a person's work. The information format can help us consider the information's creation process. For example, tweet, scholarly journal, newspaper article, book, etc. *Penyelidikan merupakan proses berulang yang unik untuk dicerminkan dalam kerja seseorang. Format maklumat boleh membantu kita mempertimbangkan proses penciptaan maklumat. Contohnya, tweet, jurnal ilmiah, artikel akhbar, buku, dan sebagainya.* <u>Question:</u> Please share your understanding of the characteristics of information sources as well as how and for whom they were created *Sila kongsikan pemahaman anda mengenai ciri-ciri sumber maklumat serta bagaimana dan untuk siapa sumber-sumber tersebut diciptakan*

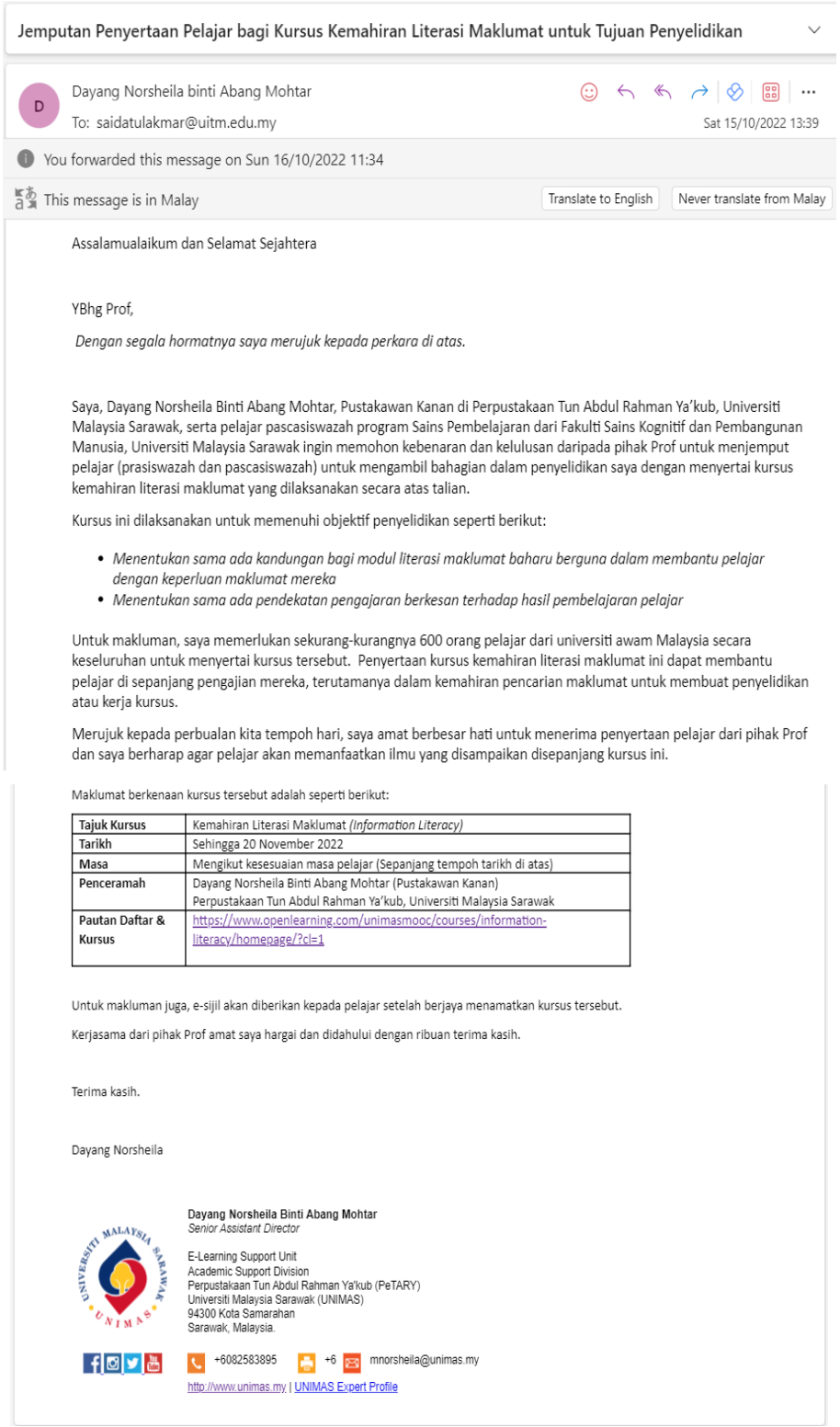
3	**INFORMATION HAS VALUE** ***MAKLUMAT MEMPUNYAI NILAI*** Information possesses several dimensions of value, including as a commodity, as a means of education, as a means of influence, and as a means of negotiating and understanding the world. Legal and socioeconomic interests on the other hand influence information production and dissemination. An example for a "value" in which information can have is that information can be valuable as a commodity, means it can be bought and sold like books, intellectual property rights, etc. *Maklumat mempunyai beberapa dimensi nilai termasuk sebagai komoditi, sebagai kegunaan pendidikan, sebagai pengaruh, dan sebagai cara untuk perundingan dan pemahaman dunia. Kepentingan undang-undang dan sosioekonomi sebaliknya mempengaruhi pengeluaran dan penyebaran maklumat. Contoh untuk "nilai" yang boleh dimiliki oleh maklumat ialah maklumat boleh menjadi bernilai sebagai komoditi, bermakna ia boleh dibeli dan dijual seperti buku, hak harta intelek, dan sebagainya.* <u>Question:</u> Please share your understanding about giving credit to the original ideas of others through proper attribution and citation *Sila kongsikan pemahaman anda tentang pemberian penghargaan kepada idea-idea asli pihak lain melalui atribusi dan petikan yang betul*
4	**RESEARCH AS INQUIRY** ***PENYELIDIKAN SEBAGAI PERTANYAAN*** Questions in the research process build on previous ones and pave the way for the next. It is about how people develop a series of questions and go deeper and it is the iterative dig into what we do know about things. For example, you need to experiment with different questions about your topic, keep an open mind, always be looking for ways to make new conversations, and break questions or topics down into smaller, more manageable pieces. *Soalan-soalan dalam proses penyelidikan dibina berdasarkan soalan-soalan sebelumnya dan membuka jalan untuk soalan seterusnya. Ia adalah berkenaan dengan cara seseorang individu dalam membangunkan dan mengkaji dengan lebih mendalan satu siri soalan dan ia juga merupakan proses berulang dalam menggali pengetahuan kita tentang sesuatu. Sebagai contoh, anda perlu mencuba soalan yang berbeza berkenaan dengan topik anda, sentiasa berfikiran terbuka, sentiasa mencari cara untuk memulakan perbualan baharu, dan memecahkan soalan atau topik kepada bahagian yang lebih kecil dan lebih mudah diurus.* <u>Question:</u> Please share your understanding about asking increasingly complex or new questions on any particular topic for further exploration *Sila kongsikan pemahaman anda berkenaan pertanyaan soalan-soalan kompleks atau baharu mengenai topik-topik tertentu untuk penerokaan selanjutnya*

5	**SCHOLARSHIP AS CONVERSATION** ***PEMBELAJARAN SEBAGAI PERBUALAN*** Communities of scholars, researchers or professionals who engage in sustained discourse with new insights and discoveries occurring over time as a result of varied perspectives and interpretations. For example, there are several kinds of conversation happening in academic spaces, such as seek out different perspectives, consider who is being excluded from the conversation, critically evaluate information, use the citations of others to follow the conversation, and pull in different ideas and questions. *Komuniti sarjana, penyelidik atau profesional yang terlibat dalam wacana berterusan dengan pandangan dan penemuan baharu yang berlaku dari semasa ke semasa hasil daripada pelbagai perspektif dan tafsiran. Sebagai contoh, terdapat beberapa jenis perbualan yang berlaku dalam ruang akademik seperti mencari perspektif yang berbeza, mempertimbangkan siapa yang dikecualikan daripada perbualan, menilai maklumat secara kritits, menggunakan petikan orang lain untuk mengikuti perbualan, dan mempersoalkan idea-idea dan soalan-soalan yang berbeza.* <u>Question:</u> Please share your understanding about multiple people conversing and writing their ideas with hope that others would pick up and use the information to form new conversations *Sila kongsikan pemahaman anda berkenaan perbualan dan penulisan idea yang pelbagai dengan harapan individu lain akan mengambil dan menggunakan maklumat tersebut untuk membentuk perbualan baharu*
6	**SEARCHING AS STRATEGIC EXPLORATION** ***PENCARIAN SEBAGAI PENEROKAAN STRATEGIK*** Research works best when approached with an open, flexible mind and when you apply certain kinds of strategies to the process. For example, searching for the right or relevant sources which meet your information need. *Penyelidikan berfungsi paling baik apabila didekati dengan fikiran yang terbuka dan fleksibel dan apabila anda menggunakan strategi tertentu dalam proses tersebut. Contohnya, mencari sumber yang betul atau berkaitan yang memenuhi keperluan maklumat anda.* <u>Question:</u> Please share your understanding about information searching as the act of finding the needed information *Sila kongsikan pemahaman anda berkenaan pencarian maklumat sebagai tindakan mencari maklumat yang diperlukan*

Thank you for your time and for participating in this interview

Terima kasih atas masa anda dan mengambil bahagian dalam temu bual ini.

Appendix E: Student Participation in the Information Literacy MOOC (Lecturer/Librarian Invitation Email)



Jemputan Penyertaan Pelajar bagi Kursus Kemahiran Literasi Maklumat untuk Tujuan Penyelidikan

Dayang Norsheila binti Abang Mohtar
To: saidatulakmar@uitm.edu.my
Sat 15/10/2022 13:39

You forwarded this message on Sun 16/10/2022 11:34

This message is in Malay — Translate to English — Never translate from Malay

Assalamualaikum dan Selamat Sejahtera

YBhg Prof,

Dengan segala hormatnya saya merujuk kepada perkara di atas.

Saya, Dayang Norsheila Binti Abang Mohtar, Pustakawan Kanan di Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak, serta pelajar pascasiswazah program Sains Pembelajaran dari Fakulti Sains Kognitif dan Pembangunan Manusia, Universiti Malaysia Sarawak ingin memohon kebenaran dan kelulusan daripada pihak Prof untuk menjemput pelajar (prasiswazah dan pascasiswazah) untuk mengambil bahagian dalam penyelidikan saya dengan menyertai kursus kemahiran literasi maklumat yang dilaksanakan secara atas talian.

Kursus ini dilaksanakan untuk memenuhi objektif penyelidikan seperti berikut:

- *Menentukan sama ada kandungan bagi modul literasi maklumat baharu berguna dalam membantu pelajar dengan keperluan maklumat mereka*
- *Menentukan sama ada pendekatan pengajaran berkesan terhadap hasil pembelajaran pelajar*

Untuk makluman, saya memerlukan sekurang-kurangnya 600 orang pelajar dari universiti awam Malaysia secara keseluruhan untuk menyertai kursus tersebut. Penyertaan kursus kemahiran literasi maklumat ini dapat membantu pelajar di sepanjang pengajian mereka, terutamanya dalam kemahiran pencarian maklumat untuk membuat penyelidikan atau kerja kursus.

Merujuk kepada perbualan kita tempoh hari, saya amat berbesar hati untuk menerima penyertaan pelajar dari pihak Prof dan saya berharap agar pelajar akan memanfaatkan ilmu yang disampaikan disepanjang kursus ini.

Maklumat berkenaan kursus tersebut adalah seperti berikut:

Tajuk Kursus	Kemahiran Literasi Maklumat *(Information Literacy)*
Tarikh	Sehingga 20 November 2022
Masa	Mengikut kesesuaian masa pelajar (Sepanjang tempoh tarikh di atas)
Penceramah	Dayang Norsheila Binti Abang Mohtar (Pustakawan Kanan) Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak
Pautan Daftar & Kursus	https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1

Untuk makluman juga, e-sijil akan diberikan kepada pelajar setelah berjaya menamatkan kursus tersebut.

Kerjasama dari pihak Prof amat saya hargai dan didahului dengan ribuan terima kasih.

Terima kasih.

Dayang Norsheila

Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

E-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

+6082583895 +6 mnorsheila@unimas.my
http://www.unimas.my | UNIMAS Expert Profile

Invitation for Student Participation in Information Literacy Skills Course (Online)

D

Dayang Norsheila binti Abang Mohtar

To: Auzani Zeda binti Mohamed Kassim

Thu 20/10/2022 13:44

About IL MOOC_Dayang Nor...
351 KB

Salam dan Selamat Sejahtera.

Dear Ms Auzani Zeda,

I, Dayang Norsheila Binti Abang Mohtar, a Senior Librarian at Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak, and also a postgraduate student of the Learning Sciences programme from the Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak, would like to ask for your permission to invite students (undergraduate and postgraduate) from the Faculty of Applied and Creative Arts to participate in my research by joining an information literacy skills course which is conducted online.

This course is implemented to meet the following research objectives:

- To determine whether the content of the new information literacy module is useful in assisting students with their information needs
- To determine whether the teaching approach is effective on student learning outcomes

For your information, I need at least 600 students from Malaysian public universities as a whole to participate in the course. Student participation in this information literacy skills course can help them with their research and assignment.

Information regarding the course is as follows:

Course Title	Information Literacy Skills (course is conducted in English)
Date	Until 20th November 2022
Time	According to students' convenience (Throughout the above period)
Speaker	Dayang Norsheila Binti Abang Mohtar (Senior Librarian) Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak
Registration & Course Link	https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1 Information Literacy | UNIMAS MOOC This course introduces you to the important factors needed to shape you to become an information-literate individual. www.openlearning.com

For your information, an e-Certificate will be given to each student after successfully completing the course.

Attached herewith the information about the MOOC course mentioned above for your reference.

Your cooperation and attention are very much appreciated.

Thank you.

Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

E-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

+6082583895 +6 mnorsheila@unimas.my
http://www.unimas.my | UNIMAS Expert Profile

Reply Forward

Student Participation for PhD Learning Sciences Research

D

Dayang Norsheila binti Abang Mohtar

To: keeren.rajoo@upm.edu.my

Wed 22/06/2022 11:54

You forwarded this message on Mon 11/07/2022 20:27



MOOC_student consent form...
123 KB

2 attachments (921 KB) Save all to OneDrive - UNIMAS Download all

Assalamualaikum and Selamat Sejahtera

YBhg. Prof/ Associate Prof/ Dr/ Sir/ Madam,

My name is Dayang Norsheila Binti Abang Mohtar. I am a doctoral student at Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak. I am currently doing my second year PhD programme in Learning Sciences. My thesis will determine the effectiveness of instructional method towards students' learning outcomes throughout students' participation in the Information Literacy MOOC which is designed to enable them to recognise information resources as well as other related matters for their research and information needs.

All data recorded will be treated CONFIDENTIAL and will only be used for the purpose of this study and all related publications. Their cooperation is highly appreciated to improve or enhance the instructional delivery methods in teaching information literacy among academic librarians in Malaysia especially in today's information age.

I would like to invite 30 interested students to participate in this study and their participation is voluntary. Students who participate and complete the entire course will receive RM 10 via their e-wallet as a token of appreciation.

Attached herewith are the following documents for your reference:

- Invitation for research participation poster
- Student consent form

For further inquiries, you may contact me at 012 234 2912. I am looking forward to receiving positive feedback from your side regarding this matter. Your attention and consideration are very much appreciated.

Thank you.

Best Regards,

Dayang Norsheila

Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

e-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

+6082583895 +6 mnorsheila@unimas.my
http://www.unimas.my | UNIMAS Expert Profile

Invitation for Student Participation in Information Literacy Skills Course (Online)

D

Dayang Norsheila binti Abang Mohtar

To: shahrulr@uthm.edu.my

Cc: faizul@uthm.edu.my

Mon 19/09/2022 14:54



Assalamualaikum and Greetings!

Dear Sir/ Madam,

I, Dayang Norsheila Binti Abang Mohtar, a Senior Librarian at Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak, and also a postgraduate student of the Learning Sciences programme from the Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak, would like to ask for your permission and assistance to invite students (undergraduate and postgraduate) from all fields of study to participate in my research by joining an information literacy skills course which is conducted online.

This course is implemented to meet the following research objectives:

- To determine whether the content of the new information literacy module is useful in assisting students with their information needs
- To determine whether the teaching approach is effective on student learning outcomes

For your information, I need at least 600 students from Malaysian public universities as a whole to participate in the course. Student participation in this information literacy skills course can help them with their studies, especially information search skills in conducting their research and assignments.

Information regarding the course is as follows:

Course Title	Information Literacy Skills (course is conducted in English)
Date	5th September 2022 – 31st October 2022
Time	According to students' convenience (Throughout the above period)
Speaker	Dayang Norsheila Binti Abang Mohtar (Senior Librarian) Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak
Registration & Course Link	https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1 Information Literacy | UNIMAS MOOC This course introduces you to the important factors needed to shape you to become an information-literate individual. www.openlearning.com

For your information, an e-Certificate will be given to each student after successfully completing the course.

Attached herewith the promotional poster for your reference and action.

Your cooperation and attention are very much appreciated.

Thank you.

Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

E-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

Jemputan Penyertaan Pelajar bagi Kursus Kemahiran Literasi Maklumat (Atas talian)

D

Dayang Norsheila binti Abang Mohtar
To: salwati@iium.edu.my
Cc: hawa@iium.edu.my

Mon 12/09/2022 19:06

This message is in Malay | Translate to English | Never translate from Malay



Assalamualaikum dan Selamat Sejahtera

Puan,

Dengan segala hormatnya saya merujuk kepada perkara di atas.

Saya, Dayang Norsheila Binti Abang Mohtar, Pustakawan Kanan, Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak, serta pelajar pascasiswazah program Sains Pembelajaran dari Fakulti Sains Kognitif dan Pembangunan Manusia, Universiti Malaysia Sarawak ingin memohon kebenaran serta bantuan daripada pihak puan untuk menjemput pelajar (prasiswazah dan pascasiswazah) dari semua bidang pengajian untuk mengambil bahagian dalam penyelidikan saya dengan menyertai kursus kemahiran literasi maklumat yang dilaksanakan secara atas talian.

Kursus ini dilaksanakan untuk memenuhi objektif penyelidikan seperti berikut:

- *Menentukan sama ada kandungan bagi modul literasi maklumat baharu berguna dalam membantu pelajar dengan keperluan maklumat mereka*
- *Menentukan sama ada pendekatan pengajaran berkesan terhadap hasil pembelajaran pelajar*

Untuk makluman, saya memerlukan sekurang-kurangnya 600 orang pelajar dari universiti awam Malaysia secara keseluruhan untuk menyertai kursus tersebut. Penyertaan kursus kemahiran literasi maklumat ini dapat membantu pelajar di sepanjang pengajian mereka, terutamanya dalam kemahiran pencarian maklumat untuk membuat penyelidikan atau kerja kursus.

Maklumat berkenaan kursus tersebut adalah seperti berikut:

Tajuk Kursus	Kemahiran Literasi Maklumat *(Information Literacy)*
Tarikh	5 September 2022 – 31 Oktober 2022
Masa	Mengikut kesesuaian masa pelajar (Sepanjang tempoh tarikh di atas)
Penceramah	Dayang Norsheila Binti Abang Mohtar (Pustakawan Kanan) Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak
Pautan Daftar & Kursus	https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1

Untuk makluman juga, e-sijil akan diberikan kepada pelajar setelah berjaya menamatkan kursus tersebut.

Dimajukan poster promosi untuk rujukan serta tindakan pihak puan.

Kerjasama dari pihak puan amat saya hargai dan didahului dengan ribuan terima kasih.

Terima kasih.

Dayang Norsheila

Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

E-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

+6082583895 +6 mnorsheila@unimas.my
http://www.unimas.my | UNIMAS Expert Profile

Memohon Kebenaran dan Kelulusan bagi Jemputan Penyertaan Pelajar UiTM Cawangan Sarawak untuk Kursus Kemahiran Literasi Maklumat bagi Tujuan Penyelidikan

D

Dayang Norsheila binti Abang Mohtar

To: rektorsrk@uitm.edu.my

Sat 15/10/2022 13:25

Cc: nurafeqah@uitm.edu.my; farizan294@uitm.edu.my

This message is in Malay

Translate to English | Never translate from Malay

UiTM Kota Samarahan.pdf
405 KB

Assalamualaikum dan Selamat Sejahtera

YBhg Prof Dato,

Dengan segala hormatnya saya merujuk kepada perkara di atas.

Saya, Dayang Norsheila Binti Abang Mohtar, Pustakawan Kanan di Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak, serta pelajar pascasiswazah program Sains Pembelajaran dari Fakulti Sains Kognitif dan Pembangunan Manusia, Universiti Malaysia Sarawak ingin memohon kebenaran dan kelulusan daripada pihak YBhg Prof Dato untuk menjemput pelajar (prasiswazah dan pascasiswazah) dari semua bidang pengajian untuk mengambil bahagian dalam penyelidikan saya dengan menyertai kursus kemahiran literasi maklumat yang dilaksanakan secara atas talian.

Kursus ini dilaksanakan untuk memenuhi objektif penyelidikan seperti berikut:

- Menentukan sama ada kandungan bagi modul literasi maklumat baharu berguna dalam membantu pelajar dengan keperluan maklumat mereka
- Menentukan sama ada pendekatan pengajaran berkesan terhadap hasil pembelajaran pelajar

Untuk makluman, saya memerlukan sekurang-kurangnya 600 orang pelajar dari universiti awam Malaysia secara keseluruhan untuk menyertai kursus tersebut. Penyertaan kursus kemahiran literasi maklumat ini dapat membantu pelajar di sepanjang pengajian mereka, terutamanya dalam kemahiran pencarian maklumat untuk menjalankan penyelidikan atau kerja kursus.

Maklumat berkenaan kursus tersebut adalah seperti berikut:

Tajuk Kursus	Kemahiran Literasi Maklumat (Information Literacy)
Tarikh	Sehingga 20 November 2022
Masa	Mengikut kesesuaian masa pelajar (Sepanjang tempoh tarikh di atas)
Penceramah	Dayang Norsheila Binti Abang Mohtar (Pustakawan Kanan) Perpustakaan Tun Abdul Rahman Ya'kub, Universiti Malaysia Sarawak
Pautan Daftar & Kursus	https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1

Untuk makluman juga, e-sijil akan diberikan kepada pelajar setelah berjaya menamatkan kursus tersebut.

Dimajukan surat permohonan kebenaran dan kelulusan bagi perkara ini untuk tindakan lanjut pihak Ybhg Prof Dato.

Kerjasama dari pihak YBhg Prof Dato amat saya hargai dan didahului dengan ribuan terima kasih.

Terima kasih.

Dayang Norsheila

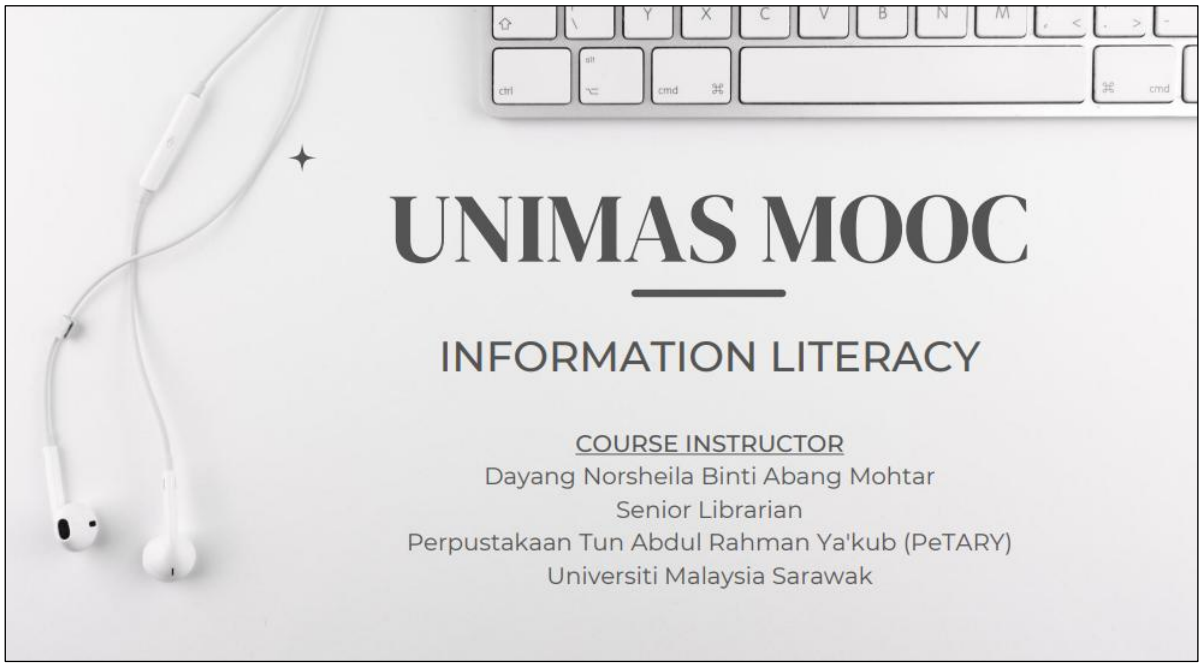
Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

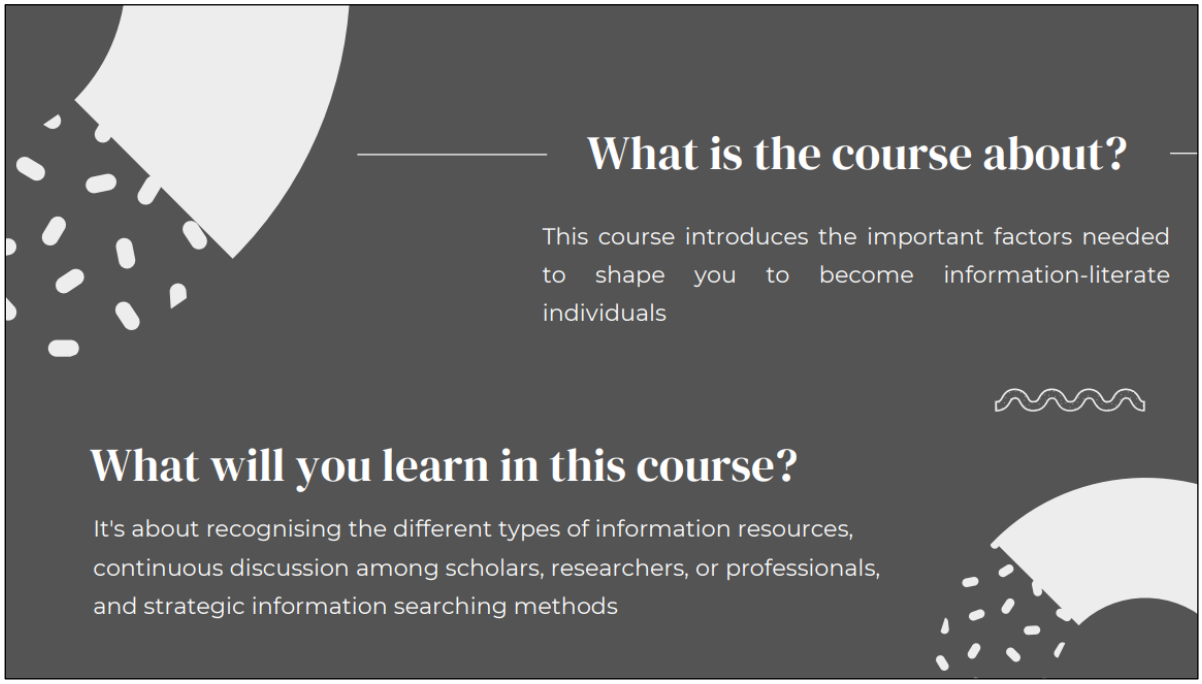
E-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

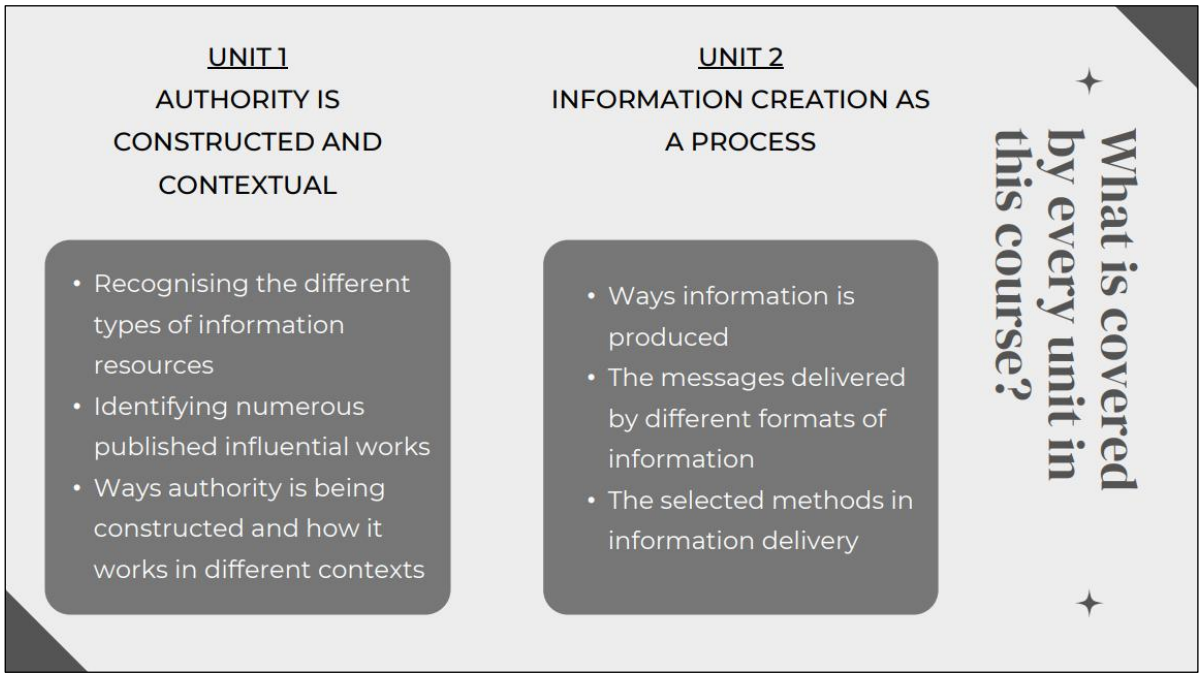
+6082583895 +6 mnorsheila@unimas.my

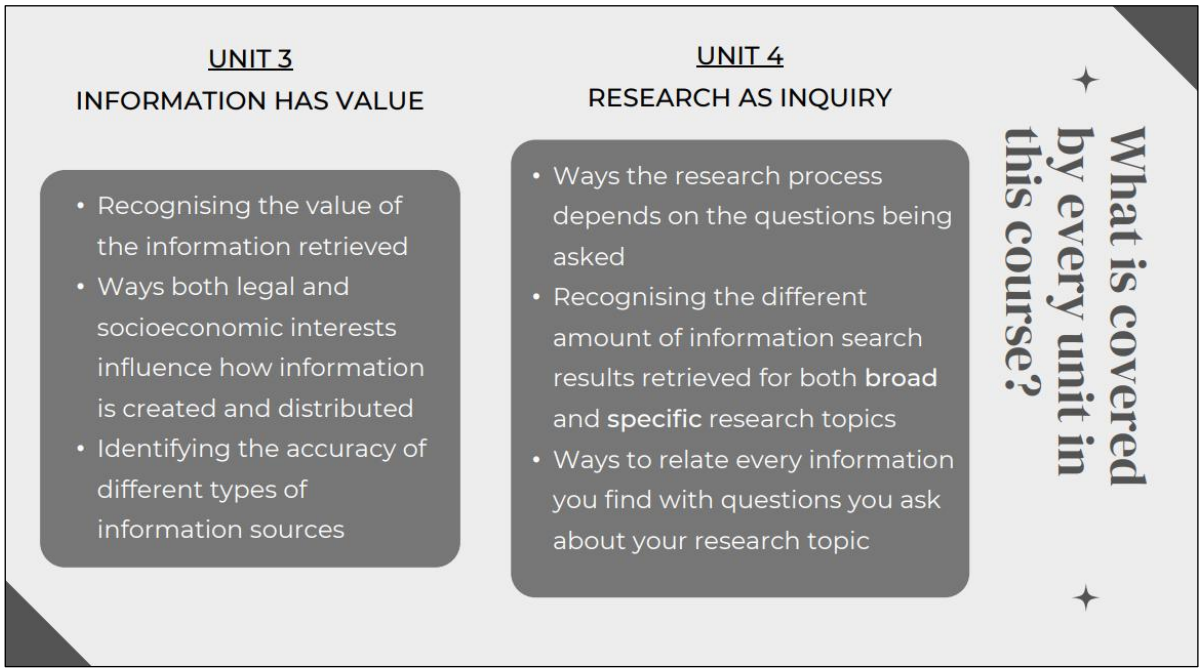
http://www.unimas.my | UNIMAS Expert Profile

Appendix F: About Information Literacy MOOC (Slides shared to participants)






What is covered by every unit in this course?
UNIT 1
AUTHORITY IS CONSTRUCTED AND CONTEXTUAL
• Recognising the different types of information resources
• Identifying numerous published influential works
• Ways authority is being constructed and how it works in different contexts
UNIT 2
INFORMATION CREATION AS A PROCESS
• Ways information is produced
• The messages delivered by different formats of information
• The selected methods in information delivery


What is covered by every unit in this course?
UNIT 3
INFORMATION HAS VALUE
• Recognising the value of the information retrieved
• Ways both legal and socioeconomic interests influence how information is created and distributed
• Identifying the accuracy of different types of information sources
UNIT 4
RESEARCH AS INQUIRY
• Ways the research process depends on the questions being asked
• Recognising the different amount of information search results retrieved for both broad and specific research topics
• Ways to relate every information you find with questions you ask about your research topic

What is covered by every unit in this course?

UNIT 5
SCHOLARSHIP AS CONVERSATION

- Ways you can join academic conversation
- Ways to engage in a research process in the project you are about to create
- Ways to do your own research and interpret the works of others

UNIT 6
SEARCHING AS STRATEGIC EXPLORATION

- The strategic searching methods to search for your needed information
- Understanding the process of searching information
- Recognising the several searching platforms used for information searching

What is included in every unit?

Tutorial Video
A short video on each topic
(approx 3 to 10 mins)

Learning Activity
Simple question asked related to each topic

Learning Assessment
Simple task/ assignment assigned to students for each unit to measure their level of understanding



How to join this course?

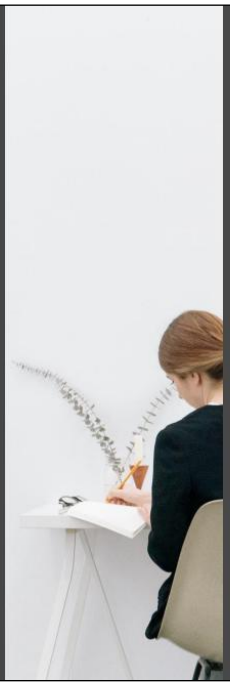
Here's the link to the course

https://www.openlearning.com/unimasmooc/courses/information-literacy/homepage/?cl=1

**Note: Students need to sign up for an account in the OpenLearning platform before joining the course*

THANK YOU!

DON'T HESITATE TO CONTACT ME FOR FURTHER INQUIRY



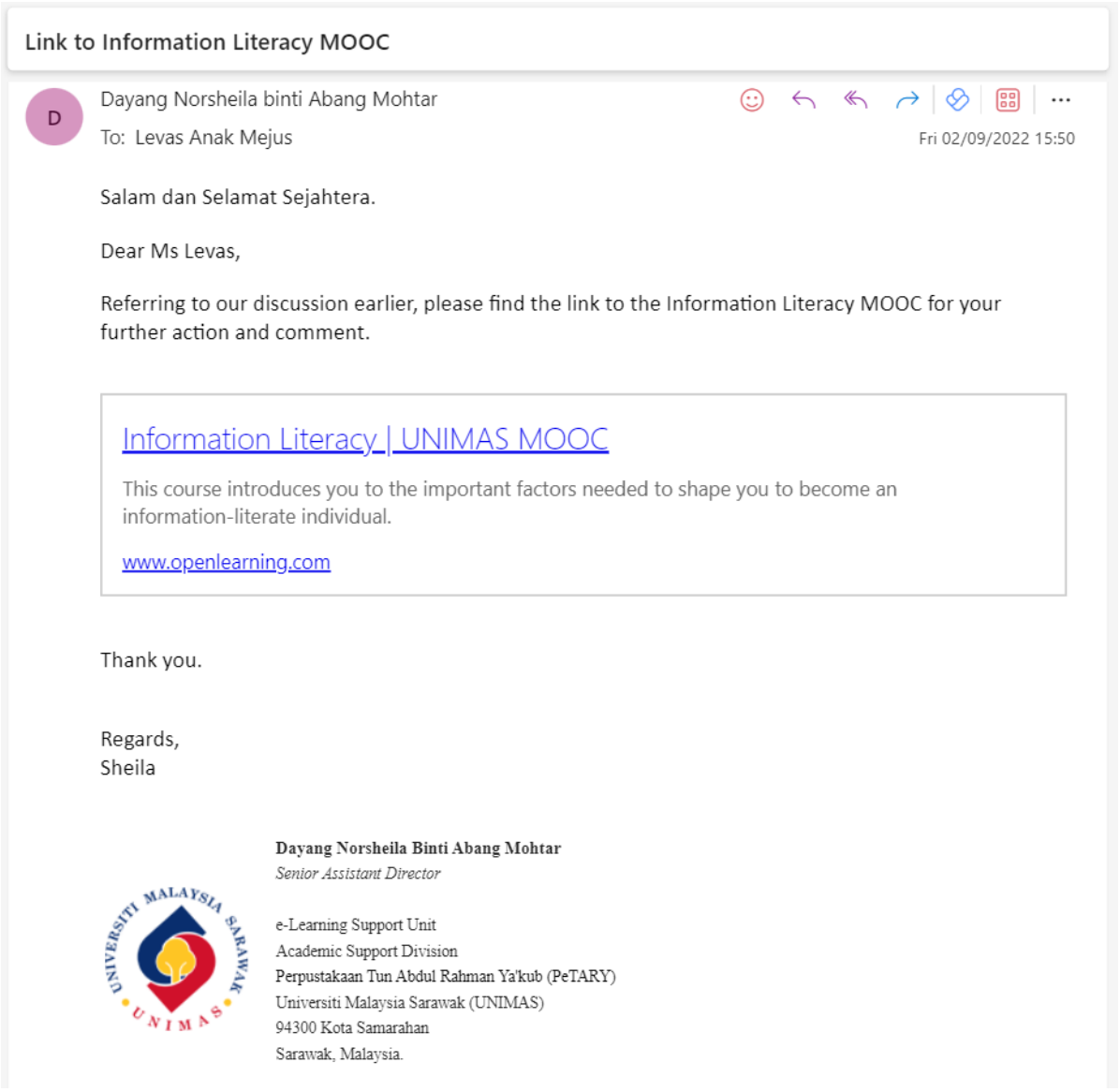
EMAIL

mnorsheila@unimas.my

MOBILE

012 234 2912

Appendix G: Email to the Director of Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY), Universiti Malaysia Sarawak – Request for permission to share the Information Literacy MOOC on PeTARY's social media platforms



Link to Information Literacy MOOC

D

Dayang Norsheila binti Abang Mohtar

To: Levas Anak Mejus

Fri 02/09/2022 15:50

Salam dan Selamat Sejahtera.

Dear Ms Levas,

Referring to our discussion earlier, please find the link to the Information Literacy MOOC for your further action and comment.

Information Literacy | UNIMAS MOOC

This course introduces you to the important factors needed to shape you to become an information-literate individual.

www.openlearning.com

Thank you.

Regards,
Sheila

Dayang Norsheila Binti Abang Mohtar
Senior Assistant Director

e-Learning Support Unit
Academic Support Division
Perpustakaan Tun Abdul Rahman Ya'kub (PeTARY)
Universiti Malaysia Sarawak (UNIMAS)
94300 Kota Samarahan
Sarawak, Malaysia.

Appendix H: Information Literacy MOOC Content

Unit 2: Information Creation as a Process

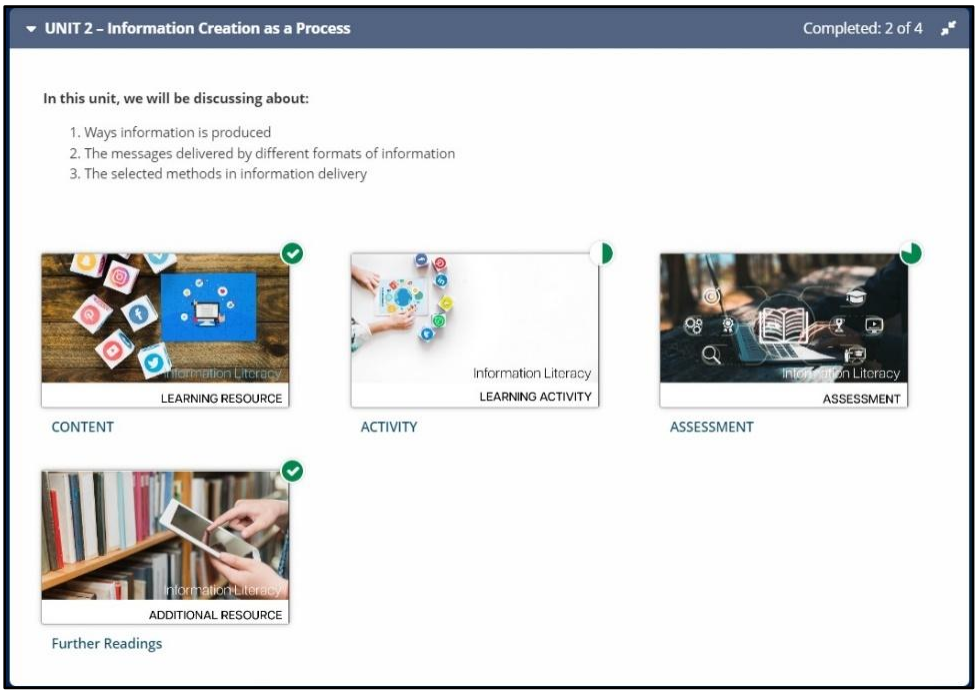


Figure H1: Unit 2 Summary

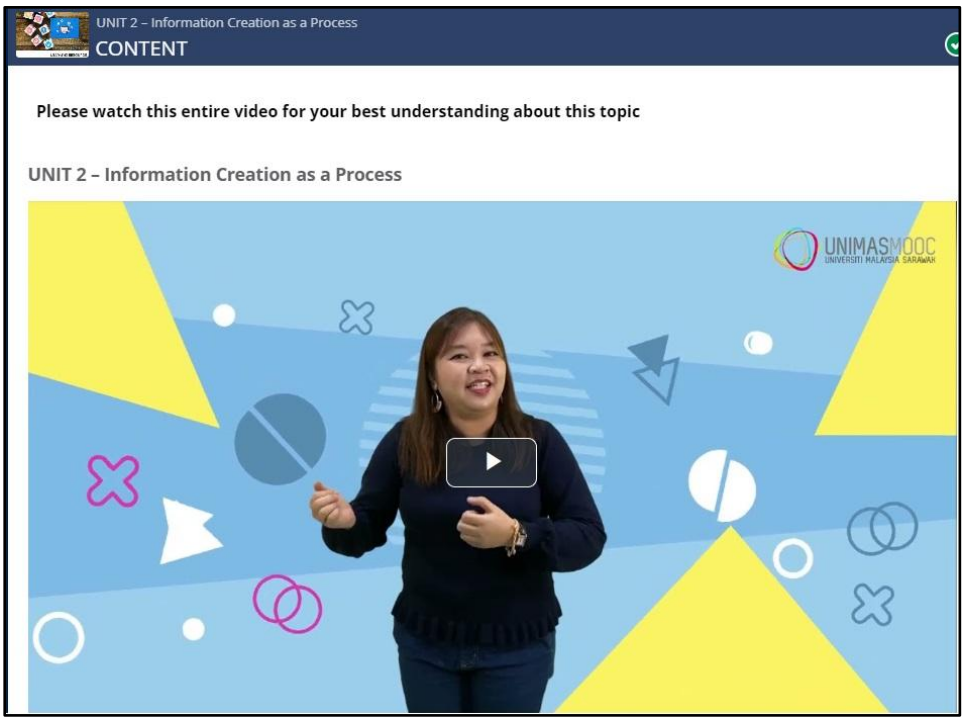


Figure H2: Unit 2 Lecture video



Figure H3: Comments for Unit 2 Lecture video

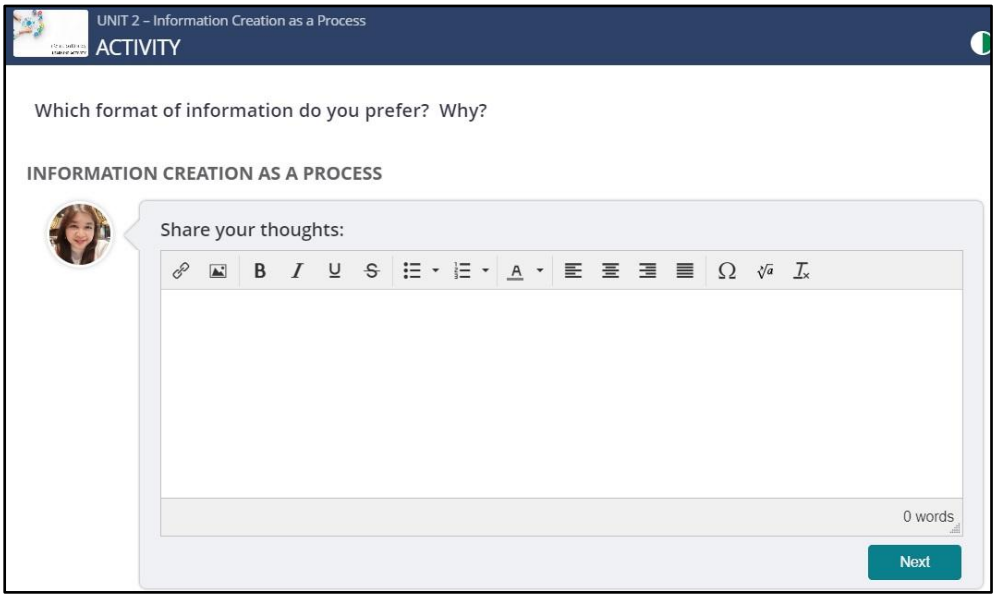


Figure H4: Unit 2 Activity (Quiz)

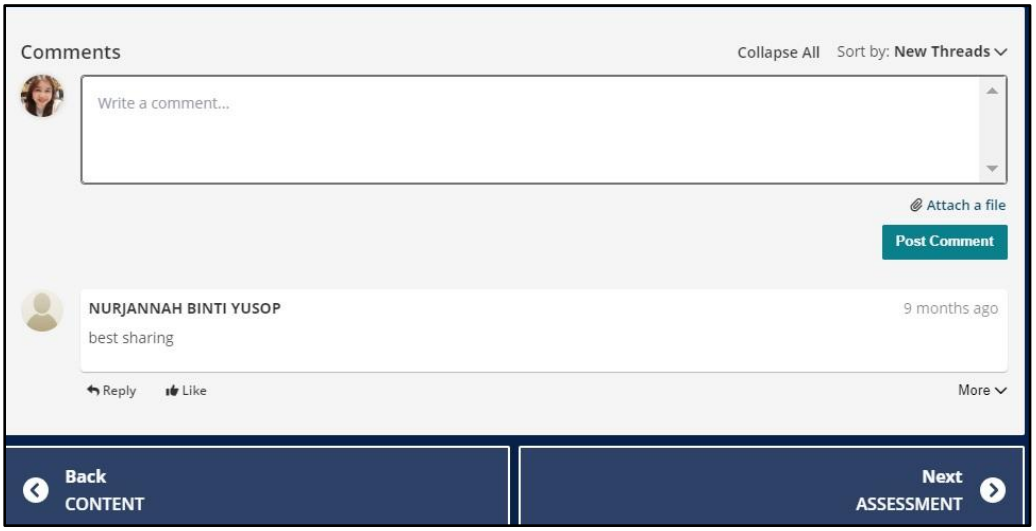


Figure H5: Comments for Unit 2 Activity (Quiz)

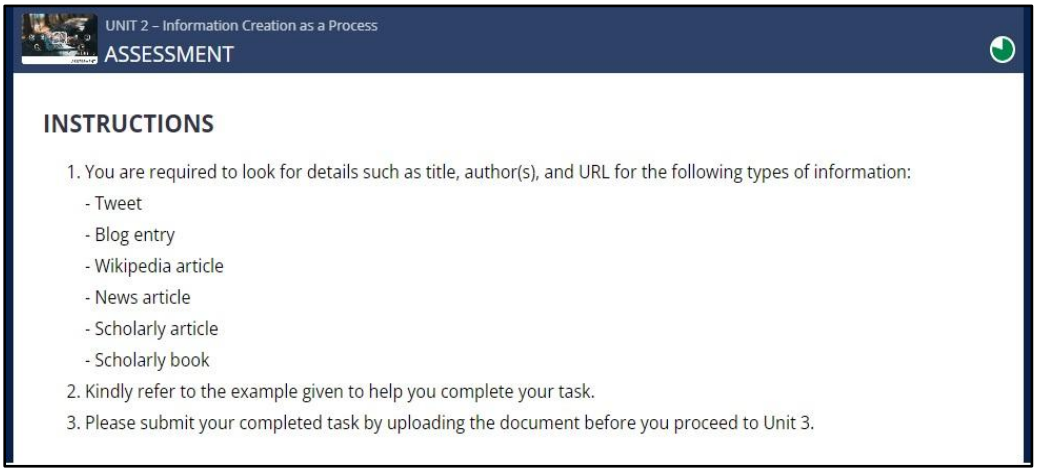


Figure H6: Unit 2 Assessment

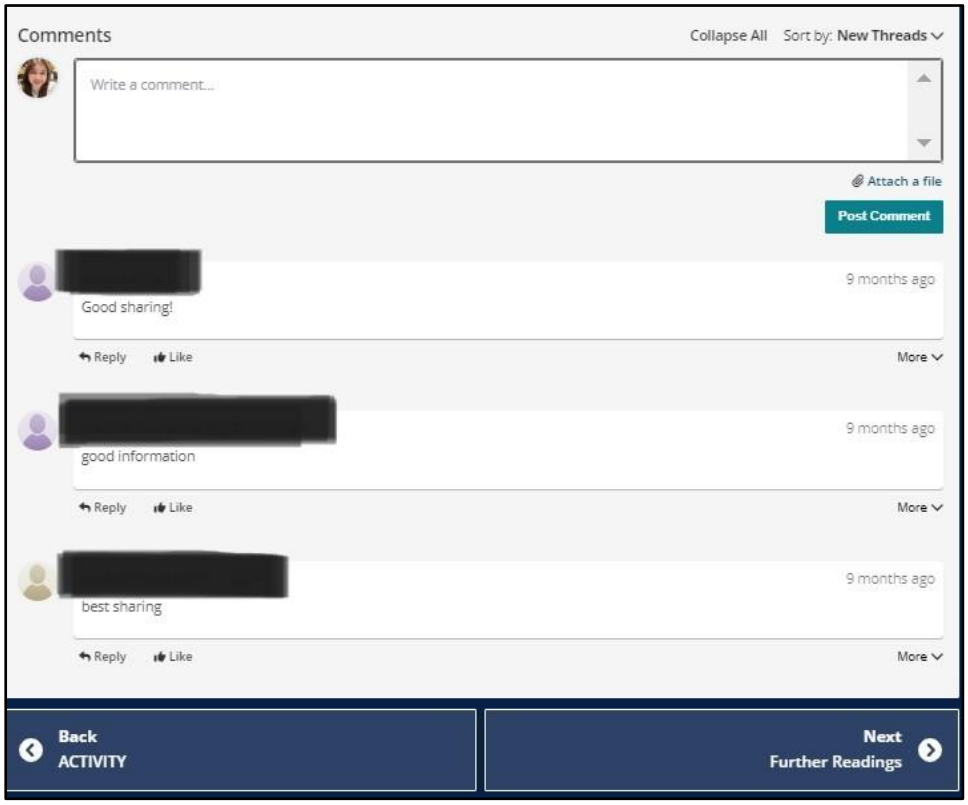


Figure H7: Comments for Unit 2 Assessment (Assignment)

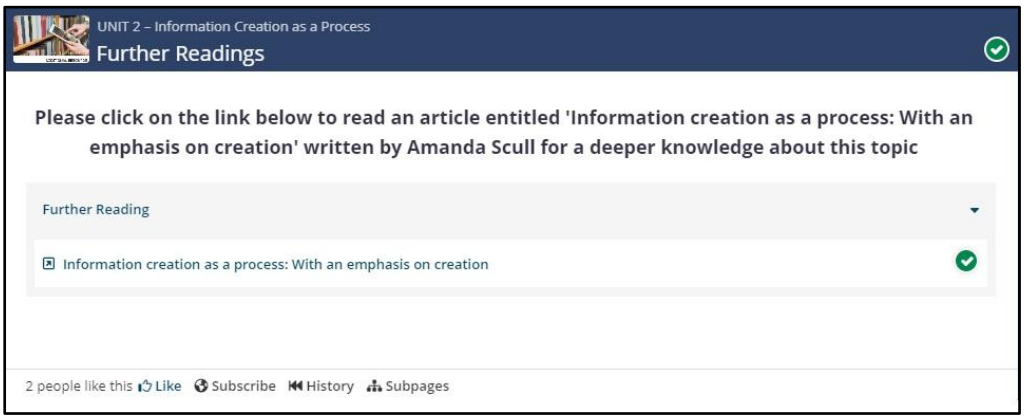


Figure H8: Unit 2 Further readings



Figure H9: Comments for Unit 2 Further readings

Unit 3: Information has Value

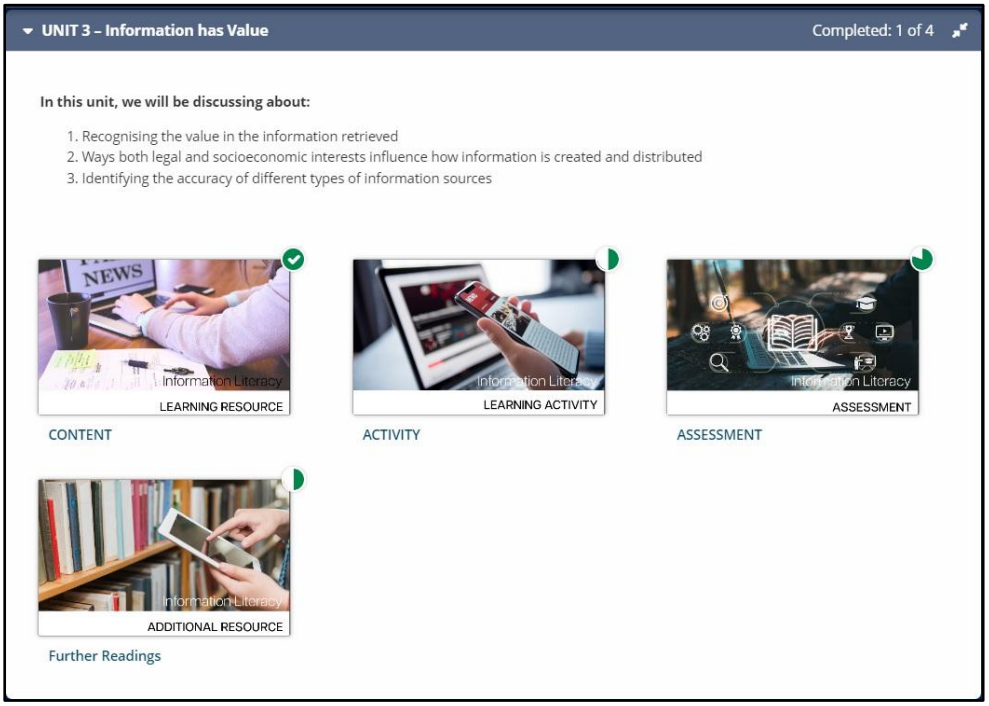


Figure H10: Unit 3 Summary

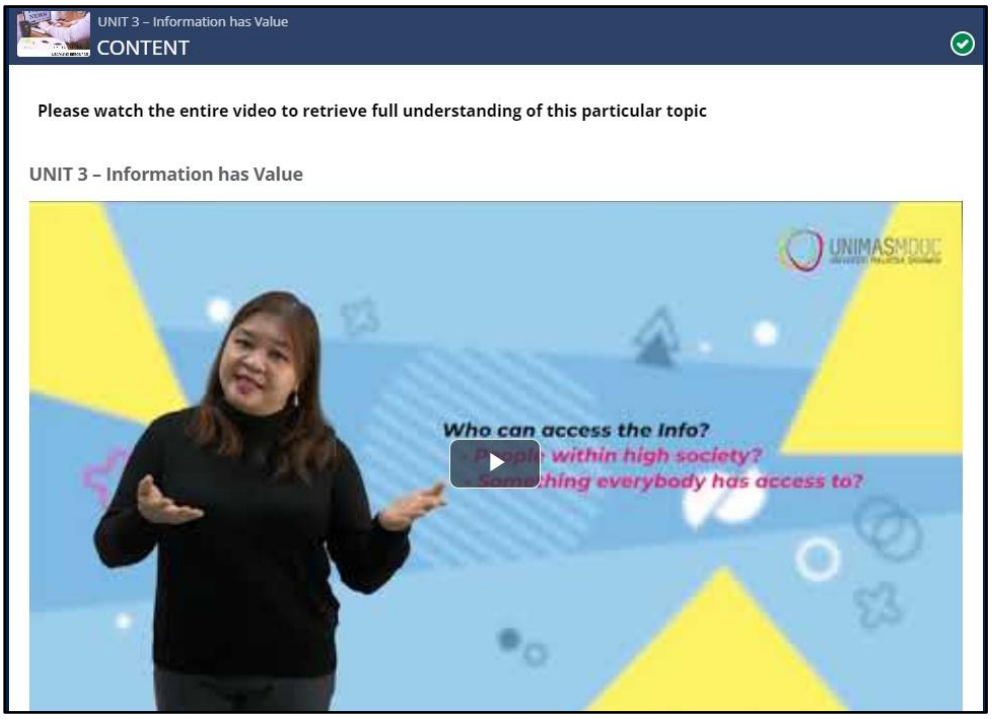


Figure H11: Unit 3 Lecture video



Figure H12: Comments for Unit 3 Lecture video

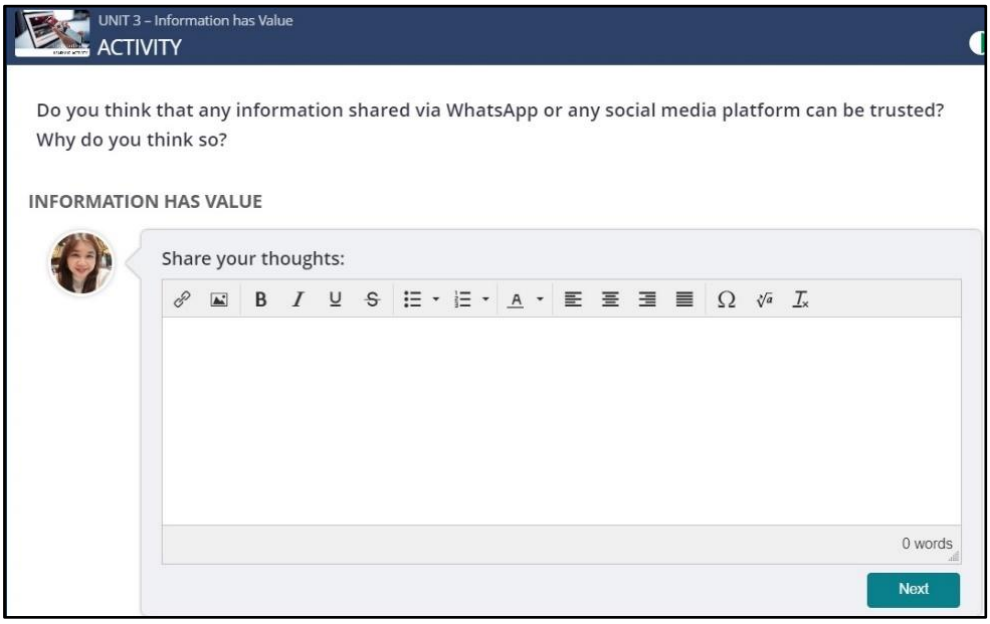


Figure H13: Unit 3 Activity (Quiz)

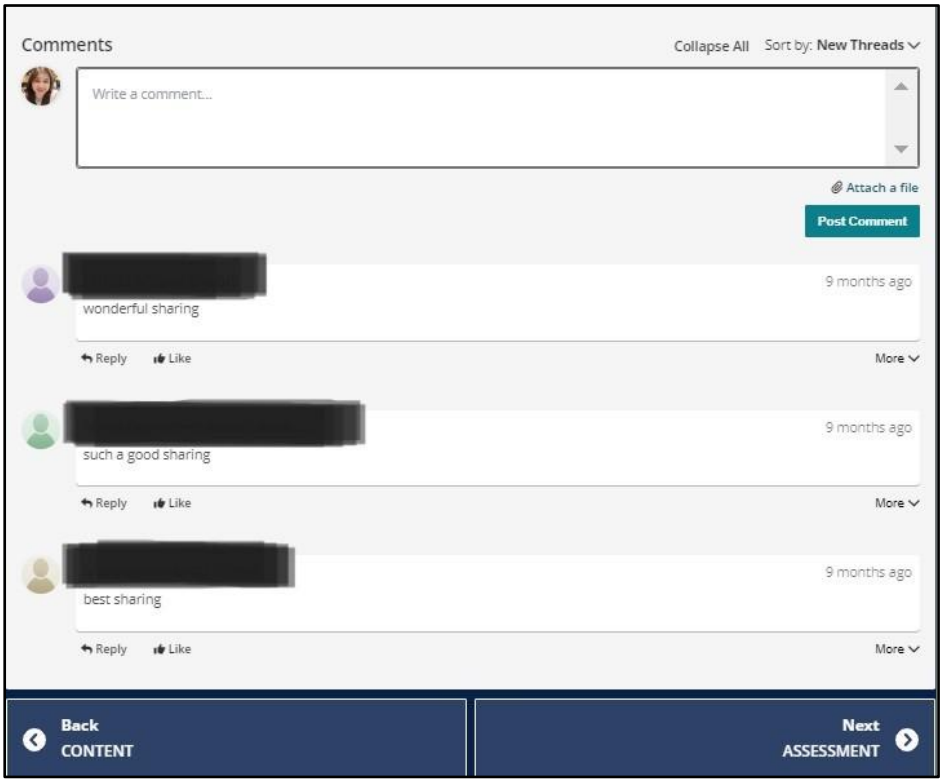


Figure H14: Comments for Unit 3 Activity (Quiz)

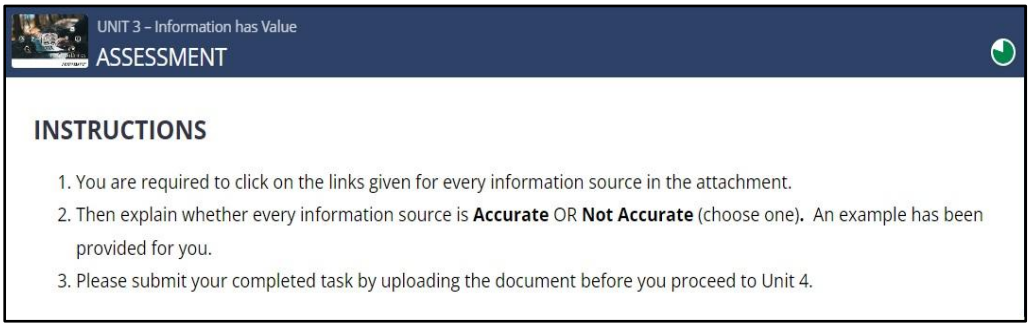


Figure H15: Unit 3 Assessment (Assignment)



Figure H16: Comments for Unit 3 Assessment (Assignment)



Figure H17: Unit 3 Further Readings



Figure H18: Comments for Unit 3 Further Readings

Unit 4: Research as Inquiry

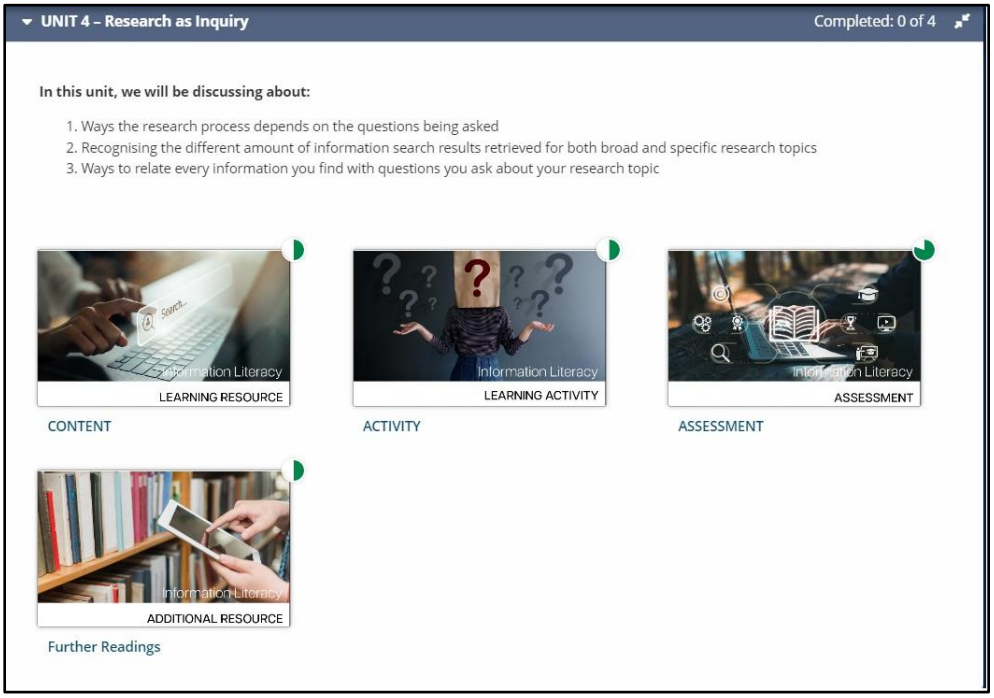


Figure H19: Unit 4 Summary

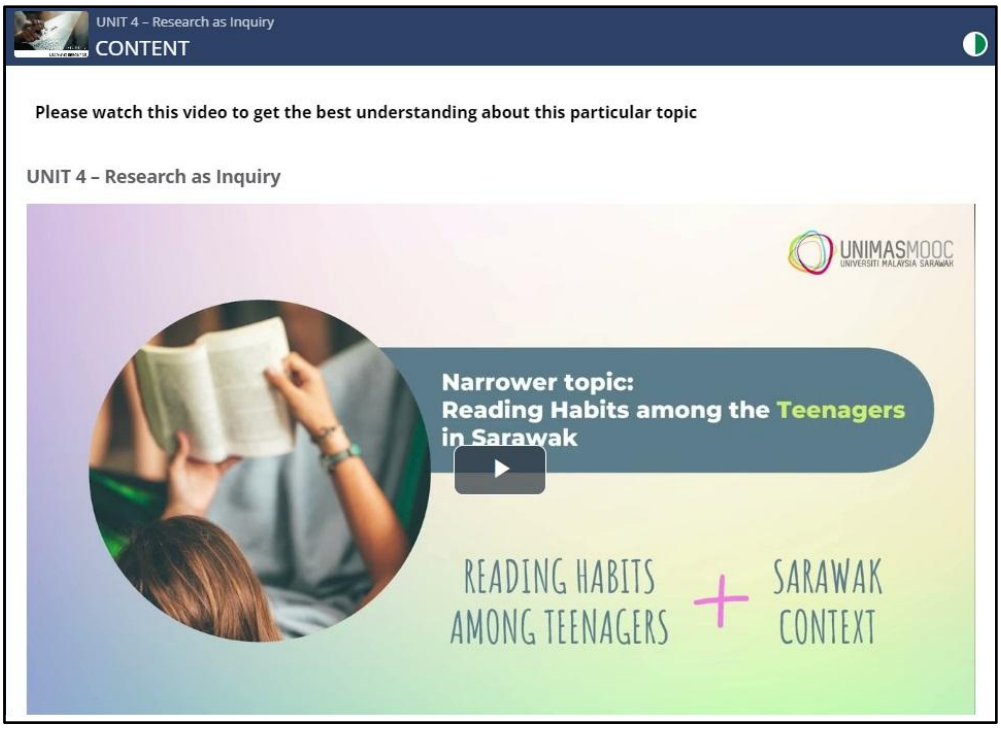


Figure H20: Unit 4 Lecture Video



Figure H21: Comments for Unit 4 Lecture Video

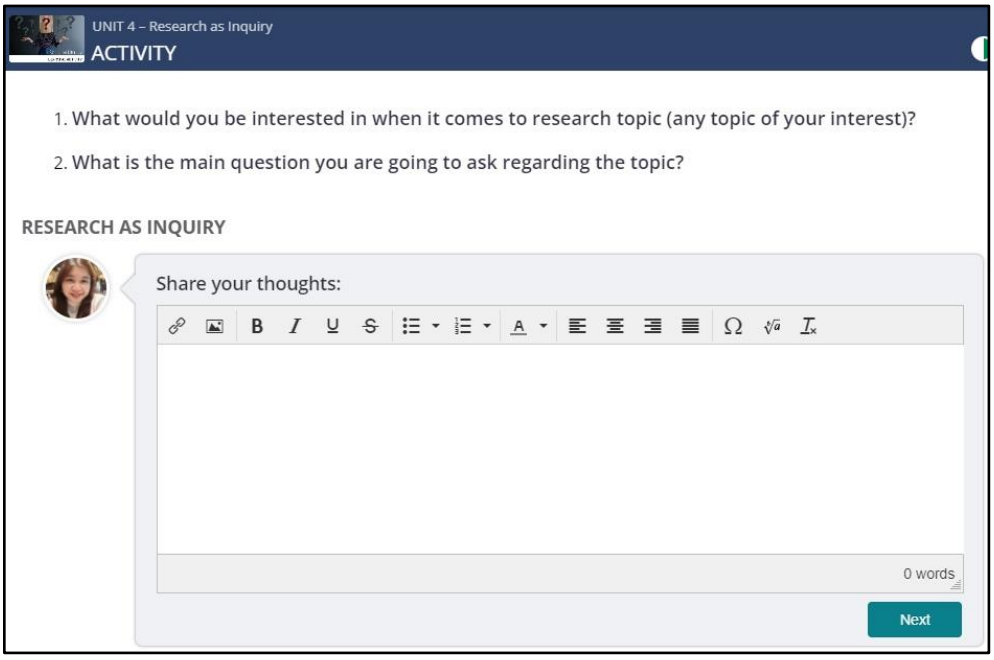


Figure H22: Unit 4 Activity (Quiz)

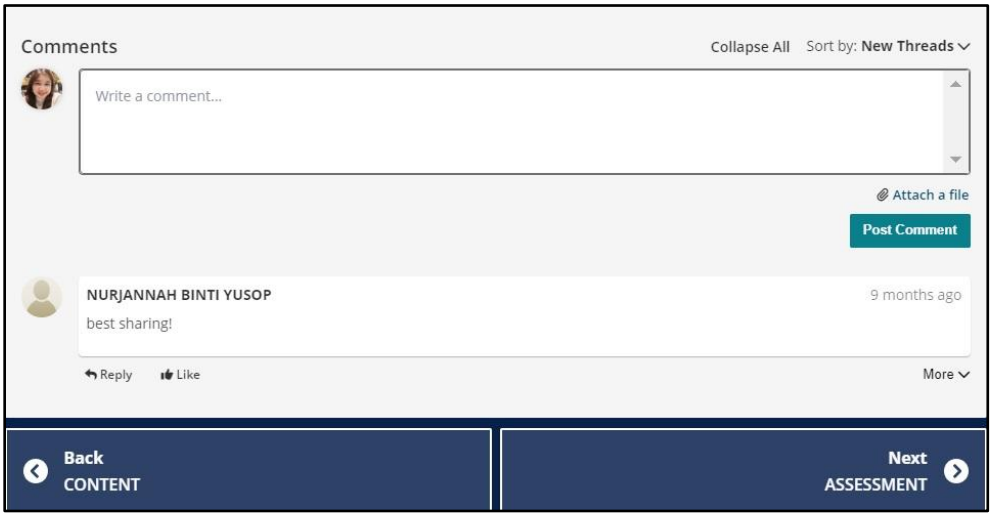


Figure H23: Comments for Unit 4 Activity (Quiz)

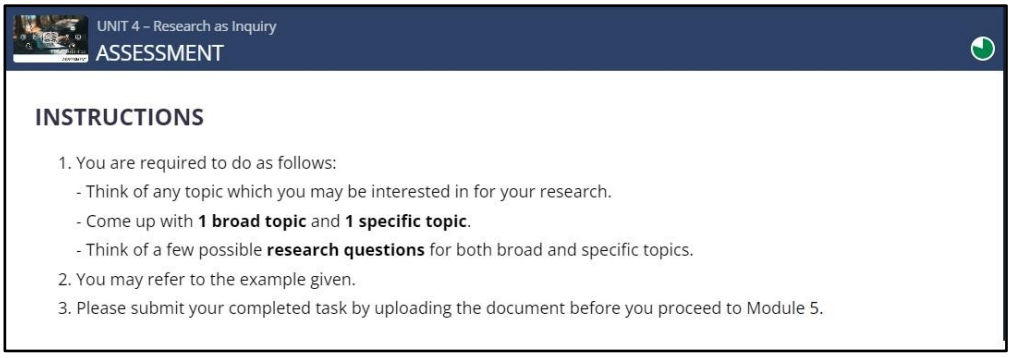


Figure H24: Unit 4 Assessment (Assignment)



Figure H25: Comments for Unit 4 Assessment (Assignment)



Figure H26: Unit 4 Further Readings

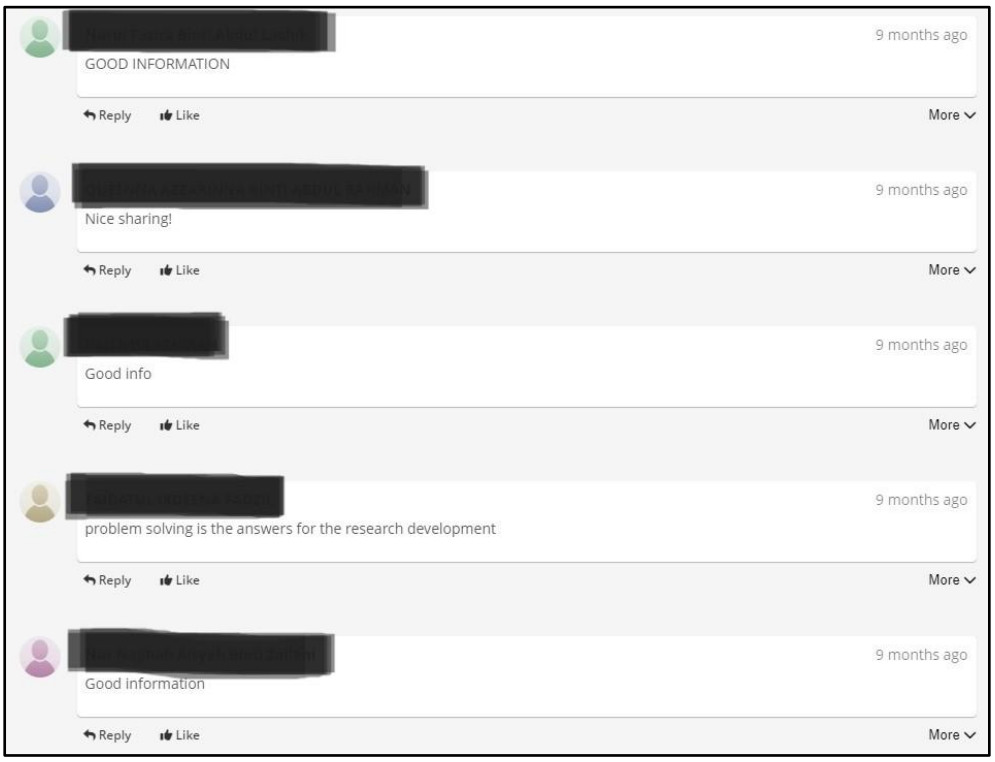


Figure H27: Comments for Unit 4 Further Readings

Unit 5: Scholarship as Conversation

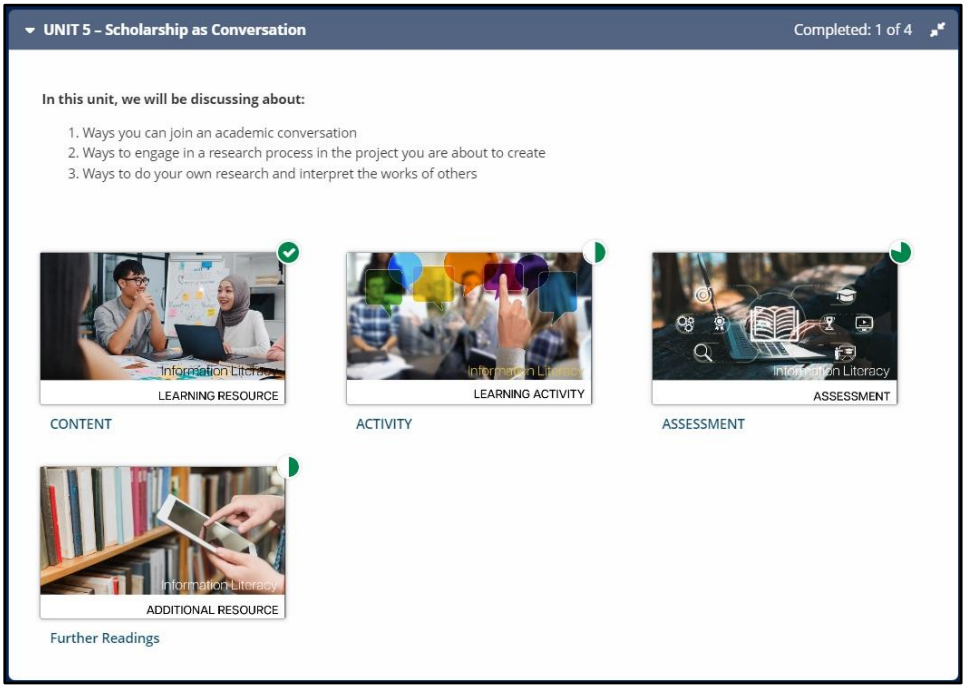


Figure H28: Unit 5 Summary

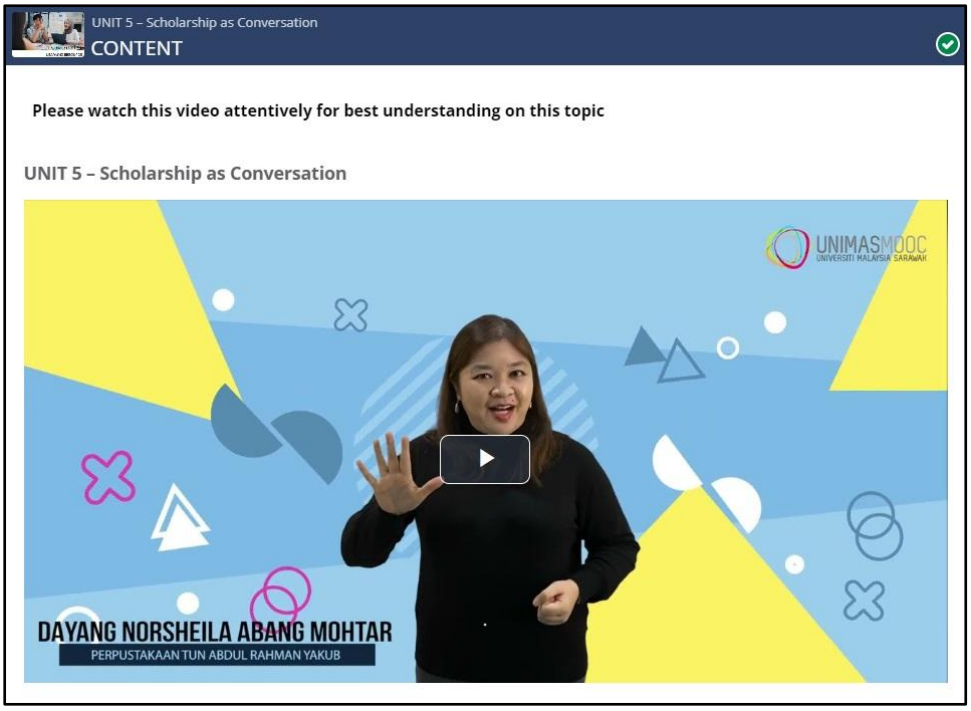


Figure H29: Unit 5 Lecture Video



Figure H30: Comments for Unit 5 Lecture Video

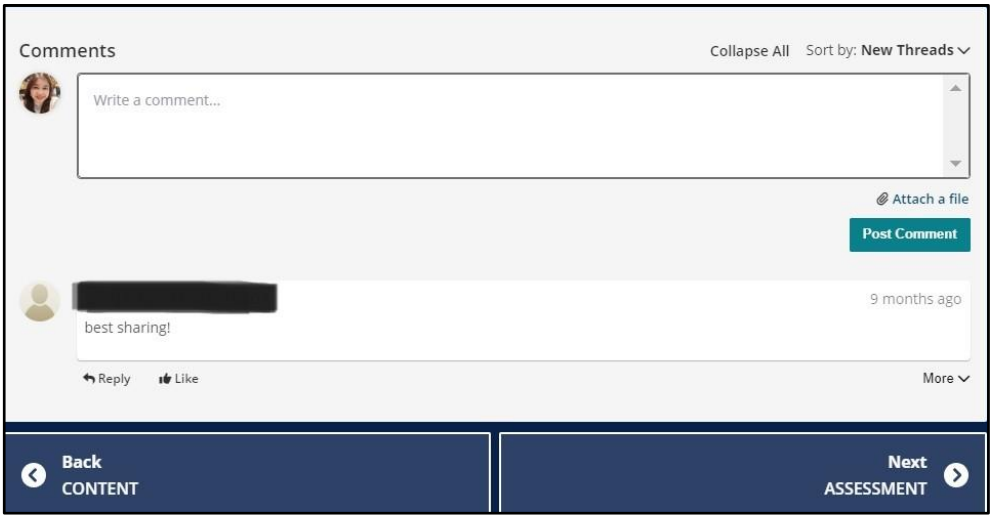


Figure H31: Comments for Unit 5 Activity (Quiz)

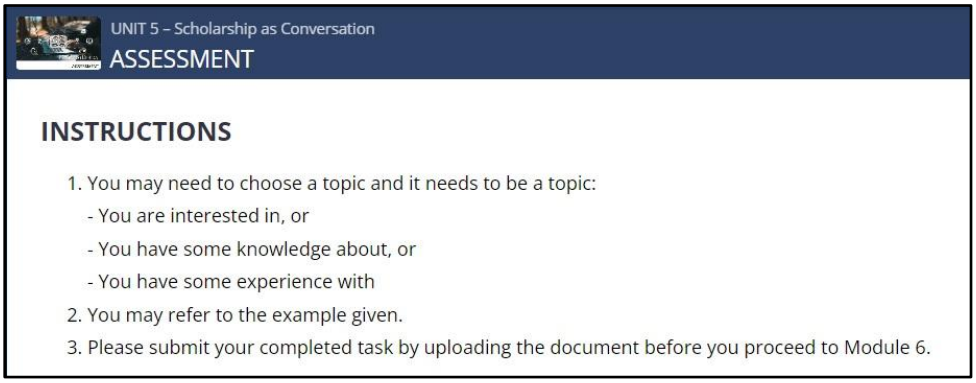


Figure H32: Unit 5 Assessment (Assignment)

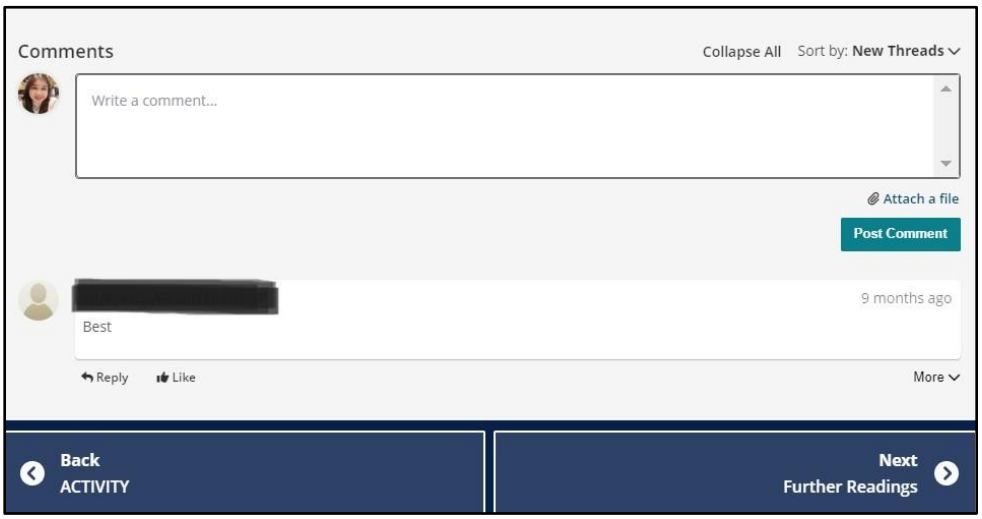


Figure H33: Comments for Unit 5 Assessment (Assignment)

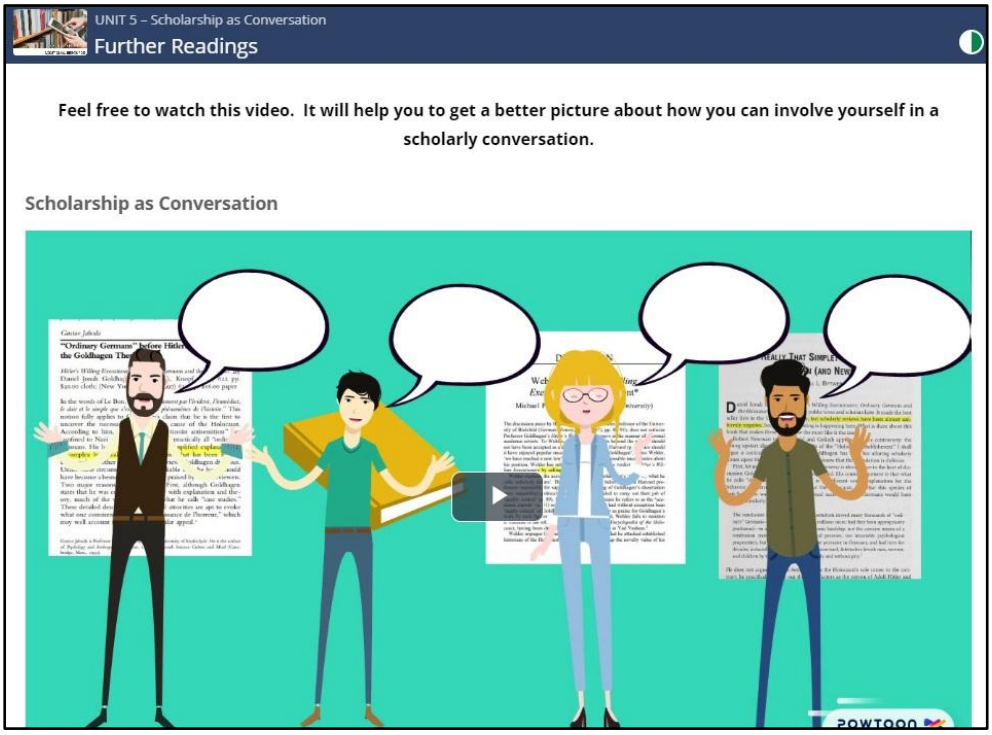


Figure H34: Unit 5 Further Readings

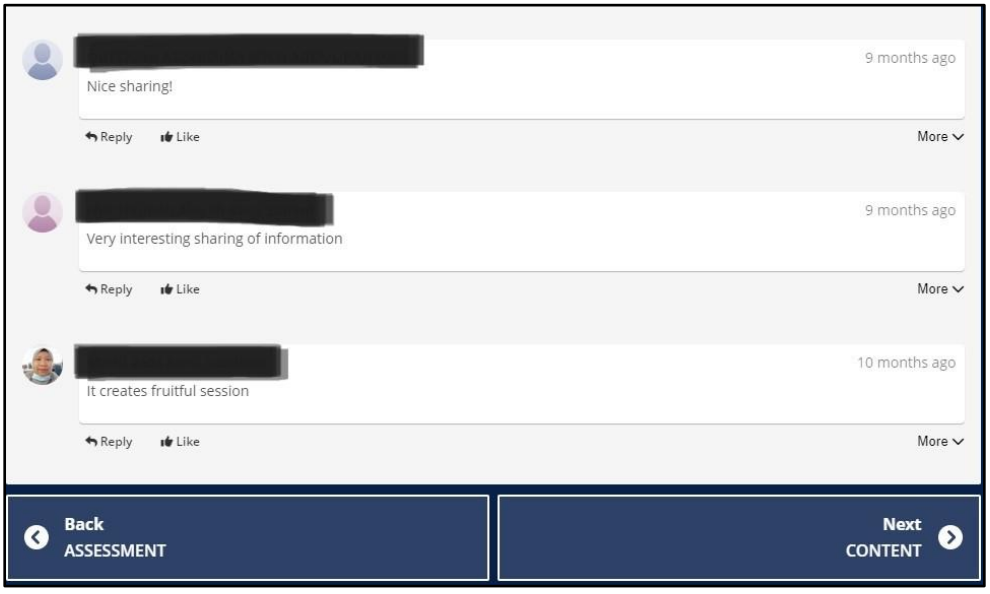


Figure H35: Comments for Unit 5 Further Readings

Unit 6: Searching as Strategic Exploration

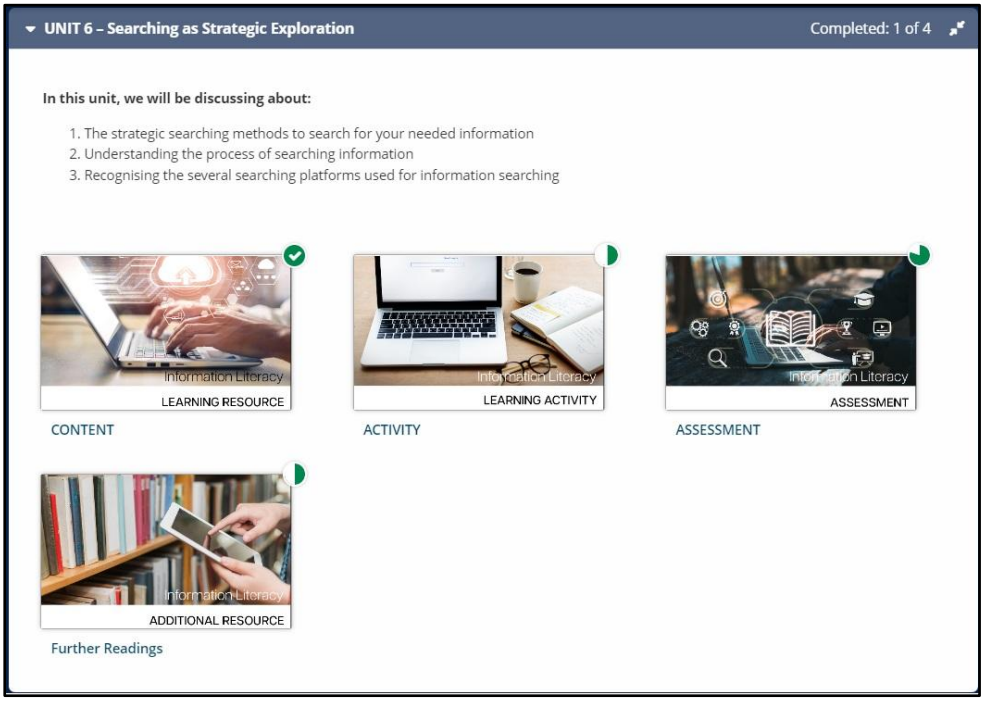


Figure H36: Unit 6 Summary

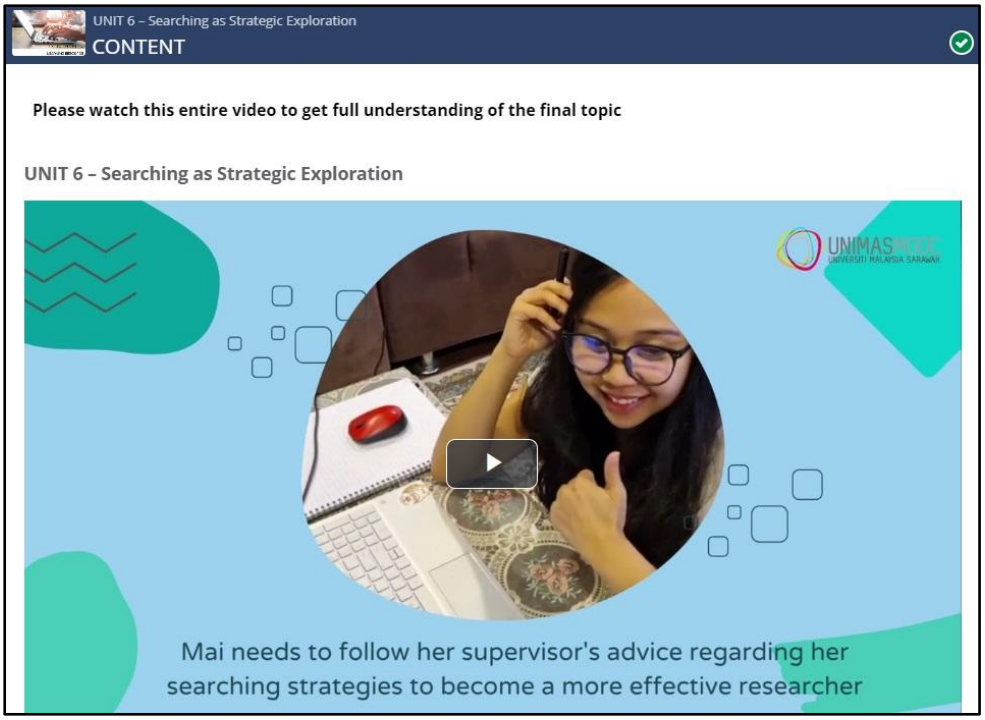


Figure H37: Unit 6 Lecture Video



Figure H38: Comments for Unit 6 Lecture Video

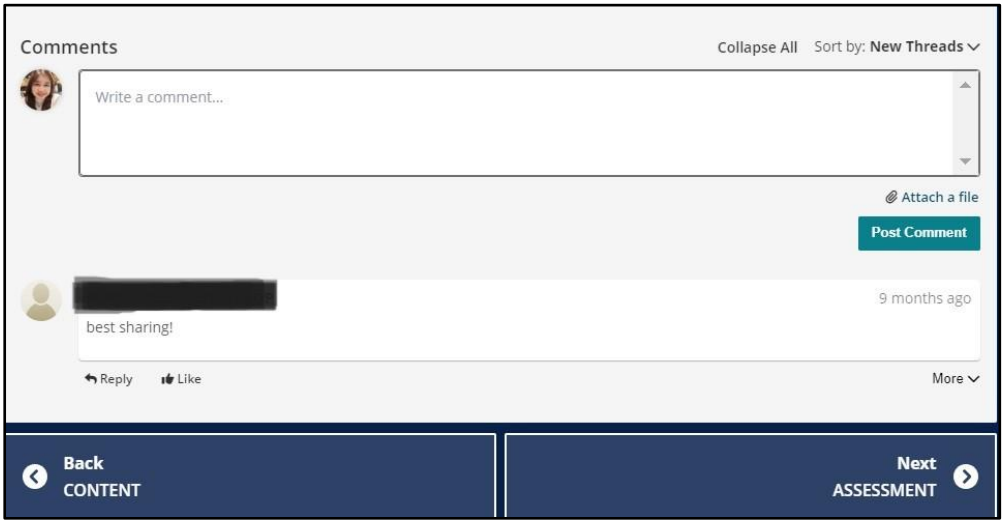


Figure H39: Comments for Unit 6 Activity (Quiz)



Figure H40: Unit 6 Assessment (Assignment)

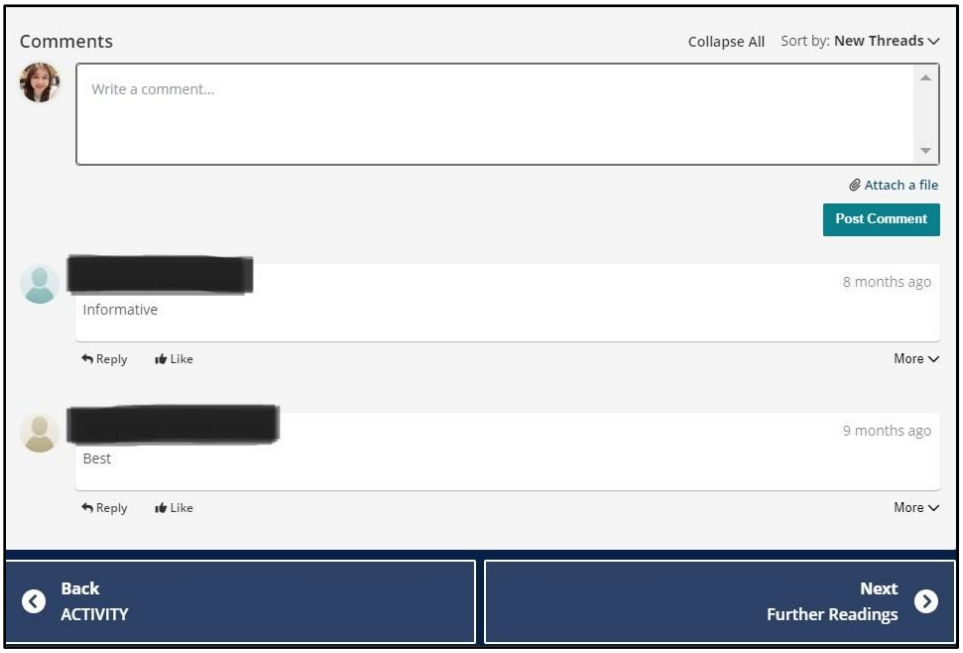


Figure H41: Comments for Unit 6 Assessment (Assignment)

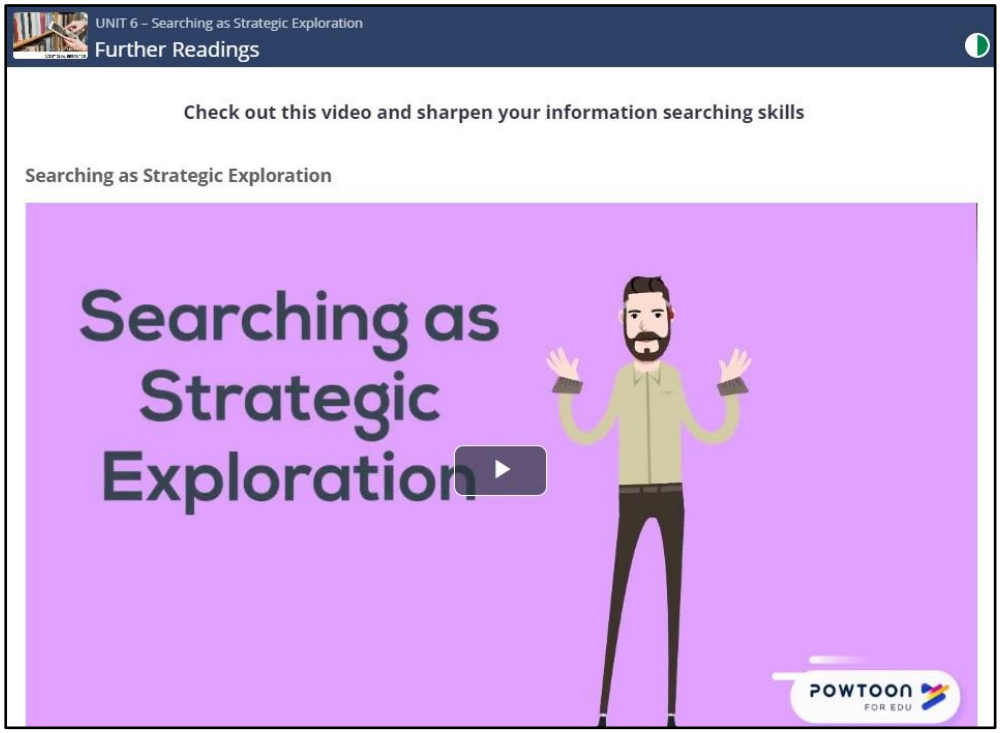


Figure H42: Unit 6 Further Readings



Figure H43: Comments for Unit 6 Further Readings

Appendix I: Alternatives to get more Participants for Information Literacy MOOC



Figure I1(a): Promoting IL MOOC to a group of Cognitive Science students at the Faculty of Cognitive Sciences and Human Development on 17th October 2022



Figure I1(b): Promoting IL MOOC to a group of Cognitive Science students at the Faculty of Cognitive Sciences and Human Development on 17th October 2022

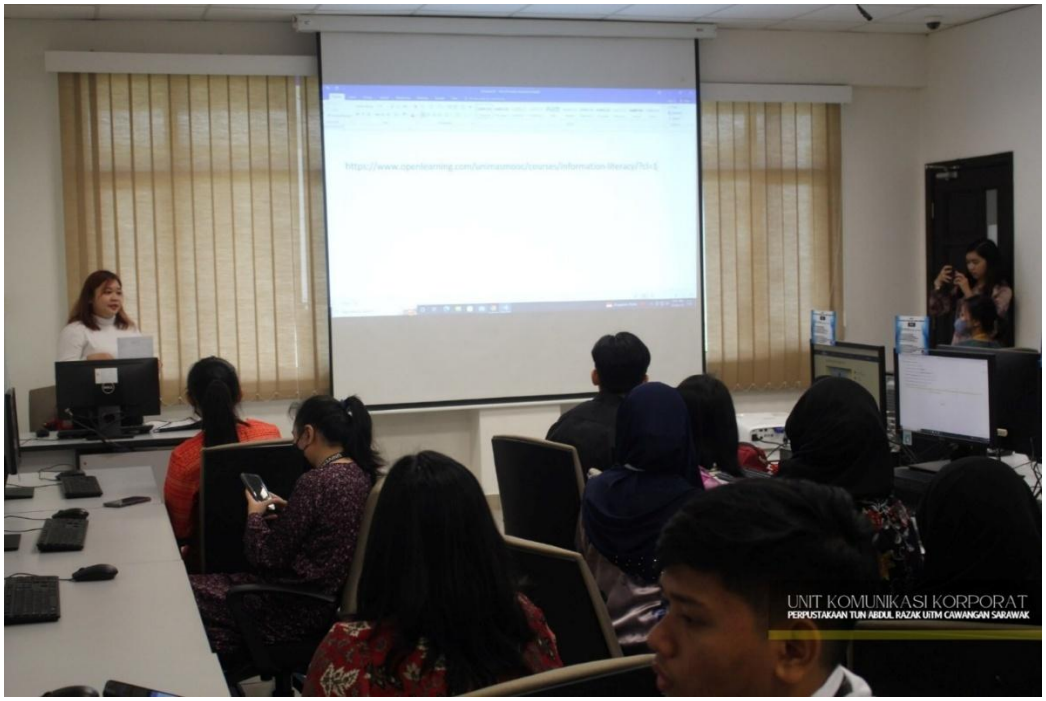


Figure I2(a): Promoting IL MOOC to a group of UiTM students at Perpustakaan Tun Abdul Razak, Universiti Teknologi MARA, Kota Samarahan, Sarawak on 14th November 2022 (Perpustakaan Tun Abdul Razak, 2022)

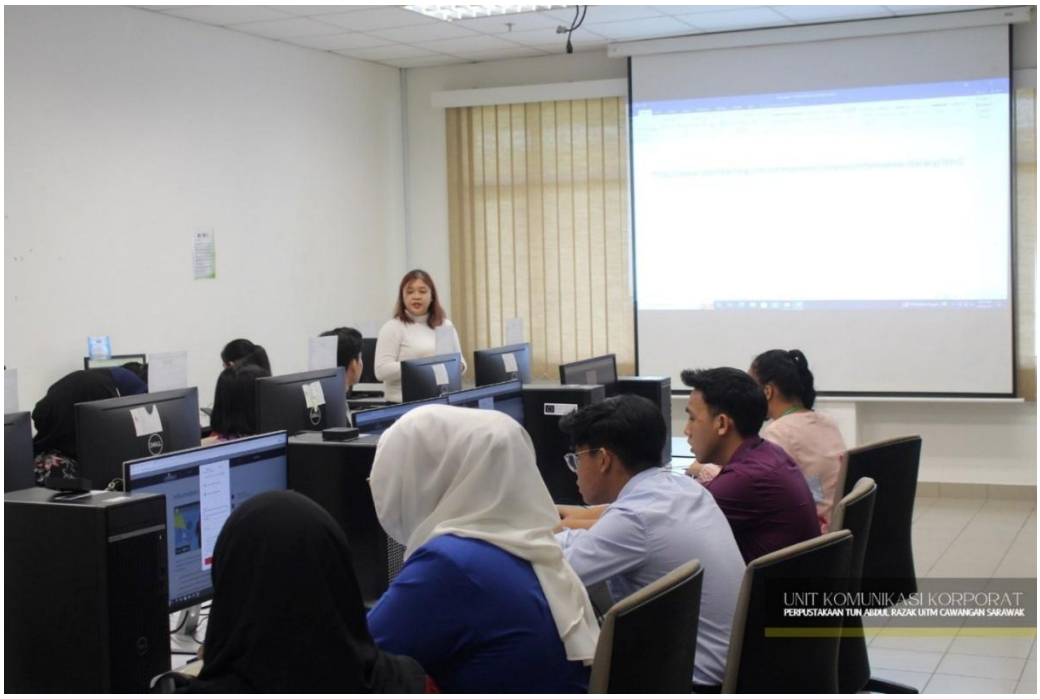


Figure I2(b): Promoting IL MOOC to a group of UiTM students at Perpustakaan Tun Abdul Razak, Universiti Teknologi MARA, Kota Samarahan, Sarawak on 14th November 2022 (Perpustakaan Tun Abdul Razak, 2022)

Appendix J: Information Literacy MOOC Certificate of Completion



Figure J1: Example of Information Literacy MOOC Certificate of Completion

Appendix K: Level of Assessment for Information Literacy Skills Competency (Answer Sheets)

Unit 1: Authority is Constructed and Contextual

Level of Assessment: Advanced

QUIZ – AUTHORITY IS CONSTRUCTED AND CONTEXTUAL

Name/ Student ID	P134 / XXXXX
University	U05
Programme/ Year of Study	FOS08/ X
Contact details (email/ mobile)	XXXXX@XXXXX.XX / XXXXXXXXXX

1) Identify the type of information based on your information need:

Topic (e.g. *Korean wave*)	Mental health
Subject (e.g. Communication, music)	Globalisation, health
Focus (e.g. Korean pop, Korean drama)	Mental health issue

2) Identify the type of information source which you would like to refer to (e.g. scholarly journal, social media, blog, news article, etc.)

Scholarly journal

3) Title of your chosen information source

Mental Health Issues and the University Student

4) Several things to identify **before you start reading** the information retrieved onany information source:

Author background/ details (Who is the author?) The author's name is Doris Iarovici. She grew up in New York City and is a graduate of Yale College and the Yale University School of Medicine.She is a writer and a psychiatrist whose short story collection Minus One was released in November 2020.A previous collection, American Dreaming and Other Stories, received the Novello Literary Award and other publishing honors. She is a recipient of the Jack Dyer Fiction Prize and fellowships in fiction to the Djerassi Resident Artists Program, Virginia Center for the Creative Arts, Hambidge, and elsewhere. Her nonfiction book, Mental Health Issues and the University Student, focuses on college psychiatry.
Author qualifications (Did they graduate in the relevant field of study or are they very experienced in what they do?) Education The author Education, Training and Certifications : ● Chief Resident, Psychiatry Outpatient Clinic, Psychiatry, Duke University School of Medicine (1995 - 1996) ● Psychiatry Residency, Psychiatry, Duke University School of Medicine (1992 -1995) ● M.D., Yale University (1992) Publication ● Published 5 books ● Published 3 articles ● Published 24 referred articles ● Published 2 book chapters ● Published 5 book reviews

Recognition:

In the news - The antidepresant Generation (the New York Times / 17th April2014)

- Djerassi Artist Program Fellow (2019)
- Novello Literary Award
- Virginia Center for the Creative Arts Fellow in Writing
- The Portland Review Short Fiction Award (2016)
- Crab Orchard Review Jack Dyer Award for Fiction
- Durham Arts Council Emerging Artist Award in Literature

Author authority (Did they go to school/ university/ college for a number of years or do they have a lot of life experience?)

The author Education, Training and Certifications:

- Chief Resident, Psychiatry Outpatient Clinic, Psychiatry, Duke University School of Medicine (1995 - 1996)
- Psychiatry Residency, Psychiatry, Duke University School of Medicine (1992 -1995)
- M.D., Yale University (1992)

The author previous Appointments and Affiliations:

- Clnical Associate in the Department of Psychiatry and Behavioral Sciences, Psychiatry, Child and Family Mental Health and Community Psychiatry, Psychiatry and Behavioral Sciences (2013 - 2017)
- Clinical Associate in the Department of Psychiatry and Behavioral Sciences, Psychiatry and Behavioral Sciences, Clinical Science Departments (2000 - 2013)
- Consulting Associate in the Department of Psychiatry and Behavioral Sciences, Psychiatry and Behavioral Sciences, Clinical Science Departments (1996 - 2000)

5) Several things to identify **as you read** the information retrieved:

The way the information are presented in the information source (How doesthe author's authority, i.e. through education/ personal experience shaped the way they talk about the subject?)

The information in this article is presented and discussed in a logical manner. The author's writing style reveals his in-depth understanding of the subject. It's clear thatthe author's education, which is what gives him his authority, has shaped how he tackles the subject. This article's material improves readers' awareness of the importance of being aware of numerous distinct features relating to the issue at handin addition to offering in-depth explanations on the subject.

The limitations of the author's expertise (Whether the author's knowledge isdelivered based on facts/ data or life experience, etc.)

Both data and logical facts were used in the book as well as how the subject relates tothe current global phenomenon. In this article, the author explained about Crisis on the College Campus at the beginning of the book, followed by both statistical data and facts cited from several other relevant studies.

The author's expertise construct or context (Whether they resulted in any bias) According to the book based on my interpretation, the author mentioned that college is the one of the most ideal time for positive change in with the young people during crucial period of their development. The author also thinks that the current college mental health crisis and narrates how college mental health services have evolved along with the changes in student populations. Substance misuse, marital issues, eating disorders, depression, anxiety, and cultural differences are all covered. Sleep problems and perfectionism are two issues that this book specifically addresses. A manual for conducting emergency assessments, including risk classification, hospitalisation, public safety, and communication both inside and outside the campus community, is a crucial part of the volume. In my opinion there are no bias involved and mentioning the mental health of college students.

6) Consider authority as you look for sources to use in your research project/ assignment:

Figure out more about your research project/ assignment and see whether the author actually has the authority to make the claims they are making My assignment requires me to write an essay about how Mental health describes the current crisis in college mental health and tells the story of how college mental health services have changed as student populations have changed. She discusses the lifestyle issues and mental health issues that students face, exploring various interventions through case vignettes. Based on the book that was referred to, the author has the authority in what was stated. This is due to the fact that the article is written properly, with each piece of information is based on statistics and the author providing further explanations based on his or her understanding of the current topic.
Is the author's expertise sufficient for use in your research project/ assignment and how do you determine the *credibility* of this information source? Even though I can use the author's knowledge in my assignment as it's valid. The author's confidence in supporting and rationalising his assertions with facts is also not overlooked, but I think I could do better if I read more of the other article by the same topic written by other authors. Meanwhile, the author's writing style and the clarity of her explanations speak to the authority of this source.
How do you determine the *validity* of the information created by the authority oftheir information source? It depends on the author's level of expertise on a particular subject or topic through his written explanation as well as the sources to which the author refers as towhether the information provided by the authority of their information source is accurate.

Unit 1: Authority is Constructed and Contextual

Level of Assessment: Proficient

QUIZ – AUTHORITY IS CONSTRUCTED AND CONTEXTUAL

Name/ Student ID	P014/ XXXXX
University	U01
Programme/ Year of Study	FOS24/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) Identify the type of information based on your information need:

Topic (e.g. *Korean wave*)	Cancer Pathogenesis
Subject (e.g. Communication, music)	Medical sciences
Focus (e.g. Korean pop, Korean drama)	Role of PAD4 enzymes in cancer pathogenesis

2) Identify the type of information source which you would like to refer to (e.g. scholarly journal, social media, blog, news article, etc.)
   1) Journal article
   2) Books

3) Title of your chosen information source
   Potential Role of Peptidylarginine Deiminase Enzymes and Protein Citrullination in Cancer Pathogenesis

4) Several things to identify **before you start reading** the information retrieved on any information source:

Author background/ details (Who is the author?) Paul R. Thompson. He is the researcher and lecturer at University of Massachusetts Medical School, United States. Thompson and his team actively involve in research related PAD4. He has publish more than 177 article in his career. He also has successfully to develop two novel PAD4 inhibitor cl-amidine and GSK199
Author qualifications (Did they graduate in the relevant field of study or are they very experienced in what they do?)

He is lecturer and researcher in organics chemistry, chemical biology and biochemistry
Author authority (Did they go to school/ university/ college for a number of years or do they have a lot of life experience?) He is lecturer at Department of Biochemistry and Molecular Pharmacology in University of Massachusetts Medical School, United States

5) Several things to identify **<u>as you read</u>** the information retrieved:

The way the information are presented in the information source (How does the author's authority, i.e. through education/ personal experience shaped the way they talk about the subject?) He has education in pharmaceutical chemistry and has a lot of experience in research related to PAD4.
The limitations of the author's expertise (Whether the author's knowledge is delivered based on facts/ data or life experience, etc.) The article was based on the research finding
The author's expertise construct or context (Whether they resulted in any bias) Both it was constructed from multiple research that has been done and contextual from his learning. There is no any bias, the author address the issues in a good manner.

6) Consider authority as you look for sources to use in your research project/ assignment:

Figure out more about your research project/ assignment and see whether the author actually has the authority to make the claims they are making Yes, the author has patent several PAD4 inhibitor
Is the author's expertise sufficient for use in your research project/ assignment and how do you determine the *credibility* of this information source? The author work has been cited by other researcher
How do you determine the *validity* of the information created by the authority of their information source? The author cited the work that is not been done by him and reporting the finding in the article and publish it on high impact journal

Unit 1: Authority is Constructed and Contextual

Level of Assessment: Developing

QUIZ – AUTHORITY IS CONSTRUCTED AND CONTEXTUAL

Name/ Student ID	P098/ XXXXX
University	U08
Programme/ Year of Study	FOS18/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) Identify the type of information based on your information need:

Topic (e.g. *Korean wave*)	Mental Health
Subject (e.g. Communication, music)	Peer support
Focus (e.g. Korean pop, Korean drama)	Work, Specialist

2) Identify the type of information source which you would like to refer to (e.g. scholarly journal, social media, blog, news article, etc.)
Scholarly Journal

3) Title of your chosen information source
The Impact of Peer Support Work On The Mental Health of Peer Support Specialist

4) Several things to identify **before you start reading** the information retrieved on any information source:

Author background/ details (Who is the author?) Daniel Poremski, Jonathan Han Loong Kuek, Qi Yuan, Ziqiang Li, Kah Lai Yow, Pui Wai Eu and Hong Choon Chua
Author qualifications (Did they graduate in the relevant field of study or are they very experienced in what they do?) Yes. They are all from Institute of Mental Health in Singapore.
Author authority (Did they go to school/ university/ college for a number of years or do they have a lot of life experience?) They have worked in the field for a very long time, therefore they have a lot of experience

5) Several things to identify **<u>as you read</u>** the information retrieved:

The way the information are presented in the information source (How does the author's authority, i.e. through education/ personal experience shaped the way they talk about the subject?) Through education
The limitations of the author's expertise (Whether the author's knowledge is delivered based on facts/ data or life experience, etc.) It is based on participant data that they have examined
The author's expertise construct or context (Whether they resulted in any bias) No, as they directly studied the perceptions of the participants and backed them up with solid information from other scholars

6) Consider authority as you look for sources to use in your research project/ assignment:

Figure out more about your research project/ assignment and see whether the author actually has the authority to make the claims they are making Yes, provided they are natively trained professionals in the relevant field
Is the author's expertise sufficient for use in your research project/ assignment and how do you determine the ***credibility*** of this information source? Yes. The paper is offered by BMC, a reputable collection of peer-reviewed journals that consistently uphold the quality of the research they publish
How do you determine the ***validity*** of the information created by the authority of their information source? It offered the sources

Unit 2: Information Creation as a Process

Level of Assessment: Advanced

QUIZ – INFORMATION CREATION AS A PROCESS

Name/ Student ID	P001/ XXXXX
University	UOS
Programme/ Year of Study	FOS05/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

Compare the characteristics of the different types of publications in order to further understand the unique capabilities and constraints of the information creation process.

Type of Information	Example & URL	Discussion				
		Ease Arrange in the order of how easy or hard you think it is to create or publish one each ***Range from 1 to 6*** 1 for easiest and 6 for most difficult	**Time** Arrange in the order how long you think it takes to create or publish each one ***Range from 1 to 6*** 1 for shortest and 6 for longest	**Research** Arrange in the order of how much research you think goes into each one ***Range from 1 to 6*** 1 for least and 6 for most	**Editing** Arrange them in the order of how much you think each one is edited before it gets published ***Range from 1 to 6*** 1 for least edited and 6 for most edited	**Length** Arrange them in the order of how long or short you think each one is ***Range from 1 to 6*** 1 for shortest and 6 for longest
Tweet *A message limited to 140 characters and posted to Twitter without any kind of review*	Title: It's a shine off! Author NASA URL: https://twitter.com/NASA/status/1554225463945469953?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Etweet	2	2	4	3	1
Blog entry *A personal account posted online without any kind of review*	Title: What Are Gold Nanoparticles? Author: bioparticles.com URL: https:// www.cd-bioparticles.com/blog/nanoparticles/what-are-gold-nanoparticles/	4	3	5	3	4
Wikipedia Article *An online encyclopedia entry presenting basic information on a subject. Written and edited by dozens of anonymous authors*	Title: Colloidal gold Author: Anonymous URL: https://en.wikipedia.org/wiki/Colloidal_gold	4	4	5	4	5
News Article *An article describing a recent event. Written by a journalist, reviewed by their editor, and posted online*	Title: New gold nanoparticle purifies water of difficult pollutants Author: William Weir URL: https://news.yale.edu/2020/06/22/new-gold-nanoparticle-purifies-water-difficult-pollutants	4	3	3	3	3
Scholarly Article *A research article on a specific topic, authored by an expert in their field of study, which has been peer-reviewed and published in an academic journal*	Title: Plant Mediated Synthesis Of Gold Nanoparticles Using Fruit Extracts Of Ananas Comosus (L.) (Pineapple) And Evaluation Of Biological Activities Authors: Nagaraj Basavegowda Agnieszka Sobczak-Kupiec Dagmara Malina Yathirajan HS Keerthi V R Chandrashekar N Salman Dinkar Liny P URL: https://amliaamonline.org/article_14370.html	5	5	5	5	5
Scholarly Book *A comprehensive account of a subject. Written by an expert in their field of study and published by a university press*	Title: Metal Nanoparticles in Microbiology Author: Mahendra Rai et al **URL:** https://books.google.co.in/books?hl=en&lr=&id=K71WeEHPCvcC&oi=fnd&pg=PR3&dq=gold+nanoparticles+scholarly+book&ots=2CN0SAzZi4&sig=mxE2h_f30OFqRPWwAL1G8pOZmTU#v=onepage&q&f=false	6	6	6	6	6

Unit 2: Information Creation as a Process

Level of Assessment: Proficient

QUIZ – INFORMATION CREATION AS A PROCESS

Name/ Student ID	P022
University	U07
Programme/ Year of Study	FOS04/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

Compare the characteristics of the different types of publications in order to further understand the unique capabilities and constraints of the information creation process.

Type of Information	**Example & URL**	**Discussion**				
		Ease Arrange in the order of how easy or hard you think it is to create or publish one each ***Range from 1 to 6*** 1 for easiest and 6 for most difficult	**Time** Arrange in the order how long you think it takes to create or publish each one ***Range from 1 to 6*** 1 for shortest and 6 for longest	**Research** Arrange in the order of how much research you think goes into each one ***Range from 1 to 6*** 1 for least and 6 for most	**Editing** Arrange them in the order of how much you think each one is edited before it gets published ***Range from 1 to 6*** 1 for least edited and 6 for most edited	**Length** Arrange them in the order of how long or short you think each one is ***Range from 1 to 6*** 1 for shortest and 6 for longest
Tweet *A message limited to 140 characters and posted to Twitter without any kind of review*	Title: A wall of across Africa. Author: UN Climate Change URL: https://twitter.com/UNFCCC/status/1564539498779889664?cxt=HHwWgMC-3dCYrrYrAAAA	1	1	1	1	1
Blog entry *A personal account posted online without any kind of review*	Title: Just Transition: Clean Energy with a Clear Conscience Author: Claudio Formisano URL: https://www.bsr.org/en/our-insights/blog-view/just-transition-clean-energy-with-a-clear- conscience	2	2	2	2	3
Wikipedia Article *An online encyclopedia entry presenting basic information on a subject. Written and edited by dozens of anonymous authors*	Title: Climate Change Author: Unknown URL: https://en.wikipedia.org/wiki/Climate_change	4	4	4	4	4
News Article *An article describing a recent event. Written by a journalist, reviewed by their editor, and posted online*	Title: After Deadly Fires and Disastrous Floods, A Canadian City Moves to Sue Big Oil Author: Norimitsu Onishi URL: https://www.nytimes.com/2022/08/29/world/canada/vancouver-floods-fires-lawsuit.html	3	3	3	3	2
Scholarly Article *A research article on a specific topic, authored by an expert in their field of study, which has been peer-reviewed and published in an academic journal*	Title: Climate Change Authors: Chris Riedy URL: https://www.researchgate.net/publication/311301385_Climate_Change	5	5	5	5	5
Scholarly Book *A comprehensive account of a subject. Written by an expert in their field of study and published by a university press*	Title: The Science of Climate Change Author: M. R. Islam and M. M. Khan URL: https://onlinelibrary.wiley.com/doi/book/10.1002/9781119522850	6	6	6	6	6

Unit 2: Information Creation as a Process

Level of Assessment: Developing

QUIZ – INFORMATION CREATION AS A PROCESS

Name/ Student ID	P093
University	U08
Programme/ Year of Study	FOS18/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXX

Compare the characteristics of the different types of publications in order to further understand the unique capabilities and constraints of the information creation process.

Type of Information	**Example & URL**	**Discussion**				
		Ease Arrange in the order of how easy or hard you think it is to create or publish one each ***Range from 1 to 6*** 1 for easiest and 6 for most difficult	**Time** Arrange in the order how long you think it takes to create or publish each one ***Range from 1 to 6*** 1 for shortest and 6 for longest	**Research** Arrange in the order of how much research you think goes into each one ***Range from 1 to 6*** 1 for least and 6 for most	**Editing** Arrange them in the order of how much you think each one is edited before it gets published ***Range from 1 to 6*** 1 for least edited and 6 for most edited	**Length** Arrange them in the order of how long or short you think each one is ***Range from 1 to 6*** 1 for shortest ~~and~~ 6 for longest
Tweet *A message limited to 140 characters and posted to Twitter without any kind of review*	Title: The K-Wave, Korean pop culture, has been decades in the making Author: Bloomberg Quicktake URL: https://twitter.com/i/events/1460568129994727426	1	6	1	6	1
Blog entry *A personal account posted online without any kind of review*	Title: Korean Wave: The Global Rise of Culture in Seoul Author: SilverDoor Apartments URL: https://www.silverdoorapartments.com/blog/korean-wave-the-global-rise-of-culture-in-seoul/	2	5	2	5	2
Wikipedia Article *An online encyclopedia entry presenting basic information on a subject. Written and edited by dozens of anonymous authors*	Title: Korean Wave Author: Anonymous URL: https://en.wikipedia.org/wiki/Korean_wave	3	4	3	4	3
News Article *An article describing a recent event. Written by a journalist, reviewed by their editor, and posted online*	Title: K-everything: the rise of Korean culture Author: Tim Adams URL:https://www.theguardian.com/world/2022/sep/04/korea-culture-k-pop-music-film-tv-hallyu-v-and-a	4	3	4	3	4
Scholarly Article *A research article on a specific topic, authored by an expert in their field of study, which has been peer-reviewed and published in an academic journal*	Title: Globalization, or the logic of cultural hybridization: the case of the Korean wave Authors: Woongjae Ryoo URL: https://www.tandfonline.com/doi/abs/10.1080/01292980902826427	5	2	5	2	5
Scholarly Book *A comprehensive account of a subject. Written by an expert in their field of study and published by a university press*	Title: The Korean Wave: A Decade of Ups and Downs Author: Jin Young and Jong Oh Lee URL: https://link.springer.com/chapter/10.1007/978-3-642-35521-9_35	6	1	6	1	6

Unit 3: Information has Value

Level of Assessment: Advanced

QUIZ – INFORMATION HAS VALUE

Name/ Student ID	F001/ XXXXX
University	UOS
Programme/ Year of Study	FOS05/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) Explain what the information of each source is about
2) Identify the accuracy of each source and provide your reasons (why the source is accurate OR why it is not accurate)

Title of Information Source	Link to Information Source	What is the information about?	Accurate Why?	Not Accurate Why?
Example: Review of the Literature on Children with Special Educational Needs	https://files.eric.ed.gov/fulltext/EJ1126490.pdf	The information is about the literature relevant to the Cross-cultural issues andthe politics of SEN and the different perspectives arising from the literature on this widely debated issue are addressed.	It is a scholarly article and it is published in an academic journal (trusted source) and written by expertsof the field.	-
Adult degenerative scoliosis – Aliterature review	https://www.researchgate.net/publication/338361484_Adult_degenerative_scoliosis_-_A_literature_review	The information is about literature review on adult degenerative scoliosis.	It is a scholarly article and it is published in an academic journal (trusted source) and written by expertsof the field.	
Architecture Design Values	https://en.wikipedia.org/wiki/Architectural_design_values	The information is about architecturaldesign values.		Some of the information are accurate, however, with Wikipedia being able to be edited by the public, it is not a reliable source for information. There is also a warning that the entry on the subject matter was written with a personal opinion format. It is good for a quick general information, but the fact that it can be edited by the publicmakes it not suitable for academic information sources.
10 Facts about Emperor Penguins	https://www.natgeokids.com/uk/discover/animals/birds/emperor-penguins/	The information is about 10 facts about emperor penguins.	The article is written by a credible nature and science organisation whichis national geographic. Given their passion and credibility in educational content, this article is fairly accurate.	
The Art of Writing & Speaking the English Language	https://www.gutenberg.org/ebooks/19719	The information is about The Art of Writing & Speaking the English Language	The writer is Sherwin Cody, an American writer with a lot of experience in book writing. His knowledge inEnglish language made his work a credible source of informations.	
2022 Monkeypox Outbreak in the United States	https://en.wikipedia.org/wiki/2022_monkeypox_outbreak_in_the_United_States	The information is about monkeypox outbreak in the United States in 2022.		Some of the information are accurate, however, with Wikipedia being able to be edited by the public, it is not a reliable source for information. It is good for a quick general information, but the fact that it can be edited by the public makes it not suitable for academic information sources.

Unit 3: Information has Value

Level of Assessment: Proficient

QUIZ – INFORMATION HAS VALUE

Name/ Student ID	P208/ XXXXX
University	U05
Programme/ Year of Study	FOS08/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXX

1) Explain what the information of each source is about
2) Identify the accuracy of each source and provide your reasons (why the source is accurate OR why it is not accurate)

Title of Information Source	Link to Information Source	What is the information about?	Accurate Why?	Not Accurate Why?
Example: Review of the Literature on Children with Special Educational Needs	https://files.eric.ed.gov/fulltext/EJ1126490.pdf	The information is about the literature relevant to the Cross-cultural issues and the politics of SEN and the different perspectives arising from the literature on this widely debated issue are addressed.	It is a scholarly article and it is published in an academic journal (trusted source) and written by experts of the field.	-
Adult degenerative scoliosis – A literature review	https://www.researchgate.net/publication/338361484_Adult_degenerative_scoliosis_-_A_literature_review	The information is about adult scoliosis is an umbrella term referring to all forms of scoliosis occurring in skeletally mature individuals, irrespective of whether the deformity began before or after skeletal maturity.	It is an article that is trusted enough by having the article license.	-
Architecture Design Values	https://en.wikipedia.org/wiki/Architectural_design_values	This information is about architectural design values. Architectural design values make up an important part of what influences architects and designers when they make their design decisions. However, architects and designers are not always influenced by the same values and intentions.		It is a Wikipedia article. Wikipedia is not a trustworthy source for references on other Wikipedia pages. Since it is a user-generated source, anybody can update it at any moment, and any information it includes at any one time may be inaccurate, the result of vandalism, a work in progress, or both.
10 Facts about Emperor Penguins	https://www.natgeokids.com/uk/discover/animals/birds/emperor-penguins/	This information is about the birds of Antarctica. They wrote about 10 facts about emperor penguins.	It is one of the national geographic blogs which is national graphic kids.	
The Art of Writing & Speaking the English Language	https://www.gutenberg.org/ebooks/19719	This information is about The Art of Writing & Speaking the English Language by Sherwin Cody. The link led us to an ebook that need to be downloaded.	It is an ebook and it is published in an academic journal (trusted source) and written by experts in the field.	
2022 Monkeypox Outbreak in the United States	https://en.wikipedia.org/wiki/2022_monkeypox_outbreak_in_the_United_States	This information is about the 2022 monkeypox outbreak in the United States. The United States was the fourth country, outside of the African countries with endemic monkeypox, to experience an outbreak in 2022.		It is a Wikipedia article. Wikipedia is not a trustworthy source for references on other Wikipedia pages. Since it is a user-generated source, anybody can update it at any moment, and any information it includes at any one time may be inaccurate, the result of vandalism, a work in progress, or both.

Unit 3: Information has Value

Level of Assessment: Developing

QUIZ – INFORMATION HAS VALUE

Name/ Student ID	P030/ XXXXX
University	U01
Programme/ Year of Study	FOS12/ XX
Contact details (email/ mobile)	XXXXXX@XXXXX.XX/ XXXXXXXXX

1) Explain what the information of each source is about
2) Identify the accuracy of each source and provide your reasons (why the source is accurate OR why it is not accurate)

Title of Information Source	Link to Information Source	What is the information about?	Accurate Why?	Not Accurate Why?
Example: Review of the Literature on Children with Special Educational Needs	https://files.eric.ed.gov/fulltext/EJ1126490.pdf	The information is about the literature relevant to the Cross-cultural issues and the politics of SEN and the different perspectives arising from the literature on this widely debated issue are addressed.	It is a scholarly article and it is published in an academic journal (trusted source) and written by experts of the field.	-
Adult degenerative scoliosis – A literature review	https://www.researchgate.net/publication/338361484_Adult_degenerative_scoliosis_-_A_literature_review	It is about adult scoliosis is an umbrella term referring to all forms of scoliosis occurring in skeletally mature individuals, irrespective of whether the deformity began before or after skeletal maturity. This review aims to provide a comprehensive overview of adult degenerative scoliosis considering the clinical, pathophysiological, and surgical management of this increasingly prevalent problem. The problem is best managed by Neurosurgeons and Orthopedic surgeons in a multi-disciplinary team familiar with the complexity of this disease in a patient specific manner.	It is accurate because it is a scholarly article and is written by experts.	
Architecture Design Values	https://en.wikipedia.org/wiki/Architectural_design_values	Architectural design values make up an important part of what influences architects and designers when they make their design decisions. However, architects and designers are not always influenced by the same values and intentions. Value and intentions differ between different architectural movements. It also differs between different schools of architecture and schools of design as well as among individual architects and designers.		Not accurate because it is written by ~~non-experts~~. It maybe just their opinion.
10 Facts about Emperor Penguins	https://www.natgeokids.com/uk/discover/animals/birds/emperor-penguins/	Facts about penguins.	It is accurate because the information are facts, credible source and it is a ~~well-known~~ source.	
The Art of Writing & Speaking the English Language	https://www.gutenberg.org/ebooks/19719	The Art of Writing & Speaking the English Language	It is accurate because it is written by experts of the field.	
2022 Monkeypox Outbreak in the United States	https://en.wikipedia.org/wiki/2022_monkeypox_outbreak_in_the_United_States	The 2022 monkeypox outbreak in the United States is part of the larger outbreak of human monkeypox caused by the West African clade of the monkeypox virus. The United States was the fourth country, outside of the African countries with endemic monkeypox, to experience an outbreak in 2022.	It is accurate because it is facts and it happened for real.	

Unit 4: Research as Inquiry

Level of Assessment: Advanced

QUIZ – RESEARCH AS INQUIRY

Name/ Student ID	P014/ XXXXX	Programme/ Year of Study	FOS24/ XX
University	U01	Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

Think of a **broad topic** for your research that interests you *Topic: Detection of rheumatoid arthritis*	Narrow down your research topic to a more **specific topic** *Topic: What is the inheritance biomarker in rheumatoid arhtritis*
Search for information related to your **broad** research topic. Use the correct or relevant keywords *Keywords: biomarker AND "rheumatoid arthritis"*	Search for information related to your **specific** research topic. Use the correct or relevant keywords *Keywords: biomarker AND "rheumatoid arthritis" AND (inheritance OR genetic)*
Look at the total search result for each different platform you used for information search.	Look at the total search result for each different platform you used for information search.

Platform	Total Search Result
Google	2,240,000
Google Scholar	220,000
Library online database (please provide name of database): PubMed	2,812
Library online database (please provide name of database):Scopus	6,358
Library online database (please provide name of database): DOAJ	498
Others (please provide link): Science Direct	20,637
Others (please provide link): ProQuest	78,968

Platform	Total Search Result
Google	2,260,000
Google Scholar	97200
Library online database (please provide name of database): PubMed	893
Library online database (please provide name of database): Scupus	1005
Library online database (please provide name of database):	498
Others (please provide link):	10745
Others (please provide link): ProQuest	45399

Research Questions: 1) What is the biomarker in rheumatoid arthritis 2) How the biomarker works in body 3) Can the biomarker work for diagnostic 4) It is possible for the biomarker can be work as target for rheumatoid arthritis	Research Questions: 1) What is the biomarker that can be inherited. 2) Can the biomarker be detected in the early stage 3) Can infants present with the biomarker 4) Can we develop a test kit to detect the biomarker in infants

Unit 4: Research as Inquiry

Level of Assessment: Proficient

QUIZ – RESEARCH AS INQUIRY

Name/ Student ID	P198/ XXXXX	Programme/ Year of Study	FOS27/ XX
University	U05	Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

Think of a **broad topic** for your research that interests you ***Topic:*** Rape Statistics in Malaysia	Narrow down your research topic to a more **specific topic** ***Topic:*** Rape Statistics in Sarawak, Malaysia
Search for information related to your **broad** research topic. Use the correct or relevant keywords ***Keywords:*** Rape cases, rape statistics, teenagers, Malaysia, victims, rapists, law	Search for information related to your **specific** research topic. Use the correct or relevant keywords ***Keywords:*** Rape cases, rape statistics, teenagers, Malaysia, victims, rapists, law, Sarawak, youth
Look at the total search result for each different platform you used for information search.	Look at the total search result for each different platform you used for information search.

Platform	Total Search Result
Google	2,970,000
Google Scholar	26,000
Library online database (please provide name of database): Oxford Academic	248
Library online database (please provide name of database): JSTOR	1529
Library online database (please provide name of database): ScienceDirect	526
Others (please provide link): https://pubmed.ncbi.nlm.nih.gov/?term=rape+statistics+in+malaysia	7
Others (please provide link): https://journals.sagepub.com/action/doSearch?field1=AllField&text1=rape+statistics+in+malaysia&field2=AllField&text2=&publication=&Ppub=&access=	554

Platform	Total Search Result
Google	663,000
Google Scholar	1,790
Library online database (please provide name of database): Oxford Academic	12
Library online database (please provide name of database): JSTOR	174
Library online database (please provide name of database): ScienceDirect	26
Others (please provide link): https://pubmed.ncbi.nlm.nih.gov/?term=rape+statistics+in+sarawak	7
Others (please provide link): https://journals.sagepub.com/action/doSearch?AllField=rape+statistics+in+sarawak	38

Research Questions: 1) What is the level of awareness about rape among the people in Malaysia? 2) Do the victims of rape in Malaysia know the law that protect them against the raping case? 3) What are the effective ways to prevent raping from happening in Malaysia? 4) Do the people in Malaysia truly understand the clothes the rape victims wore do not advocate the rape action?	Research Questions: 1) What is the level of awareness about rape among the people in Sarawak, Malaysia? 2) Do the victims of rape in Sarawak, Malaysia know the law that protect them against the raping case? 3) What are the effective ways to prevent raping from happening in Sarawak, Malaysia? 4) Do the people in Sarawak, Malaysia truly understand the clothes the rape victims wore do not advocate the rape action?

Unit 4: Research as Inquiry

Level of Assessment: Developing

QUIZ – RESEARCH AS INQUIRY

Name/ Student ID	K068/ XXXXX	Programme/ Year of Study	FOS07/ XX
University	UOS	Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

Think of a **broad topic** for your research that interests you ***Topic:*** Covid 19	Narrow down your research topic to a more **specific topic** ***Topic:*** Covid 19 in Malaysia 2022
Search for information related to your **broad** research topic. Use the correct or relevant keywords ***Keywords:*** corvid, covid 19	Search for information related to your **specific** research topic. Use the correct or relevant keywords ***Keywords:*** covid, covid 19, Malaysia, 2022
Look at the total search result for each different platform you used for information search.	Look at the total search result for each different platform you used for information search.

Platform	Total Search Result
Google	4,400,000,000
Google Scholar	4,760,000
Library online database (please provide name of database): **Perpustakaan Negara Malaysia**	3
Library online database (please provide name of database):Open Library	2,700
Library online database (please provide name of database):	
Others (please provide link):	
Others (please provide link):	

Platform	Total Search Result
Google	376,000,000
Google Scholar	69,200
Library online database (please provide name of database): **Perpustakaan Negara Malaysia**	0
Library online database (please provide name of database): Open Library	0
Library online database (please provide name of database):	
Others (please provide link):	
Others (please provide link):	

Research Questions: 1) How to fully recover from covid 19. 2) How to avoid getting covid 19.	Research Questions: 1) How Malaysian get fully recover from covid 19 in Malaysia 2022. 2) How Malaysian avoid from getting covid 19 in 2022.

Unit 5: Scholarship as Conversation

Level of Assessment: Advanced

QUIZ – SCHOLARSHIP AS CONVERSATION

Name/ Student ID	P001/ XXXXX
University	U05
Programme/ Year of Study	FOS05/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) **Choose a topic of your interest or any topic on which you have someknowledge/ experience**

   Topic: Biosynthesis of gold nanoparticle using black pepper plant extract

2) **Identify 3 sources that shape the conversation (e.g. reading, watchingvideos, blog, discussion forum, other social media site, etc.)**

   a) **Reading journal related to biosynthesis of gold nanoparticle**
   b) **Attend conferences related to nanotechnology, biochemistry and natural product**
   c) **Engage in discussion with lecturers and colleague with similar background and expertise in nanotechnology, biochemistry or naturalproduct**

3) **How would you involve yourself in this conversation? (e.g. reading anarticle, attending a discussion with experts in the field, etc.)**

Reading journal related to biosynthesis of gold nanoparticle	Extensively expand the literature review of thesis by reading relevant journals. This will ensure the necessary information from previous work orstudies done by expert be the foundation of our own project.
Attend conferences related to nanotechnology, biochemistry and natural product	By attending conferences related to my work, I can learn and see works done by expert while engage in discussion to see other point of view on my project.
Engage in discussion with lecturers and colleague with similar background and expertise in nanotechnology, biochemistry or natural product	By consulting lecturers and colleagues, especially seniors, we can tap into their vast experience to enhance our own project. Some recommendations might include access to research grant, new equipment and even better experimental design.

Unit 5: Scholarship as Conversation

Level of Assessment: Proficient

QUIZ – SCHOLARSHIP AS CONVERSATION

Name/ Student ID	P163/ XXXXX
University	U05
Programme/ Year of Study	XXXXX/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) Choose a topic of your interest or any topic on which you have some knowledge/ experience

Topic: The socio-economic effects of Terrrorism on Reurnees

2) Identify 3 sources that shape the conversation (e.g. reading, watching videos, blog, discussion forum, other social media site, etc.)

a) Focused Group Discussion with those who were directly affacted

b) Reading journals and some other literary works

c) Discussion done on national dailies and TV stations

3) How would you involve yourself in this conversation? (e.g. reading an article, attending a discussion with experts in the field, etc.)

Focused Group Discussion	I had a conversation with the people who were dislocated by terrorism and returned back. I was able to gather a couple of them and we had a group discussion regarding terrorism and how it affected them.
Reading Journals and some other literary works	Overtime, I have read journals and some other articles on terrorism. This opened my eyes on the concept and how it affects people and countries.
Discussion done on national dailies and TV stations	Regularly, some discussions are done on the national TV stations and this in a way broadened my knowledge of terrorism and its effects.

Unit 5: Scholarship as Conversation

Level of Assessment: Developing

QUIZ – SCHOLARSHIP AS CONVERSATION

Name/ Student ID	P068/ XXXXX
University	U05
Programme/ Year of Study	FOS07/ XX
Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) **Choose a topic of your interest or any topic on which you have some knowledge/ experience**

   Topic: Is TaiChi good for health?

2) **Identify 3 sources that shape the conversation (e.g. reading, watching videos, blog, discussion forum, other social media site, etc.)**

   a) **Reading some news about this topic**

   b) **Participating in TaiChi shows**

   c) **Watch some videos about TaiChi**

3) **How would you involve yourself in this conversation? (e.g. reading an article, attending a discussion with experts in the field, etc.)**

Reading some news about this topic	I have read some news about TaiChi benefits on social media or sometimes I will read in some articles.
Participating in TaiChi shows	I have participated in TaiChi when I went to form six and performed with the other TaiChi lover from everywhere.
Watch some videos about TaiChi	I have watch some videos which is to improve my skills and also see how people can performed so well.

Unit 6: Searching as Strategic Exploration

Level of Assessment: Advanced

QUIZ – SEARCHING AS STRATEGIC EXPLORATION

Name/ Student ID	P014/ XXXXX	Programme/ Year of Study	FOS24/ XX
University	U01	Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) CHOOSE A TOPIC

Choose a topic of interest before you start with your search strategies.

Topic: Natural products in drug discovery

2) DEVELOPING KEYWORDS

Think of broader and narrower terms for your topic. Then search using those terms.

Broader Term	Narrower Terms
Natural products	Natural products, plants, animals
Drug design	In silico, in vivo, in vitro
Disease	Mechanisms of actions

3) COLLABORATIVE KEYWORDS

Write down your research topic and 3 related areas you might explore.

Topic	Related areas to explore
Natural products in drug discovery	Research, experimental, lab works,

4) EXPLORING LIBRARY DATABASES

Search for sources related to your research topic based on the given search engines:

Search Engine	Title of Source	Type of Source	URL
Google	Natural products in drug discovery: advances and opportunities	Article	https://www.nature.com/articles/s41573-020-00114-z
Other search engines (if any) e.g. Bing:	The Success of Natural Products in Drug Discovery	Article	https://www.scirp.org/html/3-2500287_33502.htm#:~:text=Natural%20products%2C%20particularly%2C%20microbial%20and%20plant%20products%20in,drug%20leads%20suitable%20for%20optimization%20by%20synthetic%20means
Library online database: PubMed	Natural products in drug discovery: advances and opportunities	Article	https://pubmed.ncbi.nlm.nih.gov/33510482/
Other library online database (if any) e.g. Emerald, EBSCO, etc. :	A Review of Fungal Protoilludane Sesquiterpenoid Natural Products	Article	https://doaj.org/article/002f66b4950f4edba088e20d0ee227ae

5) FINDING SOURCES WITHIN LIBRARY COLLECTION

Search for sources related to your research topic using your library's search engine (OPAC – Online Public Access Catalog).

Title of Source	Type of Source	Name of Library/ University	Source Location (Call No.)
Bioactive compounds from natural sources : natural products as lead compounds in drug discovery / edited by Corrado Tringali	Book	Library of International Islamic University Malaysia	RS160 B615T 2012
Drug discovery in Africa : impacts of genomics, natural products, traditional medicines, insights into medicinal chemistry, and technology platforms in pursuit of new drugs / Kelly Chibale, Mike Davies-Coleman, Collen Masimirembwa, editors	Books Online Access	Library of International Islamic University Malaysia	https://link.springer.com/book/10.1007/978-3-642-28175-4
Natural products : drug discovery and therapeutic medicine / edited by Lixin Zhang, Arnold L. Demain	Book	Library of International Islamic University Malaysia	RS160N285Z 2005.

Unit 6: Searching as Strategic Exploration

Level of Assessment: Proficient

QUIZ – SEARCHING AS STRATEGIC EXPLORATION

Name/ Student ID	P103	Programme/ Year of Study	FOS18/ XX
University	U08	Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) **CHOOSE A TOPIC**
Choose a topic of interest before you start with your search strategies.
Topic: Optometrist

2) **DEVELOPING KEYWORDS**
Think of broader and narrower terms for your topic. Then search using those terms.

Broader Term	Narrower Terms
What is Optometrist?	"What is Optometrist?"
Difference between Optometrist and Optician	Optometrist AND optician
What does Optometrist do?	"Optometrist jobscope"

3) **COLLABORATIVE KEYWORDS**
Write down your research topic and 3 related areas you might explore.

Topic	Related areas to explore
Optometrist	- Optician - Optometric - Pharmacy

4) **EXPLORING LIBRARY DATABASES**
Search for sources related to your research topic based on the given search engines:

Search Engine	Title of Source	Type of Source	URL
Google	What is an optometrist?	Article on website	https://www.college-optometrists.org/qualifying/a-career-in-optometry/what-is-an-optometrist
Other search engines (if any) e.g. Bing:	Optometrist	Articles on website	https://my.clevelandclinic.org/health/articles/24219-optometrist
Library online database:	What is an optometrist?	Article	https://www-webofscience-com.ezaccess.library.uitm.edu.my/wos/woscc/full-record/WOS:000221566900001
Other library online database (if any) e.g. Emerald, EBSCO, etc.:	Optometrist's perspectives of Artificial Intelligence in eye care	Article	https://www-sciencedirect-com.ezaccess.library.uitm.edu.my/science/article/pii/S1888429622000395

5) **FINDING SOURCES WITHIN LIBRARY COLLECTION**
Search for sources related to your research topic using your library's search engine (OPAC – Online Public Access Catalog).

Title of Source	Type of Source	Name of Library/ University	Source Location (Call No.)
The Optician Training Manual: Simple Step to Becoming a Great Optician	Book	PTAR KAMPUS PUNCAK ALAM	WW39 .M4788o 2018
Essential contact lens practice	Book	PTAR KAMPUS PUNCAK ALAM	WW355 V596e 2002
Optometry and vision science	Journals	PTAR KAMPUS PUNCAK ALAM	W1 O68

Unit 6: Searching as Strategic Exploration

Level of Assessment: Developing

QUIZ – SEARCHING AS STRATEGIC EXPLORATION

Name/ Student ID	P021	Programme/ Year of Study	FOS01/ XX
University	U08	Contact details (email/ mobile)	XXXXX@XXXXX.XX/ XXXXXXXXXX

1) CHOOSE A TOPIC

Choose a topic of interest before you start with your search strategies.

Topic: The effectiveness of Open & Distance Learning (ODL) among students

2) DEVELOPING KEYWORDS

Think of broader and narrower terms for your topic. Then search using those terms.

Broader Term	Narrower Terms
Open Distance Learning (ODL)	Concept of ODL, Education, Practices
Effectiveness	Efficacy, Reliability,
Student	Perspectives, Needs

3) COLLABORATIVE KEYWORDS

Write down your research topic and 3 related areas you might explore.

Topic	Related areas to explore
The effectiveness of Open & Distance Learning (ODL) among students	To study the effectiveness of ODL concept among students whether it is effective or not

4) EXPLORING LIBRARY DATABASES

Search for sources related to your research topic based on the given search engines:

Search Engine	Title of Source	Type of Source	URL
Google	University Students' Perspectives on Open and Distance Learning (ODL) Implementation Amidst COVID-19	Scholarly Article	https://www.researchgate.net/publication/348820042_University_Students%27_Perspectives_on_Open_and_Distance_Learning_ODL_Implementation_Amidst_COVID-19
Other search engines (if any) e.g. Bing:			
Library online database: OPAC PUSTAKA Negeri Sarawak	HIGHER education through open and distance learning	Books	https://pustaka.librarynet.com.my/Angka.sa2/PUSTAKA/BibDetail.htm
Other library online database (if any) e.g. Emerald, EBSCO, etc. :			

5) FINDING SOURCES WITHIN LIBRARY COLLECTION

Search for sources related to your research topic using your library's search engine (OPAC – Online Public Access Catalog).

Title of Source	Type of Source	Name of Library/ University	Source Location (Call No.)
The role of learning interaction in open & distance learning (ODL): issues, experiences and practices	Books	OPAC PUSTAKA Negeri Sarawak	ISBN : 9789833827701
Reconsidering open and distance learning in the developing world: meeting students' learning needs	Books	OPAC PUSTAKA Negeri Sarawak	ISBN : 9780415401401(sc)
Open and distance learning in developing countries	Books	OPAC PUSTAKA Negeri Sarawak	ISBN : 0415194199

Appendix L: Promotional Infographic for the Information Literacy MOOC



Appendix M: Promotional Posters for the Information Literacy MOOC



LET'S BECOME INFORMATION LITERATE!

DATE
5 SEPT 2022 - 31 OCT 2022

TIME
ACCORDING TO STUDENTS' CONVENIENCE (THROUGHOUT THE ABOVE PERIOD)



SPEAKER

Dayang Norsheila Binti Abang Mohtar
Senior Librarian
Perpustakaan Tun Abdul Rahman Ya'kub
Universiti Malaysia Sarawak
Email: mnorsheila@unimas.my

***E-Certificate will be issued after completion of course**

REGISTRATION & PARTICIPATION LINK
https://www.openlearning.com/unimasmooc/courses/information-literacy/HomePage/

YOU WILL LEARN HOW TO:

- **CONDUCT PROPER RESEARCH WHICH MEETS COURSE REQUIREMENTS**
- **SEARCH FOR INFORMATION CORRECTLY AND ACCURATELY**
- **IDENTIFY SOURCES OF INFORMATION IN VARIOUS FORMATS**
- **GET ACCESS TO INFORMATION FROM AUTHENTIC SOURCES**

Appendix N: IL MOOC Assessment (Blank Sheets)

Unit 1: Authority is Constructed and Contextual

QUIZ – AUTHORITY IS CONSTRUCTED AND CONTEXTUAL

Name/ Student ID	
University	
Programme/ Year of Study	
Contact details (email/ mobile)	

1) Identify the type of information based on your information need:

Topic (e.g. *Korean wave*)	
Subject (e.g. Communication, music)	
Focus (e.g. Korean pop, Korean drama)	

2) Identify the type of information source which you would like to refer to (e.g. scholarly journal, social media, blog, news article, etc.)

3) Title of your chosen information source

4) Several things to identify **before you start reading** the information retrieved on any information source:

Author background/ details (Who is the author?)

Author qualifications (Did they graduate in the relevant field of study or are they very experienced in what they do?)
Author authority (Did they go to school/ university/ college for a number of years or do they have a lot of life experience?)

Several things to identify **as you read** the information retrieved:

The way the information are presented in the information source (How does the author's authority, i.e. through education/ personal experience shaped the way they talk about the subject?)
The limitations of the author's expertise (Whether the author's knowledge is delivered based on facts/ data or life experience, etc.)

The author's expertise construct or context (Whether they resulted in any bias)

6) Consider authority as you look for sources to use in your research project/ assignment:

Figure out more about your research project/ assignment and see whether the author actually has the authority to make the claims they are making
Is the author's expertise sufficient for use in your research project/ assignment and how do you determine the ***credibility*** of this information source?
How do you determine the ***validity*** of the information created by the authority of their information source?

Unit 2: Information Creation as a Process

QUIZ – INFORMATION CREATION AS A PROCESS

Name/ Student ID	
University	
Programme/ Year of Study	
Contact details (email/ mobile)	

Compare the characteristics of the different types of publications in order to further understand the unique capabilities and constraints of the information creation process.

Type of Information	**Example & URL**	**Discussion**				
		Ease Arrange in the order of how easy or hard you think it is to create or publish one each ***Range from 1 to 6*** 1 for easiest and 6 for most difficult	**Time** Arrange in the order how long you think it takes to create or publish each one ***Range from 1 to 6*** 1 for shortest and 6 for longest	**Research** Arrange in the order of how much research you think goes into each one ***Range from 1 to 6*** 1 for least and 6 for most	**Editing** Arrange them in the order of how much you think each one is edited before it gets published ***Range from 1 to 6*** 1 for least edited and 6 for most edited	**Length** Arrange them in the order of how long or short you think each one is ***Range from 1 to 6*** 1 for shortest and 6 for longest
Tweet *A message limited to 140 characters and posted to Twitter without any kind of review*						
Blog entry *A personal account posted online without any kind of review*						
Wikipedia Article *An online encyclopedia entry presenting basic information on a subject. Written and edited by dozens of anonymous authors*						
News Article *An article describing a recent event. Written by a journalist, reviewed by their editor, and posted online*						
Scholarly Article *A research article on a specific topic, authored by an expert in their field of study, which has been peer-reviewed and published in an academic journal*						
Scholarly Book *A comprehensive account of a subject. Written by an expert in their field of study and published by a university press*						

Unit 3: Information has Value

QUIZ – INFORMATION HAS VALUE

Name/ Student ID	
University	
Programme/ Year of Study	
Contact details (email/ mobile)	

1) Explain what the information of each source is about
2) Identify the accuracy of each source and provide your reasons (why the source is accurate OR why it is not accurate)

Title of Information Source	Link to Information Source	What is the information about?	Accurate Why?	Not Accurate Why?
Example: Review of the Literature on Children with Special Educational Needs	https://files.eric.ed.gov/fulltext/EJ1126490.pdf	The information is about the literature relevant to the Cross-cultural issues and the politics of SEN and the different perspectives arising from the literature on this widely debated issue are addressed.	It is a scholarly article and it is published in an academic journal (trusted source) and written by experts of the field.	-
Adult degenerative scoliosis – A literature review	https://www.researchgate.net/publication/338361484_Adult_degenerative_scoliosis_-_A_literature_review			
Architecture Design Values	https://en.wikipedia.org/wiki/Architectural_design_values			
10 Facts about Emperor Penguins	https://www.natgeokids.com/uk/discover/animals/birds/emperor-penguins/			
The Art of Writing & Speaking the English Language	https://www.gutenberg.org/ebooks/19719			
2022 Monkeypox Outbreak in the United States	https://en.wikipedia.org/wiki/2022_monkeypox_outbreak_in_the_United_States			

Unit 4: Research as Inquiry

QUIZ – RESEARCH AS INQUIRY

Name/ Student ID		Programme/ Year of Study	
University		Contact details (email/ mobile)	

Think of a **broad topic** for your research that interests you ***Topic:***	Narrow down your research topic to a more **specific topic** ***Topic:***
Search for information related to your **broad** research topic. Use the correct or relevant keywords ***Keywords:***	Search for information related to your **specific** research topic. Use the correct or relevant keywords ***Keywords:***
Look at the total search result for each different platform you used for information search.	Look at the total search result for each different platform you used for information search.
Research Questions:	Research Questions:

Platform	Total Search Result
Google	
Google Scholar	
Library online database (please provide name of database):	
Library online database (please provide name of database):	
Library online database (please provide name of database):	
Others (please provide link):	
Others (please provide link):	

Platform	Total Search Result
Google	
Google Scholar	
Library online database (please provide name of database):	
Library online database (please provide name of database):	
Library online database (please provide name of database):	
Others (please provide link):	
Others (please provide link):	

Unit 5: Scholarship as Conversation

QUIZ – SCHOLARSHIP AS CONVERSATION

Name/ Student ID	
University	
Programme/ Year of Study	
Contact details (email/ mobile)	

1) **Choose a topic of your interest or any topic on which you have some knowledge/ experience**

2) **Identify 3 sources that shape the conversation (e.g. reading, watching videos, blog, discussion forum, other social media site, etc.)**

   a)

   b)

   c)

3) **How would you involve yourself in this conversation? (e.g. reading an article, attending a discussion with experts in the field, etc.)**

Unit 6: Searching as Strategic Exploration

QUIZ – SEARCHING AS STRATEGIC EXPLORATION

Name/ Student ID		Programme/ Year of Study	
University		Contact details (email/ mobile)	

1) **CHOOSE A TOPIC**
Choose a topic of interest before you start with your search strategies.

2) **DEVELOPING KEYWORDS**
Think of broader and narrower terms for your topic. Then search using those terms.

Broader Term	Narrower Terms

3) **COLLABORATIVE KEYWORDS**
Write down your research topic and 3 related areas you might explore.

Topic	Related areas to explore

4) **EXPLORING LIBRARY DATABASES**
Search for sources related to your research topic based on the given search engines:

Search Engine	Title of Source	Type of Source	URL
Google			
Other search engines (if any) e.g. Bing:			
Library online database:			
Other library online database (if any) e.g. Emerald, EBSCO, etc. :			

5) **FINDING SOURCES WITHIN LIBRARY COLLECTION**
Search for sources related to your research topic using your library's search engine (OPAC – Online Public Access Catalog).

Title of Source	Type of Source	Name of Library/ University	Source Location (Call No.)

Appendix O: IL MOOC Assessment (Example Sheets)

Unit 1: Authority is Constructed and Contextual

QUIZ – AUTHORITY IS CONSTRUCTED AND CONTEXTUAL

Name/ Student ID	Dayang Norsheila Binti Abang Mohtar/ 19010156
University	Universiti Malaysia Sarawak
Programme/ Year of Study	PhD Learning Sciences/ 2
Contact details (email/ mobile)	mnorsheila@unimas.my / 012 234 2912

1) Identify the type of information based on your information need:

Topic (e.g. *Korean wave*)	The Korean Wave
Subject (e.g. Communication, music)	Globalisation, cultural studies
Focus (e.g. Korean pop, Korean drama)	History of Korean wave

2) Identify the type of information source which you would like to refer to (e.g. scholarly journal, social media, blog, news article, etc.)

Scholarly journal

3) Title of your chosen information source

The Korean Wave: Retrospect and Prospect

4) Several things to identify **before you start reading** the information retrieved on any information source:

Author background/ details (Who is the author?) The author's name is Dal Yong Jin. He is a distinguished professor at Simon Fraser University, a public research university in British Columbia, Canada. After working as a journalist for many years, he completed his Ph.D. in the Institute of Communications Research at the University of Illinois in 2005. His major research and teaching interests are on digital platforms and digital games, globalisation and media, transnational cultural studies, and the political economy of media and culture. He had authored various books and has also published many articles in scholarly journals.

Author qualifications (Did they graduate in the relevant field of study or are they very experienced in what they do?)

Education

- 2004 University of Illinois at Urbana-Champaign, Champaign, Illinois
  Ph. D., Program at the Institute of Communications Research
  Dissertation Title: "*Political Economy of Communication Industry Reorganization: Republic of Korea, 1987-2002*" (Advisor: Dan Schiller)
- 2000 University of Texas at Austin, Austin, Texas M.P.A. (Master of Public Affairs) at the Lyndon B. Johnson School (LBJ)
- 1988 Yonsei University Graduate School, Seoul, Korea. M.A. in Public Policy
- 1986 Yonsei University, Seoul, Korea. B. A. in Public Administration

Publication

- Published 25 books
- Published 7 edited journal articles
- Published 71 refereed journal articles
- Published 51 book chapters and encyclopaedia entries
- Published 10 book reviews

Research

- Globalization and Media
- Asian Media and Culture
- Online Game Studies/ Social Media
- Technology and Culture
- Political Economy of Culture
- Telecommunications Policy
- Science Journalism

Author authority (Did they go to school/ university/ college for a number of years or do they have a lot of life experience?)

The author went to university for a number of years. His qualifications are as follows:

- 2004 University of Illinois at Urbana-Champaign, Champaign, Illinois
  Ph. D., Program at the Institute of Communications Research
  Dissertation Title: "*Political Economy of Communication Industry Reorganization: Republic of Korea, 1987-2002*" (Advisor: Dan Schiller)
- 2000 University of Texas at Austin, Austin, Texas M.P.A. (Master of Public Affairs) at the Lyndon B. Johnson School (LBJ)
- 1988 Yonsei University Graduate School, Seoul, Korea. M.A. in Public Policy
- 1986 Yonsei University, Seoul, Korea. B. A. in Public Administration

5) Several things to identify **as you read** the information retrieved:

The way the information are presented in the information source (How does the author's authority, i.e. through education/ personal experience shaped the way they talk about the subject?) The information presented in this article is written and explained with the right flow. The author's way of writing clearly shows that he is very knowledgeable in the relevant field of study. It is obviously shown that the author's authority, which is his education, shaped the way the author talks about the subject. The information presented in this article not only explained in detail on the preferred subject but it also creates the awareness among readers, whereby they should know about several specific information about that particular subject as well.
The limitations of the author's expertise (Whether the author's knowledge is delivered based on facts/ data or life experience, etc.) The author's knowledge is delivered based on both facts and data as well as how the subject relates to the current global phenomenon. In this article, the author explained about The Korean Wave in general at the beginning, followed by both statistical data and facts cited from several other relevant studies/ research.
The author's expertise construct or context (Whether they resulted in any bias) The way the author delivered the content of this article is not bias but in a way, he is trying to make it fair theoretically. He mentioned in the article that he expected that non-Western perspectives will challenge central assumptions and arguments developed by Western perspectives in the near future. This also means that a room for discussion is needed in order to discuss the integration of Western and non-Western perspectives in media and Asian studies, the uses of theories of global comparative research, the relevance of non-Western theories and models, and successful and failed efforts at theoretical cross-pollination.

6) Consider authority as you look for sources to use in your research project/ assignment:

Figure out more about your research project/ assignment and see whether the author actually has the authority to make the claims they are making My project/ assignment requires me to write an essay about how the Korean Wave first started and how its rapid growth has invaded different parts of the world and is well received in many countries. According to this article, the author actually has the authority to make the claims he is making. This is because this article is written in appropriate manner whereby each information is arranged accordingly and further explanations regarding the subject are made based on the author's knowledge on the current trends of the Korean Wave which occur around the world. Apart from that, the author also claimed certain ideas and perceptions about the subject with justifications cited from several studies/ research as prove. The relevant statistical data are also included in order to strengthen and support those ideas.
Is the author's expertise sufficient for use in your research project/ assignment and how do you determine the ***credibility*** of this information source? The author's expertise is sufficient for use in my research project/ assignment but by referring to more articles on the similar subject/ topic by other authors at the same time may improve myself to produce a work of better quality. Meanwhile, the credibility of this source is reflected by the author's writing pattern and the fluency in his explanations. The author's confidence in justifying and rationalising his claims with evidences are not excluded as well.
How do you determine the ***validity*** of the information created by the authority of their information source? The validity of the information created by the authority of their information source is depending on the level of knowledge of the author about a particular subject/ topic through his written explanation as well as the sources in which the author referred to for his writeup. The knowledge and background of the authors of these sources will determine the validity of the information used in the article we refer to.

Unit 2: Information Creation as a Process

QUIZ – INFORMATION CREATION AS A PROCESS

Name/ Student ID	Dayang Norsheila Binti Abang Mohtar
University	Universiti Malaysia Sarawak
Programme/ Year of Study	PhD Learning Sciences/ 2
Contact details (email/ mobile)	mnorsheila@unimas.my / 012 234 2912

Compare the characteristics of the different types of publications in order to further understand the unique capabilities and constraints of the information creation process.

Type of Information	Example & URL	Discussion				
		Ease Arrange in the order of how easy or hard you think it is to create or publish one each ***Range from 1 to 6*** 1 for easiest and 6 for most difficult	**Time** Arrange in the order how long you think it takes to create or publish each one ***Range from 1 to 6*** 1 for shortest and 6 for longest	**Research** Arrange in the order of how much research you think goes into each one ***Range from 1 to 6*** 1 for least and 6 for most	**Editing** Arrange them in the order of how much you think each one is edited before it gets published ***Range from 1 to 6*** 1 for least edited and 6 for most edited	**Length** Arrange them in the order of how long or short you think each one is ***Range from 1 to 6*** 1 for shortest and 6 for longest
Tweet *A message limited to 140 characters and posted to Twitter without any kind of review*	Title: Music Plays a Crucial Role in Remedy's Games Author: Remedy Entertainment URL: https://twitter.com/remedygames/status/1334508389607628810	1	6	1	6	1
Blog entry *A personal account posted online without any kind of review*	Title: My Musical Mind: Tuning in to Spoon's Classic Vibes with Britt Daniel Author: Heather Phares URL: https://www.allmusic.com/blog/post/my-musical-mind-tuning-in-to-spoons-classic-vibes-with-britt-daniel	2	5	2	5	2
Wikipedia Article *An online encyclopedia entry presenting basic information on a subject. Written and edited by dozens of anonymous authors*	Title: Music Genre Author: Anonymous URL: https://en.wikipedia.org/wiki/Music_genre	3	4	3	4	3
News Article *An article describing a recent event. Written by a journalist, reviewed by their editor, and posted online*	Title: Genre is Disappearing. What Comes Next? Author: Amanda Petrusich URL: https://www.newyorker.com/magazine/2021/03/15/genre-is-disappearing-what-comes-next	4	3	4	3	4
Scholarly Article *A research article on a specific topic, authored by an expert in their field of study, which has been peer-reviewed and published in an academic journal*	Title: Evolution of Different Music Genres Authors: Kamalnathan, et al. URL: https://www.ijeat.org/wp-content/uploads/papers/v9i1/A1674109119.pdf	5	2	5	2	5
Scholarly Book *A comprehensive account of a subject. Written by an expert in their field of study and published by a university press*	Title: Music: Its language, history, and culture Author: Allen, et al. URL: https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=1002&context=bc_oers	6	1	6	1	6

Unit 3: Information has Value

QUIZ – INFORMATION HAS VALUE

Name/ Student ID	Dayang Norsheila Binti Abang Mohtar
University	Universiti Malaysia Sarawak
Programme/ Year of Study	PhD Learning Sciences/ 2
Contact details (email/ mobile)	mnorsheila@unimas.my / 012 234 2912

1) Explain what the information of each source is about
2) Identify the accuracy of each source and provide your reasons (why the source is accurate OR why it is not accurate)

Title of Information Source	Link to Information Source	What is the information about?	Accurate Why?	Not Accurate Why?
Example: Review of the Literature on Children with Special Educational Needs	https://files.eric.ed.gov/fulltext/EJ1126490.pdf	The information is about the literature relevant to the Cross-cultural issues and the politics of SEN and the different perspectives arising from the literature on this widely debated issue are addressed.	It is a scholarly article and it is published in an academic journal (trusted source) and written by experts of the field.	-
Adult degenerative scoliosis – A literature review	https://www.researchgate.net/publication/338361484_Adult_degenerative_scoliosis_-_A_literature_review			
Architecture Design Values	https://en.wikipedia.org/wiki/Architectural_design_values			
10 Facts about Emperor Penguins	https://www.natgeokids.com/uk/discover/animals/birds/emperor-penguins/			
The Art of Writing & Speaking the English Language	https://www.gutenberg.org/ebooks/19719			
2022 Monkeypox Outbreak in the United States	https://en.wikipedia.org/wiki/2022_monkeypox_outbreak_in_the_United_States			

Unit 4: Research as Inquiry

QUIZ – RESEARCH AS INQUIRY

Name/ Student ID	Dayang Norsheila Binti Abang Mohtar	Programme/ Year of Study	PhD Learning Sciences/ 2
University	Universiti Malaysia Sarawak	Contact details (email/ mobile)	mnorsheila@unimas.my / 012 234 2912

Think of a **broad topic** for your research that interests you

Topic:

The Reading Habits among the Teenagers in Sarawak

Search for information related to your **broad** research topic. Use the correct or relevant keywords

Keywords:

Reading habits, teenagers, Sarawak, adolescents, reading, secondary school students

Look at the total search result for each different platform you used for information search.

Platform	Total Search Result
Google	551,000
Google Scholar	6460
Library online database (please provide name of database): Emerald Management Plus	300
Library online database (please provide name of database): ProQuest	352
Library online database (please provide name of database): JSTOR	33
Others (please provide link): CORE - https://core.ac.uk/	426
Others (please provide link):	

Research Questions:

1) What is the level of awareness toward the importance of reading habits among the teenagers in Sarawak?

2) What is the level of understanding of the benefits of reading among the teenagers in Sarawak?

3) Do all teenagers in Sarawak have the ability to understand the information they read?

4) What are the effective ways to improve reading habits among teenagers in Sarawak?

Narrow down your research topic to a more **specific topic**

Topic:

The Reading Habits among the Teenagers in the Rural Area in Sarawak

Search for information related to your **specific** research topic. Use the correct or relevant keywords

Keywords:

Reading habits, teenagers, Sarawak, adolescents, reading, secondary school students, rural area, youth

Look at the total search result for each different platform you used for information search.

Platform	Total Search Result
Google	447,000
Google Scholar	5820
Library online database (please provide name of database): Emerald Management Plus	250
Library online database (please provide name of database): ProQuest	301
Library online database (please provide name of database): JSTOR	30
Others (please provide link): CORE - https://core.ac.uk/	384
Others (please provide link):	

Research Questions:

1) What is the level of awareness toward the importance of reading habits among the teenagers in the Sarawak rural area?

2) What is the level of understanding of the benefits of reading among the teenagers in the Sarawak rural area?

3) Do all teenagers in the Sarawak rural have the ability to understand the information they read?

4) What are the effective ways to improve reading habits among teenagers in the Sarawak rural area?

Unit 5: Scholarship as Conversation

QUIZ – SCHOLARSHIP AS CONVERSATION

Name/ Student ID	Dayang Norsheila Binti Abang Mohtar/ 19010156
University	Universiti Malaysia Sarawak
Programme/ Year of Study	PhD Learning Sciences/ 2
Contact details (email/ mobile)	mnorsheila@unimas.my / 012 234 2912

1) Choose a topic of your interest or any topic on which you have some knowledge/ experience

Topic: The Changing Roles of Academic Librarians in the 21st Century

2) Identify 3 sources that shape the conversation (e.g. reading, watching videos, blog, discussion forum, other social media site, etc.)

a) Reading scholarly articles on the relevant topic
b) Participating in an international library conference
c) Joining a discussion with a group of librarians in the official Facebook Page for the Malaysian Librarians Association

3) How would you involve yourself in this conversation? (e.g. reading an article, attending a discussion with experts in the field, etc.)

Reading scholarly articles on the relevant topic	I wrote an academic paper related to the topic with its references based on my readings. I justified my arguments according to my knowledge and understanding, as well as from my readings.
Participating in an international library conference	I get to know librarians from other regions and talked to them about the relevant topic as we did some knowledge sharing about how librarianship differs in each region
Joining a discussion with a group of librarians in the official Facebook page for the Malaysian Librarians Association	As a member of the Malaysian Librarians Association, I involved myself in the discussions held on the official Facebook page, like actively replying to comments given by other librarians about the relevant topic

Unit 6: Searching as Strategic Exploration

QUIZ – SEARCHING AS STRATEGIC EXPLORATION

Name/ Student ID	Dayang Norsheila Binti Abang Mohtar/ 19010156	Programme/ Year of Study	PhD Learning Sciences/ 2
University	Universiti Malaysia Sarawak	Contact details (email/ mobile)	mnorsheila@unimas.my / 012 234 2912

1) **CHOOSE A TOPIC**

Choose a topic of interest before you start with your search strategies.

Topic: Music for Stress Remedy

2) **DEVELOPING KEYWORDS**

Think of broader and narrower terms for your topic. Then search using those terms.

Broader Term	Narrower Terms
Music	melody, songs, sounds
Stress	tension, pressure
Remedy	therapy, treatment, cure

3) **COLLABORATIVE KEYWORDS**

Write down your research topic and 3 related areas you might explore.

Topic	Related areas to explore
Music for Stress Remedy	Types of music genre, therapy impact, stress categories

4) **EXPLORING LIBRARY DATABASES**

Search for sources related to your research topic based on the given search engines:

Search Engine	Title of Source	Type of Source	URL
Google	The Effect of Music on the Human Stress Response	Scholarly article	https://www.researchgate.net/publication/255791004_The_Effect_of_Music_on_the_Human_Stress_Response
Other search engines (if any) e.g. Bing:			
Library online database: ***ProQuest***	Home Remedy finds Remedy to Modern Music	Scholarly article	https://www.proquest.com/docview/2345404714/fulltext/BCC53FC08CCE41DBPQ/3?accountid=40705
Other library online database (if any) e.g. Emerald, EBSCO, etc. :			

5) **FINDING SOURCES WITHIN LIBRARY COLLECTION**

Search for sources related to your research topic using your library's search engine (OPAC – Online Public Access Catalog).

Title of Source	Type of Source	Name of Library/ University	Source Location (Call No.)
Sound Therapy to Relieve Stress University Final Year Students: Beethoven's	Project report	Perpustakaan Tun Abdul Rahman Ya'kub/ Universiti Malaysia Sarawak	RZ999 .V417 2015
Managing Stress: A relaxation tape/ Brian Luke Seaward music by James Owen Mathews	Sound recording	Perpustakaan Tun Abdul Rahman Ya'kub/ Universiti Malaysia Sarawak	HF5548 .M266
Sound Therapy Using Quranic Verse in Increasing the Calmness and Reducing Stress on Final Year Students in UNIMAS	Project report	Perpustakaan Tun Abdul Rahman Ya'kub/ Universiti Malaysia Sarawak	RZ999 .N642 2015

Appendix P: Student Consent Form

Faculty of Cognitive Sciences and Human Development

Universiti Malaysia Sarawak,

Jalan Datuk Muhammad Musa,

94300 Kota Samarahan, Sarawak

Dear all,

This study is intended to measure students' learning outcomes throughout their participation in the Information Literacy MOOC designed to enable them to recognise the information resources for their research and information needs. The Information Literacy MOOC has six modules:

1. Module 1: Authority is Constructed and Contextual
2. Module 2: Information Creation as a Process
3. Module 3: Information has Value
4. Module 4: Research as Inquiry
5. Module 5: Scholarship as Conversation
6. Module 6: Searching as Strategic Exploration

All data recorded will be treated CONFIDENTIAL and will only be used for the purpose of this study and all related publications. Your cooperation is highly appreciated in an effort to improve or enhance the instructional delivery methods in teaching information literacy among academic librarians in Malaysia especially in today's information age.

Thank you for your cooperation in making this study a success. For further inquiries, you may contact the researcher at 012-2342912 or email to mnorsheila@unimas.my

Thank you.

DAYANG NORSHEILA BINTI ABANG MOHTAR (19010156)
Doctoral student
Faculty of Cognitive Sciences and Human Development
Universiti Malaysia Sarawak

Please fill in your personal information. Please tick (√) on the appropriate bracket. Thank you.

1. Gender:	Male	[	]
	Female	[	]
2. Age:	18 – 23 years old	[	]
	24 – 29 years old	[	]
	30 – 35 years old	[	]
	36 – 41 years old	[	]
	More than 41 years old	[	]

3. Name of University:

_____

4. Programme:	Bachelors	[	]
	Masters	[	]
	Doctor of Philosophy	[	]

5. Field of Study:

_____

6. Year of Study	Year 1	[	]
	Year 2	[	]
	Year 3	[	]
	Year 4	[	]
	Others (please specify): _____		

☐ I hereby agree to participate in this study, and I understand that my data will not be revealed or used against me or the university I am attending.

Signature : _____

Date : _____

Appendix Q: Thematic Analysis of Qualitative Data (Screenshots from Quirkos)



Figure Q1: Key Focus Areas in Information Literacy Education: Management, Technology, Pedagogy, Assessment, and Flexibility

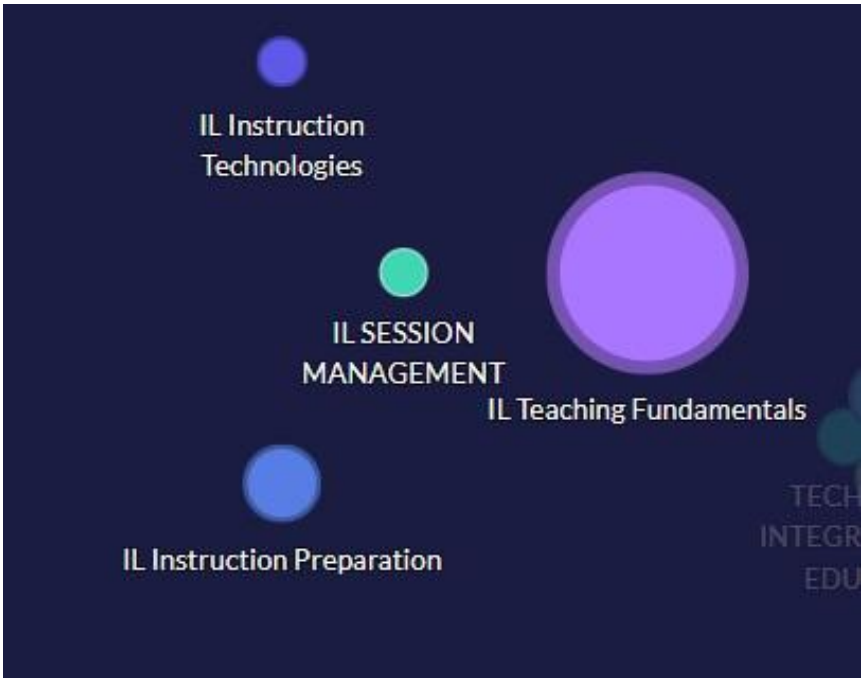


Figure Q2: Core Elements of IL Session Management: Preparation, Technologies, and Teaching Fundamentals

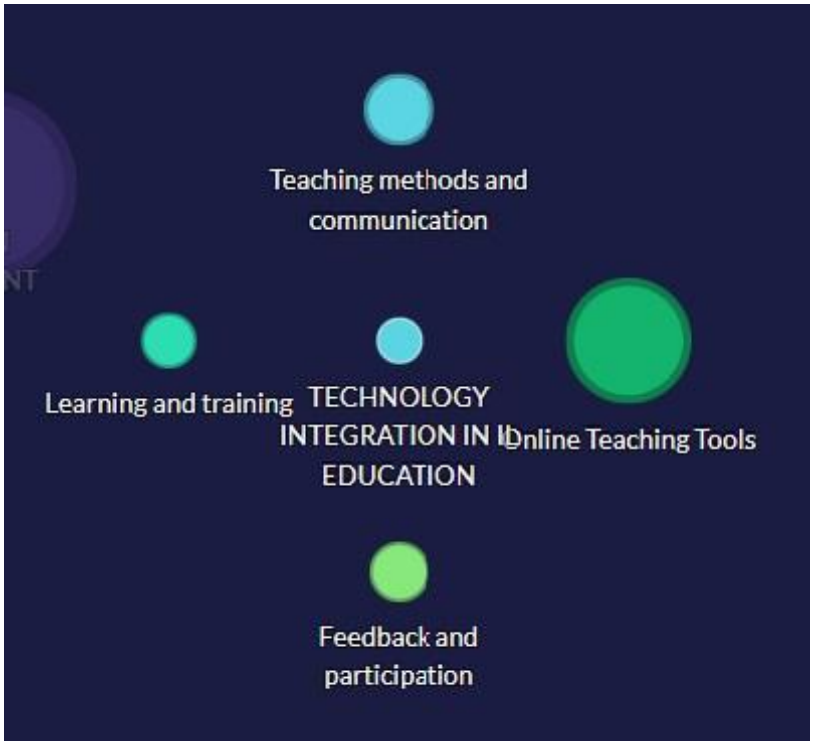


Figure Q3: Key Aspects of Technology Integration in IL Education: Teaching Methods, Online Tools, and Engagement

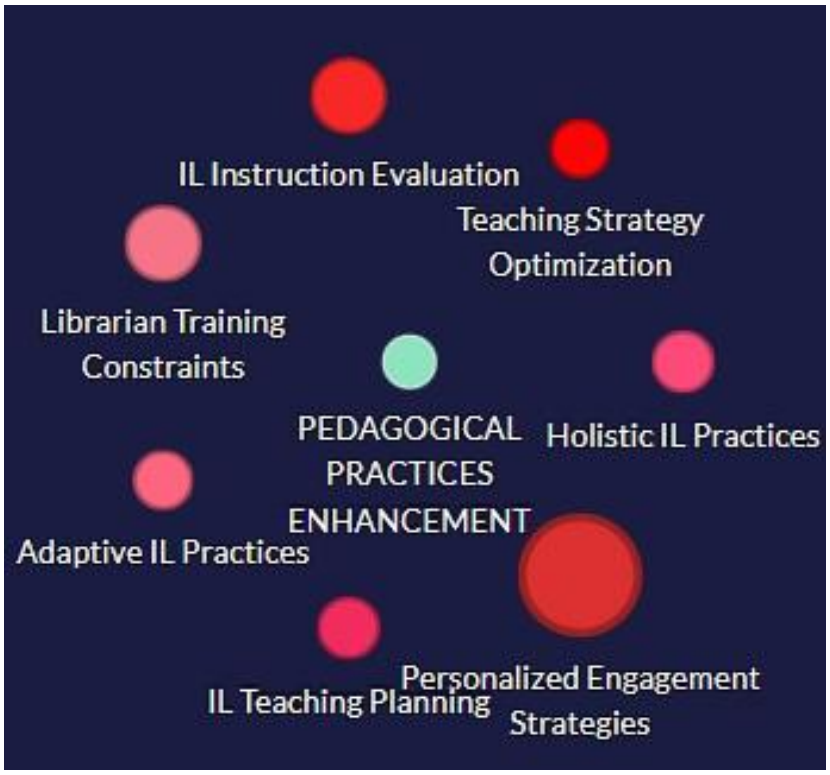


Figure Q4: Enhancing Pedagogical Practices in IL: Evaluation, Strategy Optimization, and Adaptive Teaching Approaches

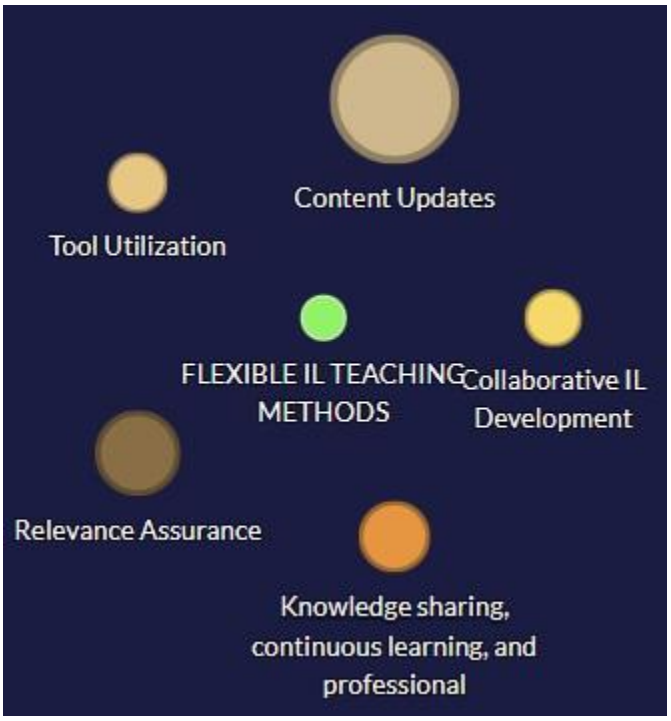


Figure Q5: Flexible IL Teaching Methods: Content Updates, Collaboration, and Knowledge Sharing for Continuous Learning

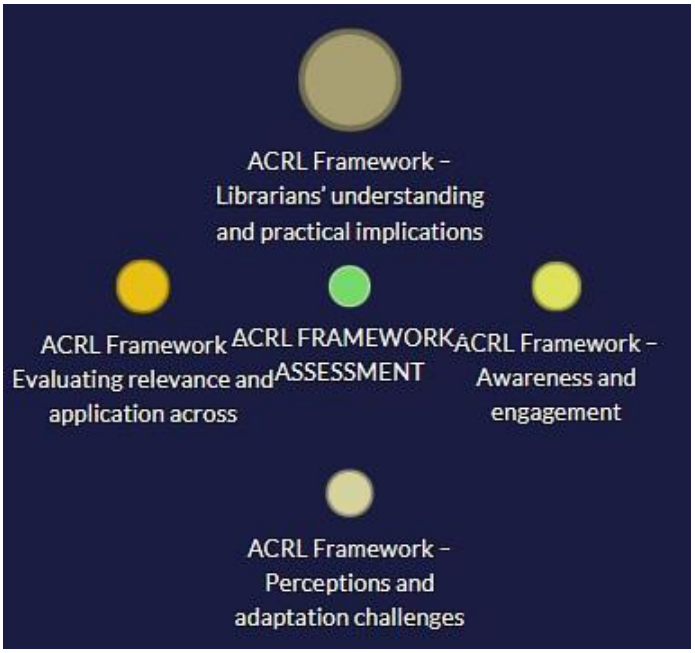


Figure Q6: ACRL Framework Assessment: Understanding, Relevance, Engagement, and Adaptation Challenges