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Lesson Learnt and Prospects of Media and Information Literacy Education in Universities: An Integrative Review

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Abstract

MIL (Media and Information Literacy) is a stand-alone course integrated by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 2011, which directly relates to an individual's daily communication and lifelong learning abilities. Nonetheless, promoting the MIL curriculum in universities worldwide is difficult since specific countries like the United States and the United Kingdom, have their frameworks, standards and models for teaching and evaluating IL or MIL. After analyzing 91 relevant articles, the researchers found that universities still need to accept the MIL curriculum worldwide. In terms of curriculum frameworks, most of the existing studies adopted the Association of College and Research Libraries (ACRL) IL curriculum framework proposed by the American Library Association (ALA). In comparison, the MIL education framework proposed by UNESCO has been not adopted fully. It will take time to synthesize ML and IL into a stand-alone course due to resistance to pedagogical reforms, overloading students, limited classroom, and faculty training gap. The promotion of student-centeredness, educational equity, gender equality, decolonization, anti-racism, rethinking Eurocentrism, white centrism and bridging the digital divide will become a universal value in the MIL curriculum in universities MIL modules will be integrated into the core curriculum of different disciplines in a flexible manner. The involvement of academic library staff in the MIL education process will become more widespread. As educational technology (EdTech) and communication technologies become widely integrated into MIL education, encouraging students' participation in the design and process of the MIL course will be more prevalent.

Keywords: media and information literacy, lessons learnt, prospects, education, higher education.

1. Introduction

In mediatized societies (Krotz, 2007), every citizen needs to access, understand, critically evaluate, use and create information efficiently. As a stand-alone course integrated by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 2011, MIL directly relates to an individual's daily communication and lifelong learning abilities (UNESCO, 2011). However, promoting the MIL curriculum in universities worldwide is difficult since countries like the United States, the United Kingdom, Australia, Canada, New Zealand, and Singapore have their frameworks, standards and models for teaching and evaluating IL or MIL. Such as the Association of College and Research Libraries (ACRL), The Society of College, National and University Libraries (SCONUL), the Australian and New Zealand University Information Literacy Joint Working Group (ANZIIL), and the Ministry of Communication and Information (MCI) in

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Singapore have developed their independent IL or MIL framework. In contrast, small countries such as Indonesia, Malaysia, the Philippines, Portugal, Romania, and Spain have been more active in developing and implementing the MIL framework by UNESCO (Association TEAM4Excellence, 2019; Costa et al., 2018; Rojas-Estrada et al., 2022; Supriyanti et al., 2020; Tibaldo et al., 2021).

Since MIL education is grounded in the particular context of politics, economics, culture, and history, each country and each university have the right to choose the type of education according to the specific demands of different disciplinary courses (Breakstone et al., 2022; Kim et al., 2023; Mateus et al., 2022; Rahimi, 2024; Schmoll, 2021). In the selected articles utilized for this study, ML, IL, MIL, digital literacy, data literacy, and visual literacy are common terminologies. For instance, some universities emphasize more on civic engagement, anti-racism, and press freedom, while other universities focus on professional development, lifelong learning, bridging the digital divide, and fighting stereotypes (Aldulaijan, 2022; Romero-Walker, 2021; Romero-Walker, 2023; Vukić, 2020). However, pedagogical philosophy and approaches regarding ML and IL can be transferred to MIL education. IL educators are familiar with student-centeredness, constructivist learning, collaborative approaches, blended learning approaches (UNESCO, 2019), scaffolding learning strategies, interdisciplinary learning, and personalized learning, which are applied in selected articles in this study (Maybee et al., 2022; Thompson, Beene, 2020).

This study framed 91 relevant articles in an attempt to answer two questions:

(1) What are the lessons learnt in MIL education?

(2) What are the prospects of MIL education?

The researchers' analysis found that scholars have many worthwhile experiences exploring ML/IL/MIL education. Firstly, IL courses for undergraduates work best when offered in the first semester after entering university to help them make the transition from high school to university (Roth et al., 2023). From the practice of one university in Australia, the provision of a self-paced interactive online module is more appropriate if it is offered to final-year undergraduates and the focus of learning is on how to use the database (Chan et al., 2020). Secondly, integrating new educational technologies and media platforms into the IL education process, embedding IL modules into different courses flexibly, advocating the integration of library staff into teaching and research sessions as a hub and pivot, and integrating emerging media content and issues and students' personal experiences into classroom activities are effective in improving students' engagement and learning effect (Saparuddin, 2021).

In the future, universities should enhance relevant faculty's ability to teach MIL. It is crucial to encourage library staff, art teachers, science teachers, MIL teachers, and journalism and communication teachers to collaborate to provide overall instructional guidance (Mercado-Sierra, Northam, 2023). This collaborative approach will not only enrich MIL course modules that meet different needs but also ensure the selection of appropriate teaching materials and a thorough arrangement of creative teaching activities (Mery et al., 2022). Strengthening course iterations will provide university students with a better experience in MIL courses (Chan et al., 2020).

2. Materials and methods

This study followed a four-stage process to select appropriate materials and ensure their coverage and validity.

The first process was the identification process. A meticulous literature search was conducted on February 9, 2024. The first stage involved the selection of terms related to MIL education in universities to create search strings in Scopus and ERIC databases. The pilot search revealed a long-standing practice of teaching ML and IL as two courses, with limited studies on MIL education. To address this, the researchers employed multiple search strategies. The search strings on Scopus and ERIC were crafted as follows: "Media literacy" OR "Information literacy" AND "Teaching modules"; "Media literacy" OR "Information literacy" AND "Learning modules"; "Media and Information literacy" AND "Higher education"; "Media literacy" OR "Information literacy" AND "Higher education". These search strings were designed to capture a wide range of literature on MIL education in universities, limiting the English language.

Even without a set timeframe, the total number of research articles, case reports, chapters, and conference materials that could be downloaded as full texts on Scopus was only 47. After searching the ERIC database with the exact string and a time period between 2020 and 2024, 171 full texts written in English could be downloaded. In the first phase, 218 studies were identified as the analytical framework.

The second step was the screening process. After comparing the titles of 218 studies, four replicated studies were excluded. After the researchers reviewed the titles for relevance, 64 studies were excluded. After reading the abstracts of the remaining studies, 59 studies were excluded. In this stage, a total of 127 studies were excluded and 91 studies were screened.

The third phase was the eligibility identification process. In the close reading of the full texts of 91 studies, 11 were excluded as they focused on topics unrelated to ML/IL/MIL education in universities, such as ML in primary schools or IL in corporate settings. Based on this, only 80 studies met the stringent requirements of this study.

The fourth process was the inclusion process. After further reading the full text and references of the 80 studies, the researchers found some high-quality and relevant studies. In order to ensure the coverage of the studies, the researchers used Google Scholar and ResearchGate to select 11 additional articles which were closely related to this study. In this stage, 91 studies were available for review (See Figure 1). It is crucial to emphasize that two articles were included in the review because they were significant, even though their studies were about MIL education for secondary school students and children (Costa et al., 2022; Supriyanti et al., 2020).

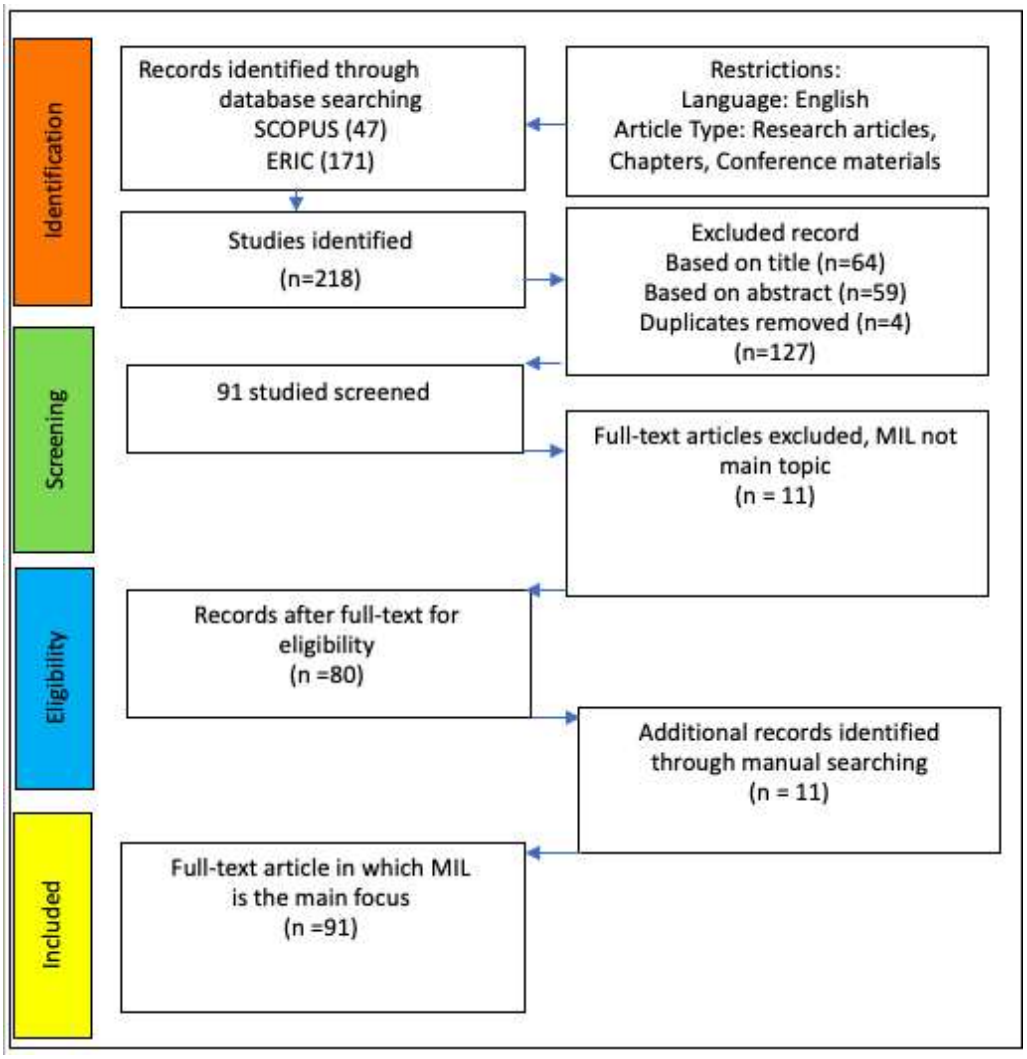

Fig. 1. Flow chart depicting records identified, excluded, and included

3. Discussion

One particular observation is that the essence of ML education lies in addressing deep-rooted problems faced by different countries. Understanding the nuances of MIL education is crucial due to the variations in national political systems, levels of economic development, cultural traditions, and history. Nicholson and Seale (Nicholson, Seale, 2022) have found that IL educators should consider more on sociopolitical contexts and values connected to teaching than instructional

strategies and classroom management techniques. They highlight that IL curricula could be redesigned by integrating activities that prompt students to reflect on their prejudices and biases. Additionally, they find there is a significant relationship between digital media literacy skills (DMLS) and students' ability to identify information disorder online (IDO)

Each country has its unique characteristics and taboos regarding MIL education. For instance, in some countries, discussing political figures, democracy, race, religion, royalty, transgender, and other topics in class is prohibited, and critical thinking is not encouraged (UNESCO, 2019). However, despite these differences, some values conveyed in MIL education are universal, such as decolonization, promoting gender equality, being cautious of Euro-centrism and White-centrism, resisting the male gaze and stereotypes in media content, bridging the digital divide, and advocating for more inclusive, equitable, and humanistic values (Marsh, 2022; Nisha, Rekha, 2021; Rahimi, 2024; Romero-Walker, 2023).

In their collaborative autoethnographic research methodology, Flynn et al. (Flynn et al., 2021) underscored the significance of considering learners' class and social capital in delivering IL education. This perspective is highly relevant to delivering MIL education as the primary factors contributing to inter-individual differences in IL are the family's economic, social class, and educational backgrounds.

The digital divide is particularly evident in ML/IL/MIL education. Tibaldo (Tibaldo, 2021) has found that while most Western countries have fully developed media education programs, Asian societies have yet to develop and mature. This study found that the United States, the United Kingdom, Germany, and Canada are countries with a more extended history of ML education, with relatively rich curriculum frameworks, educational resources, and pedagogical methods. After the field experiment of conducting an educative intervention on respondents' ability to identify misinformation, Sumitra (Sumitra, 2021) has found that the role of ML in changing people's political attitudes is negligible because strong partisans engage in strategic ignorance and push away information that contradicts their beliefs. Based on this, Sumitra has emphasized the importance of addressing misinformation in developing countries.

A particular observation is that EdTech brings creativity and accessibility to MIL education. EdTech has revolutionized ML/IL/MIL education, offering students the opportunity for self-paced, asynchronous, and personalized learning. It has also facilitated the sharing of resources, fostered teacher-student collaboration, enabled content creation, and provided a reliable means for accurate assessment of teaching and learning outcomes (Detterbeck, Sciangula, 2017).

Among the selected articles, 16 highlighted the effectiveness of EdTech in enabling students to learn asynchronously, interact with lecturers and peers, and contribute to curriculum content. In the context of IL education in UK universities, Web 2.0 tools have proven to be valuable in supporting IL pedagogy despite a few librarians expressing reservations (Shire, McKinney, 2021).

E-learning platforms like Moodle, Blackboard, SoftChalk, PebblePad, and Canvas are popular in ML/ IL/ MIL education (Aleman, Porter, 2016). For instance, the Canvas Learning Management System (LMS) is a pragmatic approach to extend IL learning beyond the "one-shot" and facilitate the embedding of IL modules that may contribute to student success (Idleman, 2022).In addition, several teaching aids such as Camtasia, Wikipedia, Google Forms, PowerPoint, Articulate 360, Kaggle, Gephi, Tableau, Panopto, PowerPoint, geo-caches, and OER Commons hub have also been used in ML/IL/ MIL education by scholars effectively (Jacobson, 2020; Mery et al.; Wernings, 2020).

EdTech has made it possible to integrate animated GIFs, infographics, vignettes, digital games, playable data, movies, and Apps into MIL teaching and learning productively (Aleman, Porter, 2016; Kertcher, Turin, 2022; Knaus, 2022; McKenzie, 2022). Instructing students in the use of online databases has also become an essential part of IL education due to the involvement of librarians, LibWizard, Library LibGuide, GitHub, OSF (Open Science Framework), EBSCOhost, and CINAHL (database for nursing) are promoted by scholars (Chan et al., 2020; Mery et al., 2022).

In order to promote student engagement, knowledge-sharing media and social media platforms such as Wikipedia, Jitterbug, Instagram, Twitter, YouTube and Facebook were used in the ML/ IL/ MIL teaching and learning process, students' various abilities of reflecting, evaluating, and producing media information were enhanced (Aldulaijan, 2022; Mery et al., 2022). The teaching module that focused on TikTok and Instagram influencers is an effective way to teach ML (Bozdağ, 2022). After Bozdağ's research in a secondary school in Bremen, he found that based on definition, ML education should not be about the transfer of knowledge about the media;

instead, it should focus on a critical dialogue around the media in order to help students develop criticality and inclusivity in their engagement with the media environments.

EdTech can improve the creative ability of students in ML and composition courses. In a pedagogical experiment, arts-based pedagogy has been recognized as a practical attempt, such as during COVID-19, to facilitate students' maintenance of mental health by promoting hand-drawing and sharing their creative works (Luetkemeyer et al., 2021).

In conclusion, the bold use of EdTech can enrich the teaching and learning resources of ML/IL/MIL materials and make the teaching and learning formats more flexible. It can also cater to students' learning online and offline, formally and informally, synchronously or asynchronously, close and long-distance learning, and even the learning of students with disabilities (Aleman, Porter, 2016).

Another suggestion is that ML/IL/MIL is more effective when embedded into the core curriculum of other disciplines, taking into account students' professional development needs. As emphasized by ACRL framework and UNESCO, integrating and embedding IL/MIL courses into other discipline's core curricula is the appropriate path to teach IL/MIL. Interdisciplinary and integrative learning is accepted by scholars who believe that a team of teachers in art, library and information science, technical education, academic librarianship, ML, rhetoric and composition to develop a MIL curriculum and integrate MIL teaching can make the program more intuitive, creative, professional, and efficient (Luetkemeyer et al., 2021).

IL module is a partner in teaching the core curriculum (Russo, 2017). For instance, embedding librarians and IL modules into online English composition courses and technology social work courses can help students process their discomfort in their first year of university. Activities and discussions should incorporate debate and other collaborative learning techniques in teaching (Luetkemeyer et al., 2020; Mercado-Sierra, Northam, 2023). At the level of teaching organization, some use the librarian and lecturer cooperation system, some use the group cooperation method, and some use the project-based teaching method (Dommermuth, Roberts, 2022). In short, the situational and cooperative teaching method is more conducive to improving students' IL.

In the selected studies, 11 have shown that integrating ML/IL modules into disciplines such as engineering, business, health sciences, political science, economic education, nursing, online English composition, technology social work, political science, biology, geography, chemistry, and language & communication had overwhelmingly positive pedagogical results, further highlighting the potential of this approach (Buljung, 2022; Chan et al., 2020; Devine et al., 2019; Lamont et al., 2020; Reecia, 2022). This should instil confidence in policymakers about the effectiveness of this strategy (Mercado-Sierra, Northam, 2023).

Research has shown that university students are more motivated and engaged in learning when they have access to flexible, portable, and reusable IL course modules that are aligned with their professional needs. This underscores the potential benefits of integrating ML/IL/MIL into educational curricula, as it enhances learning outcomes and aligns with students' professional aspirations, thereby increasing their motivation and engagement in learning (Idleman, 2022).

However, some scholars have also found that holding one-shot IL literacy lectures or research workshops within the context of a faculty-led course rather than IL as a credit-bearing course can lead to an inability to make connections between faculty and students, which can leave faculty and students feeling ineffective, exhausted, redundant, and demoralized (Dommermuth, Roberts, 2022; Kim et al., 2023).

Another suggestion is that there is a long way to go to popularize UNESCO's MIL curriculum framework. As the content of MIL education is too generalized, it is vital to select teaching and learning content relevant to the particular language, culture, and speciality.

Compared with the IL curriculum framework provided by ACRL, although UNESCO provides more comprehensive MIL teaching guidelines and teaching methods, the MIL educators must reconceptualize and reorganize their teaching content according to the MIL curriculum framework and teaching methods provided by UNESCO in order to teach MIL in different languages, cultures and specialities. What is more, MIL educators should take into account updating the curriculum, focusing on the more relevant and recent conceptualizations about MIL in this fast-changing and overwhelming media environment (Garcia, 2022).

UNESCO should exert the calling power of international organizations to strengthen the MIL education exchanges between the global regions and countries, organize the MIL Education and

Teaching Competition and set up the MIL Reform Fund to promote the impetus of MIL education reform worldwide.

Another suggestion is to improve the availability of the MIL pedagogical framework and pedagogical models. Simply referring to the teaching guidelines, online resources, and tools provided by individual organizations does not allow the IL/MIL curriculum to be applied directly to a specific university (Reecia, 2022; Robertson, 2022). Based on an analysis of the academic situation, universities must set up MIL as a course independently or flexibly embed MIL teaching modules into other core courses through their talent development programs and course structures (James, 2020). In order to ensure smooth teaching and learning, organizations such as UNESCO can solicit replicable examples of MIL teaching and provide lightweight modules with a clear flow rather than limiting themselves to providing brief principles, guidelines and toolkits.

One particular suggestion is that MIL educators should focus more on developing students' critical thinking skills. Although ML/IL/MIL education conveys modern concepts such as freedom, equality, justice and the rule of law, based on the current status quo in terms of the massive dissemination of mis/disinformation and mal-information in social media (Isam, 2022), MIL education should pay more attention to fostering the ability of students to comprehend the information critically and to be able to reasonably respond to it based on distinguishing and combating mis/disinformation (Wright, 2023). In addition, based on the proliferation of polarized thinking on the Internet, cultivating students' rational participation in public discussion and modern civic awareness is also a proper part of MIL (Breakstone et al., 2022; Fix, Fyn, 2020).

Another observation is that relevant companies should lower the threshold and cost of using educational technologies. While educational technology has facilitated MIL education, it has yet to enable the free availability and sharing of resources for some countries. The cost of building laboratories of MIL and using educational tools and databases remains high for developing and less developed countries. Artificial intelligence, big data, intelligent teaching software, and hardware will be essential elements in the future of MIL education (Garcia, 2022). However, MIL laboratories and high-quality software and hardware cost a lot of money, which is unaffordable for some countries and universities. Therefore, if the relevant companies provide some relatively favourable support for MIL education in less developed countries, it will undoubtedly be beneficial to bridging the digital divide (Eze, Aduba, 2022; Nisha, Rekha, 2021).

Another suggestion is that stakeholders should provide support for MIL education. Firstly, universities should encourage the breaking down of disciplinary barriers and advocate the formation of multi-disciplinary teachers to form MIL teaching and guidance teams to provide students with theoretical, technical and artistic support. Secondly, more practical micro-credentials should be used to recognize the results of MIL teaching so that students can obtain credits and certificates through MIL learning and motivate their participation (Chan et al., 2020). Thirdly, the training and capacity-building seminars for MIL teachers should be strengthened so that they have the critical ability to teach media knowledge, adequate ICT skills, and the use of educational technology tools (Garcia, 2022).

Potential solutions to address the challenges of IL embedding include offering IL as a credit course and embedding a research librarian to integrate IL courses into other curricula (Sohail, Haroon, 2022). This approach allows the librarian to consult with the faculty about the students' IL needs and expectations, teaching the students the details of the research process. As intermediaries between faculty and students, librarians can use appropriate methods to teach and measure the acquisition of students' IL skills, offering a hopeful and practical solution to the integration dilemma (Devine et al., 2019). In addition, the involvement of the media industry is also very important for MIL education (Hafeez, Nauman, 2020).

4. Results

The researchers analyzed the included studies using an Excel spreadsheet. They created ten categories: title, author, publication time, country, research methodology, research framework, research focus, education philosophy, education experiences, and main findings. The following results and findings are drawn from synthesizing these categories.

MIL has yet to be accepted as a universal curriculum. UNESCO suggested in 2011 that MIL curricula combine the fields of ML and IL to present a holistic approach to literacy that is essential for life and work today (UNESCO, 2011). However, in the current studies, MIL has not yet been accepted worldwide as a stand-alone university course.

Of the selected articles, 46 focused on IL education studies, 13 were on ML education studies, and only five were on MIL education studies (See Chart 1). The remaining studies were about teaching other courses and embedded ML, IL or MIL knowledge. Some studies added the prefix ML, IL or MIL with critical, digital, social, international, and inclusive, but MIL is not currently a commonly accepted curriculum (Behailu, 2021; Hicks et al., 2021). Nonetheless, from another perspective, the education experience accumulated in ML, IL, digital literacy, data literacy, and visual literacy can also be applied to MIL education.

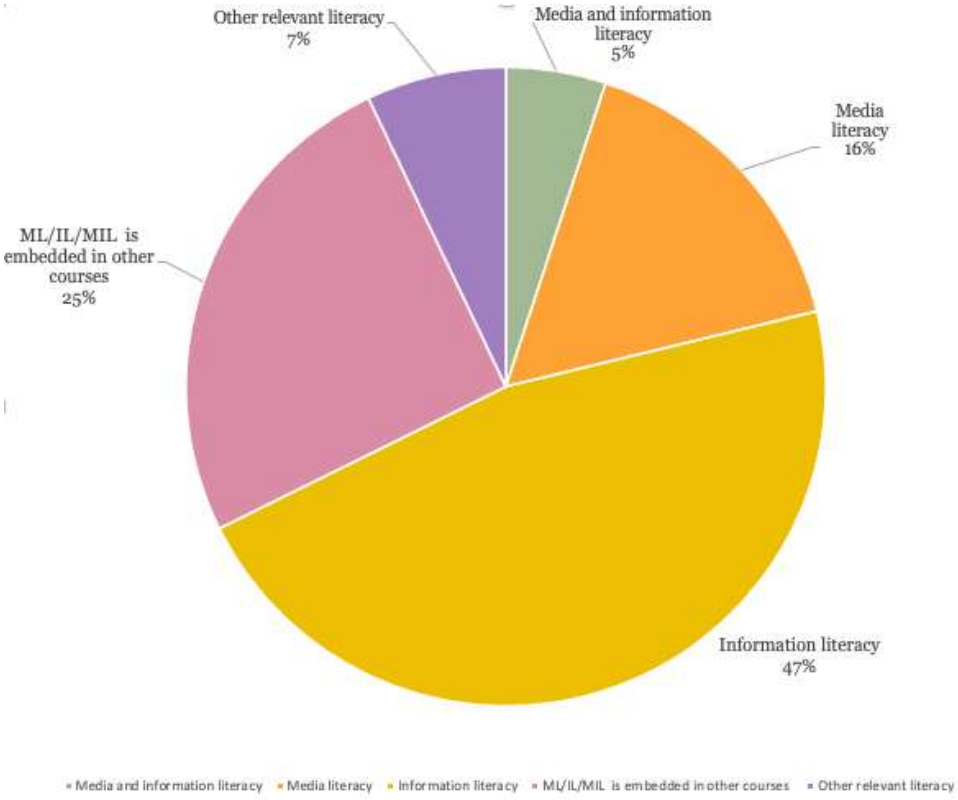

Fig.2. The distribution of research focuses of selected studies

Although UNESCO introduced the curriculum framework and resources for MIL from 2011 to 2021, only a few countries, including Indonesia, the Philippines, Portugal, Romania, and Spain, have taught MIL as a stand-alone course according to the curriculum framework provided by UNESCO in this study (Garcia, 2022; Nicoleta, 2019; Rojas-Estrada, 2023; Supriyanti et al., 2020; Tibaldo, 2021).

Of the 91 studies included, researchers from the United States were overwhelmingly outnumbered, with a relatively small number from 29 other countries (See Table 1). Since 44 of the 91 selected studies were written by American scholars, the IL curriculum framework they commonly used was the Association of College & Research Librarians (ACRL) by the American Library Association (ALA). Recently, the ACRL framework is also used by some scholars from Australia, Canada, China, New Zealand and UK (Chan et al., 2020; Denise, 2023; Feekery, 2021; Flynn et al., 2023; Zhou et al., 2023). Regarding IL education, Germany has its curriculum framework, the Digital Competence of Educators (DigCompEdu); the United Kingdom scholars use diverse frameworks to teach IL and digital literacy curriculum, for example, 6C (capitalism, citizenship, colonialism, conflict, and conscientious consumerism) framework and JISC (Joint Information Systems Committee) (Schmoll, 2021). Meanwhile, 59 % of the scholars have not articulated a specific curriculum framework in selected studies.

At the macro level, the main reasons for this phenomenon are the differences in national systems, cultural traditions, religions, and laws, etc. At the micro level, the main reasons for these are public administration policies, the resistance to pedagogical reform, the over-generalization of the content of MIL education, the heavy workload of students, limited classroom hours and

training gaps in faculty (Basili et al., 2022; Kim et al, 2023; Rojas-Estrada et al., 2023; Shire, McKinney, 2021).

Table 1. The country and region distribution of the first author in this study

Country/Region	Number	Country/Region	Number
Australia	1	Moroccan	1
Canada	3	Mexico	2
China	1	Nigeria	2
Colombia	1	New Zealand	1
Croatian	1	Peru	1
Ethiopia	1	Pakistan	2
Germany	5	Portugal	2
Holland	1	USA	50
Isreal	1	UK	7
Ireland	1	Ukraine	1
Iran	2	South Africa	1
Indonisia	3	Saudi Arabia	1
India	1	Spain	1
Italy	1	the Philippines	2
Japan	1	Taiwan	1
total	study	99	
	Country/ Region	30	

One particular observation is that the diversity of ML/IL/MIL curriculum frameworks and teaching methods has led to a diversity of teaching standards.MIL education must consider the specific educational context and level in different universities. The MIL education policy, the existing curriculum, the needs of the students, and the educational goals of the institution are all factors in deciding whether or not to choose the MIL course (UNESCO, 2013). Given the variations in social systems, economic development, demographic composition, and educational levels, MIL education is naturally diverse across different countries and regions (Mohsen, 2022).

Regarding curriculum frameworks, the ACRL Framework for IL (1. Authority Is Constructed and Contextual; 2. Information Creation as a Process; 3. Information Has Value; 4. Research as Inquiry; 5. Scholarship as Conversation; 6. Searching as Strategic Exploration) is most widely used for simplicity, clarity, operationalization and replicability. Concurrently, the IFLA (International Federation of Library Associations and Institutions) IL standards, the ISTE (International Society for Technology in Education) digital literacy standards, the UNESCO MIL curriculum framework, the ANZIIL framework, the SCONUL framework, the DIGCOMP Project (proposed by European Commission) are used by selected countries. Implementing these standards and frameworks contributes to teaching content, pedagogical approaches, and successful experience for MIL education.

Another observation is thatAsian countries embrace the UNESCO MIL framework more proactively. For instance, MIL education in Malaysia is guided by UNESCO's framework, which addresses realities facing the country, including online gaming, cyberbully, cybercrimes, digital reputation, false information, know the law, computer security, online shopping, self-regulation (MCMC, 2022). As the UNESCO MIL framework has a wide range of content, and the limited classroom time, each country and each university can only choose suitable teaching content and model to increase students' engagement and teaching effectiveness.

The researchers found that mature testing models such as The Big 6 (Eisenberg, Berkowitz, 1987), CRAAP (Kapoun, 1998), The 5W (Schrock, 2001), RADAR (Mandalios, 2013), SMELL (McManus, 2013) and SIFT (Caulfield, 2019) are widely used in MIL teaching sessions, which makes the teaching activities more operational (Elmwood, 2020).

The Big 6 model was proposed by Mike Eisenberg and Bob Berkowitzto teach inquiry, information and technology skills. The model includes six steps: 1) task definition, 2) information-seeking strategies, 3) location and access sources, 4) use of information, 5) synthesis, and 6) evaluation. Scholars have widely adopted this model as it can be better integrated into MIL classroom teaching and learning activities (Stix, Jolls, 2022).

Models for evaluating online information sources are crucial for MIL education. The CRAAP model includes five dimensions: 1) Currency, 2) Relevance, 3) Authority, 4) Accuracy, and 5) Purpose. While CRAAP as a test checklist can help students assess the authority and accuracy of the information, the ambiguity and limitations of a yes-or-no-based checklist setting may prevent students from making in-depth qualitative assessments of information (Elmwood, 2020). The 5W model is a simple journalistic method used to evaluate a website by analyzing who, what, when, where, and why, including 14 questions. The RADAR model includes five steps: 1) Rationale, 2) Authority, 3) Date, 4) Accuracy, and 5) Relevance. The SMELL model covers five dimensions: 1) Source, 2) Motive, 3) Evidence, 4) Logic, and 5) Left out. The SIFT model includes four steps: 1) Stop; 2) Investigate the source; 3) Find better coverage; 4) Trace claims, quotes and media to the original context. The above models have similarities and differences and are well-adapted and operable when applied to ML/IL/MIL education.

The above models have similarities and differences and are well-adapted and operable when applied to MIL education. However, implementing these models requires good understanding, critical thinking skills, and scientific literacy on the part of both teachers and students.

Regarding pedagogical frameworks, as UNESCO (UNESCO, 2011) suggested, constructivist learning, transformative learning, collaborative approach, integrative approach, humanistic approach to learning, and personalized/customized learning all emerged in the selected articles.

Grace Liu (Liu, 2023) has researched the dimensions of students' experiences, perceptions, and motivation in an in-depth study on improving IL of business students. She found that business students all prefer learning modules which are concise to the point and engaging. For university and IL educators, 1) promoting existing resources; 2) embedding IL into the business curriculum; 3) offering stand-alone online learning modules; 4) integrating IL into students' existing research efforts; 5) organizing workshops, events and social activities; and (6) creating real-life research and learning experience are important to improving students' business IL.

The review found that pedagogical methodologies such as project-based learning, problem-based learning, task-driven learning, evidence-based practice, web-based learning, group collaboration learning, self-learning, decision-making learning, game-based teaching, and case study are used in MIL teaching and learning broadly and have proved effective in different context. The medium of instruction preferredseminars, workshops, online lectures, self-study, and face-to-face instruction are all desirable (Click et al., 2021; Morris, Mcdermott, 2022; Roth et al., 2023).

Scholars from Brigham Young University proposed the decision-based learning (DBL) method, which is noteworthy because it exposes students to an expert's thought process. In other words, the students can learn this process by making a series of connected decisions that the expert would make. Through DBL, students can experience "authority is constructed and contextual" and "searching as strategic exploration" in ARCL standards. DBL method has been proven effective in IL education for explicitly seeking to build conceptual, procedural, and conditional knowledge and provides students with "just in time, just enough" training (Dalal et al., 2022; Pixton, 2022).

As Shin'nosuke Yamaguchi et al. (Shin'nosuke Yamaguchi et al., 2019) suggested, a more effective blended lecture style and rational organization of teaching materials and quizzes could enhance the learning effects of IL course.

In the area of teaching cases, local and global events, ads, movies and fake news have been the essential source of ML/ IL/ MIL education for some scholars, enabling engaging teaching and developing students' critical thinking skills (Romero-Walker, 2022; Schmoll, 2021). Some scholars found that integrating ML/ IL/ MIL knowledge, attitude and competencies into students' everyday life contexts, allowing students to use social media to complete the course assignments, and encouraging them to question and think critically can improve student engagement in classrooms (Aldulaijan, 2022; Luetkemeyer et al., 2021; Stix, Jolls, 2022).

5. Conclusion

This integrative literature review analyzes studies on the teaching and learning of ML/IL/MIL from a global perspective by scholars from 30 countries and regions. It discovers that although UNESCO's MIL curriculum framework is more comprehensive regarding knowledge coverage, only a few countries adopt it.

In terms of teaching methods, evidence-based research, decision-based research, task-driven methods, and MIL teaching methods based on real-life scenarios were recognized by teachers and students as inspirational for future MIL education.

Although there are variations in MIL pedagogical values in different countries and regions, the values of freedom, equality, justice, the rule of law, inclusiveness, caring, and the promotion of the enhancement of critical thinking, lifelong learning, self-protection, the ability of civic participation, and the bridging of the digital divide will be the dominant concepts in MIL education (Melda, 2021).

Technology is multifaceted in helping MIL education as it requires both suitable hardware and software environments, high-quality databases related to the teaching objects' profession, convenient image, audio and video production tools, as well as rich and varied media platforms and social platforms when teachers produce teaching content production, select teaching cases, and when students complete their coursework so that they can provide MIL with up-to-date teaching scenarios.

Due to the differences in the development of education levels in different countries and the difficulty of teaching reform, the combination of ML and IL into MIL is expected to make its presence felt in universities. With the rapid development of media technology and educational technology, MIL education must improve the training of MIL teachers, strengthen the cooperation between library staff and faculty, develop and adjust teaching modules and update teaching content promptly (Garcia, 2022).

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