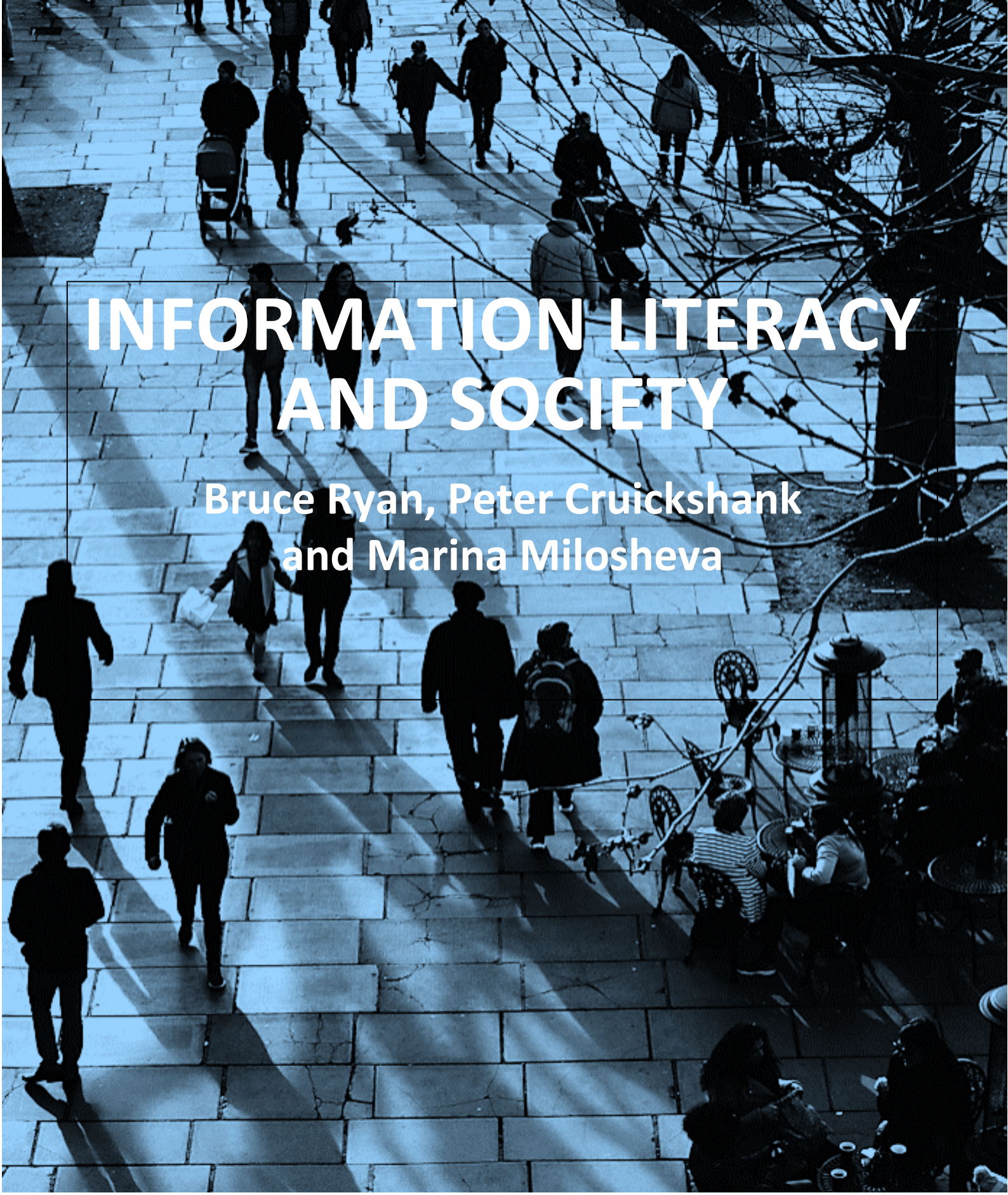

INFORMATION LITERACY AND SOCIETY

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CILIP The library and information association

INFORMATION LITERACY GROUP

Information literacy and society

A report to present findings from a review of literature on the impact of information literacy on society

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Executive summary

This report presents findings from a review of literature reporting on the impact of information literacy (IL) on society. It is intended to deliver considerations on how academic research into IL can positively affect society, building on the 2022 *Information Literacy Impact Framework* (ILIF) project report (Cruickshank et al., 2022).

The project team has:

- from a filtered set of over 4000 results, developed longlists corresponding to the five topics in the CILIP (2018) definition of IL, totalling 197 items for possible further review
- noted research themes, barriers to IL research, barriers to and enablers of shaping information-literate populations emerging from the longlists
- filtered the longlists to shortlists, totalling 35 items, for detailed review
- classified the longlists and shortlists in two dimensions: geography and method of study
- undertaken detailed analysis of the shortlist items.
- drawn conclusions on the role of information literacy in society

The core research that investigates the role of IL in society is geographically skewed towards the anglosphere and the first world. The factors causing this skew are unclear, but extra *apparent* skew may have resulted from this project's focus on English-language peer-reviewed publications. Education, particularly tertiary education, is significantly over-represented in the IL research literature. Barriers to shaping information-literate populations are raised by issues around IL teaching and structures that could support it, including government (in)action.

Other key findings are:

- IL research covers a very wide range of topics and contexts.
- IL training/education should be delivered by collaboration between librarians and teachers/lecturers, continue throughout education, and be reinforced during careers and lifetimes.
- IL research may have *indirect* impact, e.g. research into improving medical professionals' IL does not just affect these professionals but also wider society, i.e. their patients.
- There are missed opportunities for such societal impact, e.g. where medical professionals do not have IL skills and so may not give their patients the best treatment possible; if citizens do not have health information literacy their health may suffer.
- Many of the findings from the ILIF project are validated.

The next steps for the project are:

(1) Presentation of findings at an IL-facing conference
(2) Publication of findings in *Journal of Information Literacy* and/or a CILIP professional journal, including recommendations for best practice
(3) Potentially, a further project to review areas where opportunities for IL impact may have been missed, along with further refinement or validation of the ILIF framework
(4) Potentially, a further project to investigate changes following 'snapshots' of IL skills.

The authors are very grateful to the Media and Information Literacy Alliance (MILA) for commissioning this review, and to CILIP and the CILIP Information Literacy Group for funding it.

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1 Introduction

Information literacy (IL) – defined as the ability to find, understand, use, manage, and communicate information – is an essential capability for living and working in the digital age (Welsh & Wright, 2010). IL research may investigate how to enhance IL capabilities (e.g. Sanches et al., 2022), or it may simply baseline current IL skill-levels and document potential responses to low levels of IL (e.g. Fuzhi et al., 2019; Ullah & Ameen, 2019). In general, IL research may have a significant effect on members of society as it facilitates meaningful engagements with information across work, education, and leisure settings (Khan & Idris, 2019; Sundin et al., 2008).

There has been much research into IL, especially in the higher education arena (Blake et al., 2017; Brooks, 2014). However, while *media* literacy receives much attention in the form of systematic and other reviews (e.g. Jeong et al., 2012; Schofield et al., 2023), and at policy level (e.g. DCMS, 2021), IL has not received the same attention[1]. Instead, existing systematic reviews tend to focus on smaller topics/contexts such as specific populations and/or sectors (e.g. Nzomo & Fehrmann, 2020, focussing on advocacy's relations to IL frameworks). Further, IL research appears to have been overlooked at policy-level (e.g. Grizzle & Calvo, 2013). Hence there is a need for a comprehensive review of IL research as a basis for further public awareness of IL and its impact.

The report is structured as follows: accounts of the project's origin and research questions are followed by a chapter on the projects' methods. In particular, the CILIP (2018) definition of IL was used to classify IL research as covering one or more of everyday life, citizenship, primary education, secondary education, tertiary education, 'unclassified' education, workplace and health.

In the following 'findings' chapter, there are considerations of the longlists and shortlists for each 'CILIP class', followed by conclusions for each of them. (Analyses of the individual shortlist items, and their contributions to answering the research questions, are in appendix 2.)

The following 'discussion' chapter presents overall answers to the research questions, along with some other observations on IL research drawn from close-reading the shortlist items. The 'conclusions' chapter summarises this report's contribution to IL research, then notes limitations to the work. Finally, there are proposals for future work to tackle some of these limitations.

[1] Jeong et al. (2012) have attempted to disentangle the concepts of media and information literacy.

2 Project overview

2.1 Origins of this project

In 2022, the project team (Dr Bruce Ryan, Dr Peter Cruickshank, Marina Milosheva), delivered the *Information Literacy Impact Framework* (ILIF) project, reporting on how interventions to deliver IL skills in different contexts might be improved. That project was funded by Edinburgh Napier University, and undertaken in collaboration with the Media and Information Literacy Alliance (MILA).

Following this, MILA (2022) issued a call for a scoping review tackling the research questions given below. The project team delivered a bid in June 2022, and were awarded the work in July 2022.

The project team are all members of the Applied Informatics group at Edinburgh Napier University, and aspects of IL are key parts of their research interests. Ryan and Cruickshank research IL in hyperlocal government; Milosheva researches careers IL. Cruickshank has supervised and mentored aspects of Ryan's research, and is Milosheva's Director of Studies. The team were keen to make further contributions to MILA's work, seeing it as an avenue for academic research that would have tangible societal benefits.

2.2 Research questions and project structure

This project reviewed the current landscape of IL research, and the role that IL plays in different contexts. It sought to encompass all relevant literature-based IL publications since 2005. It responded to three main research questions:

(1) What is the core research that investigates the role IL plays for different user groups in society?
   (a) How comprehensive is this core research?
   (b) Which themes are absent from this core research?
   (c) Which factors prevent these themes being researched?
   (d) Which themes are over-represented?

(2) According to this core research, what are the barriers and enablers of shaping information literate populations?

(3) What research methodologies in this core research are most effective at delivering impact/societal change, and why are these methods effective?

The project was undertaken in three stages:

- database searches and consolidation of results
- generation of longlists, assessing longlist items' significance, quality and rigour.
- generation and analysis of shortlists, final reporting.

3 Obtaining publications for analysis

3.1 Database searches

To ensure a fully systematic scoping review of the potential and actual impacts of IL on society, a broad and geographically inclusive strategy was used. Peer-reviewed English-language outputs (including books and conference papers) published from 2005 onwards were considered for inclusion in the scoping review. The project then included several filtering and sense-making stages, presented in Table 1. The keywords used in the ILIF project were used again, to focus on potential and actual impacts of IL research.

Table 1: selection stages

Stage	Description
Development of keywords	Keywords were assess, benefit, effect, evaluat*, impact, indicator*, measur*, monitor*, outcome, output, result
Collection of results (N = 90,180)	Two databases were searched for results from 2005 or later: LISTA and Web of Science.
Deduplication (N = 32,380	Only unique results were retained
Focus on IL (N = 6448)	Results which did not have *information literac* in title and/or abstract were removed.
Focus on English language (N = 6035)	Results that were not in English were removed
Further deduplication (N = 4627)	Results with duplication digital object identifiers (DOIs) were removed. Results which were duplicate apart from punctuation differences were removed. Book reviews and obituaries were removed.

At this point, further filtering strategies were considered:

- An attempt to pick up 'significance, quality, rigour' (SQR) scores from the ILIF work only worked for 1095 items. It was deemed impractical to allocate SQR scores to the other items.
- It was hoped that citation counts would indicate core research but only 1943 items had these counts. A further 1684 items had DOIs, which might have been used to find citation counts. However, 996 items had neither citation count nor DOI, so this method was not pursued.
- Looking for social groups in the abstracts would have taken around 300 hours to complete.
- Only 2573 items had keywords, so the remaining items could not be allocated to social groups, contexts etc.

However, it was realised that the CILIP definition of IL (CILIP, 2018) provides classifications that could be used to examine the effects of IL research in society. These classifications are 'everyday life', 'citizenship,' 'education', 'workplace' and 'health'. Clearly, there is potential for overlap in this scheme. For example, universities are workplaces; several 'health' items concerned IL education in teaching of medicine and nursing in tertiary institutions. Despite these, titles and abstracts were then used to classify the remaining items, as shown in Table 2.

During classification, 4 more items whose titles and abstracts were not in English were removed. 466 items fell into more than one classification: detail is given in Table 3. It was also found that a significant number of items were out of scope or did not have abstracts enabling classification. Detail of this is given in Table 4. Hence there were 3492 'CILIP-classified' items, 1131 out-of-scope items and 4 more duplicates, totalling 4627 which matches the final row in Table 1.

Next, where possible, education' items were subclassified as 'primary', 'secondary' or 'tertiary'. This was not as clear-cut as might have been desired: some items either fell into more than one education subclass, or it was not clear which subclass(es) they fell into. Detail is in Table 5.

Table 2: CILIP classifications

'CILIP classification'	**Meaning**	**Number of items**
'everyday life'	different groups in society, e.g. communities or generational groups + public libraries + lifelong learning. Also used as a 'catch-all' for items that clearly covered IL but did not even hint at any social group or 'CILIP classification'	356
'citizenship'	democratic participation, empowerment, IL & human rights, civic engagement, informed citizenship	118
'education'	MOOCs, flipped classrooms, assessment tools, students' perceptions and skills, academic libraries, faculty-librarian collaborations, graduate employability	2825
'workplace'	different professions' IL skills	296
'health'	health & well-being (including lifestyle papers on e.g. diet management, pregnancy)	378
None	Items that did not fit into the above 'CILIP classifications'	1131

Table 3: further detail on CILIP classifications

Items in exactly 1 CILIP class	3026
Items in exactly 2 CILIP classes	451
Items in exactly 3 CILIP classes	15
Items in at least 1 CILIP class	3492
Items in more than 1 CILIP class	466
Items in two CILIP classifications	
'everyday life' and 'citizenship'	39
'everyday life' and 'education'	29
'everyday life' and 'workplace'	4
'everyday life' and 'health'	39
'citizenship' and 'education'	23
'citizenship' and 'workplace'	1
'education' and 'workplace'	112
'education' and 'health'	179
'workplace' and 'health'	25
Total	**451**
Items in three classifications	
'everyday life and 'citizenship' and 'education'	3
'everyday life and 'citizenship' and 'health'	1
'everyday life and 'education' and 'workplace'	1
'everyday life' and 'workplace' and 'health'	3
'education' and 'workplace' and 'health'	7
Total	**15**

Table 4: out-of-scope items

Type of 'no CILIP classification' item	Number of items
precursors to IL	32
item had no abstract	43
scientometrics/bibliometrics	48
IL standards and frameworks	57
history of IL	75
conceptual works and methodological issues	77
librarianship literature/scholarship with little to no emphasis on IL	144
Primary focus on ICT tools in education, not IL	188
Not IL	467

Table 5: education subclassifications

Education subclassifications	Meanings	Number of items
'tertiary education'	Mentions of 'higher education'; 'college'; 'community college'; 'university'; 'undergraduate'; 'post-secondary'; 'majoring'; 'postgraduate'; 'PhD students'; 'doctoral'; 'faculty'; 'academic libraries'; subjects such as law, teaching, fashion studies and nursing that are studied at tertiary institutions	1993
'secondary education'	Mentions of 'secondary education', 'high school', 'middle school' or grades 8 and above	127
'primary education'	Mentions of 'primary education', 'elementary school' and grades 7 and below	55
'level not specified' and 'more than one "education" subclassification	Mentions of 'school' that do not specify which level; 'K-12'[2]; 'student', 'freshman' or 'sophomore'[3]	650
total		**2825**

3.2 Generating longlists

The above steps still left over 3000 items. To generate a sample that could be considered for detailed review, a chronologically representative sample of up to 30 items in each classification was chosen. Firstly, items in each classification were sorted in chronological order of publication year. Next, every *n*th item was selected, where *n* is the number of items in the classification divided by 30, rounded to the nearest integer. For example, there were 356 'everyday life' items, so every 12th item was selected to be on the 'everyday life' longlist. Then, where possible, full-texts of items were obtained, leading to longlists with the numbers of items shown in Table 6. A significant number of 'tertiary education' items could not be obtained, potentially affecting the detailed findings from that classification.

[2] This term refers to the whole range of primary and secondary education, generally in the USA.

[3] These terms can apply to both high-school students and university/college students.

Table 6: numbers of items in longlists

Longlist	Full-texts obtained (long-list items)	Full-texts unobtainable
'everyday life'	22	7
'citizenship'	27	1
'primary education'	24	3
'secondary education'	29	2
'tertiary education'	19	11
'unclassified education'	24	5
'workplace'	28	1
'health'	24	5
Total	**197**	**35**

3.3 Generating shortlists

For each longlist item whose full-text was obtained, Ryan and Milosheva individually awarded 'significance', 'quality' and 'rigour' (SQR) scores as follows:

0 The paper is irrelevant and should be excluded; it does not say anything about IL, and refers to other constructs instead, e.g. information-seeking behaviour, information needs, information sources, public libraries. Examples: a conceptual paper; a paper about the predictors of IL self-efficacy; papers about the development of games, information systems or websites.

1 The abstract is impossible to read; the methodological design is weak or flawed (e.g. it has a very small dataset or sample size); it is unclear what was done or what the significance of the work is; the evidence is anecdotal at best; a new idea is being proposed but there is no convincing evidence that it works. Examples: a paper published in 2013 but is about something that happened in 2007; articles in which historical texts or philosophical works are used to make suggestions about IL; instrument and scale development papers.

2 Some claim is being made about IL (e.g. as a construct related to other constructs) and although there is nothing methodologically wrong with the research, the contribution does not have much significance. Examples: there has been an increase in pupils' something because of IL; an IL intervention has enhanced someone's IL skills; the IL of populations is assessed (i.e. do they have it or not? If not, then they need it. In papers about developing countries, the argument usually goes 'we don't have any IL skills or IL instruction so at the very least we need to introduce IL instruction. In papers about developed countries, the argument goes 'we have some IL skills but we could do better at improving them'.)

3 Robust design and clear contribution to the field. Examples: meta-analytic research; research of nation-wide effects; analyses of IL policy; something critical is being said about IL in society; national frameworks of IL; IL is the central area of study, not something else like in the 1 rating; emphasis on long-term and coordinated initiatives and not on one-shot efforts in only one institution.

Ryan and Milosheva agreed on 106 of 197 (54%) SQR scores. They differed by 1 on 71 scores (36%), by 2 on 17 scores (9%) and by 3 on 3 scores (2%). Ideally a third party would have reviewed the scores where Ryan and Milosheva disagreed.

The independent SQR scores were then summed. The numbers of items with each possible SQR score are shown in Table 7. The low percentage (16%) of high-scoring items may indicate problems with the undertaking and reporting of IL research.

Table 7: SQR scores

total SQR score	number of items	%
0	22	11%
1	29	15%
2	44	22%
3	24	12%
4	48	24%
5	22	12%
6	8	4%
Total	**197**	**100%**

Items with SQR scores of 5 or above were selected for the shortlists, except for the 'health' classification: here, no item scored more than 4, so the items scoring 4 were selected for this classification. The numbers of items in each shortlist are shown in Table 8. The shortlisted papers are considered further in sections 4.1 to 4.8, and are collated in appendix 1.

Table 8: shortlists

Shortlist	Number of items
'everyday life'	4
'citizenship'	6
'primary education'	5
'secondary education'	4
'tertiary education'	5
'unclassified education'	1
'workplace'	5
'health'	5
Total	**35**

During SQR scoring, a theme for each full-text item was noted, as were the items' geographies and research methods, any barriers to research mentioned, and barriers to and enablers of shaping information literate populations. Data on the combined longlists and shortlists is given in Table 9. Themes are reported in sections 4.1 to 4.8.

Table 9: longlist and shortlist items' geographies and methods of study

Geography	Longlist	Shortlist
Europe (including the UK)	38	11
Americas	45	8
Africa	15	2
Asia	61	10
Oceania	7	1
Global	31	3
Totals	**197**	**35**

Method of study	Longlist	Shortlist
Discussion[4]	39	8
Literature review	14	2
Mixed	30	8
Qualitative	43	6
Quantitative	71	11
Totals	**197**	**35**

29% of Europe longlist items were shortlisted, as were 20% of Americas longlist items, but only 10% of global longlist items. Similarly, 27% of 'mixed' longlist items and 23% of 'discussion' longlist items were shortlisted, but only 14% of literature review items were shortlisted. As in the ILIF project, this may have happened because authors who do not report the contexts of their research presented their work in ways that reduce their papers' SQR values. It is also possible that excellent IL work outwith the anglosphere has been excluded because the project team searched only for papers written in English.

3.4 Chapter conclusions

This review indicates that an overwhelming majority of IL research focuses on education. Within this classification, an overwhelming majority focuses on tertiary education. The 'CILIP classifications' 'everyday life', 'workplace', 'health' each account for around 10% of IL research, while 'citizenship' is the focus of only 3% of IL research. While it is clear that tertiary education can and should deliver IL skills, hopefully setting up desirable lifetime habits, there are claims that IL education needs to start sooner in life (e.g. Ullah & Ameen, 2019). This would firstly to set up desirable habits ready for tertiary education. Secondly, it would ingrain further habits developed in earlier life-stages. Thirdly, this would benefit those who do not enter tertiary education.

The SQR scoring/shortlisting stage suggests that there may be problems with the undertaking and reporting of IL research, especially for work originating outwith Europe and the UK and the Americas.

The first attempts to classify the results set failed because a significant number of items obtained from the searches did not have DOIs or keywords. Further, a noticeable number of items either had no abstract, or had abstracts that did not specific topic/problem area, methods and headline findings. Thus the project team calls for all academic publishers to insist on well-constructed abstracts, and for publications to include DOIs and keywords. With the possible exception of the items lacking helpful abstracts, DOIs or keywords, the team means no disparagement of the items that could not be placed in CILIP classifications.

[4] 'discussion' papers are those that were deemed to expound authors' experiences and positions, without clearly using literature review methods.

Two nuances arose in the classification process. *Firstly* there are overlaps between classifications. For example, some items are classified as both ‘everyday life’ and 'education’, with the implication that education is a factor of everyday life. Similarly, there is an emphasis, especially within tertiary education, on work-relevant education. For example, research on health IL may come from tertiary institutions that train healthcare professionals. *Secondly*, the ‘tertiary’ classification included items about the training of teachers. In such cases, while the direct impact is on teachers, the indirect impact on society is on their pupils.

4 Findings from individual classifications

The following sections report on the individual classifications' longlists and shortlists. In each section, some details about the longlist and shortlist are noted, followed by the shortlist's contribution to answering the research questions. Brief précises of the full-texts and their individual contributions to answering the research questions are given in Appendix 2. This appendix helps to illustrate the wide ranges of IL research and its potential impacts on society. Missed opportunities for societal impact are also noted.

4.1 Everyday life

The themes allocated to the 22 'everyday life' longlist full-texts are:

- agricultural information
- algorithms
- democracy and citizenship
- developing IL framework
- disability/visual impairment
- disinformation
- e-learning
- fact-production and dissemination
- health
- health information-gathering online
- IL and cultural heritage
- IL and libraries (two occurrences)
- information overload
- libraries, IL instruction
- lifelong learning (LLL)
- LLL and IL, public libraries
- meaning of IL
- media education
- multilingual definitions of IL
- refugees
- tourism, self-efficacy

The gross geographies and research methods of the 'everyday life' longlist items are in Table 10.

Table 10: geographies and methods in 'everyday life' longlist

Geography	Number of items
Europe	9
Americas	1
Africa	2
Asia	4
Oceania	0
global	6
Total	**22**

Method	Number of items
discussion	4
literature review	6
mixed	2
qualitative	5
quantitative	5
Total	**22**

Very little information was found during the SQR reviews on barriers to IL research. Those that were observed seem to be those that affect social research in general, namely low response or participation rates (mentioned four times; one of these instances was directly linked to sampling issues), incomplete sampling of the research populations (mentioned twice), language barriers, lack of previous research upon which to build and a need for feedback.

4.1.1 Everyday life shortlist

The items in Table 11 obtained SQR scores of 5 and 6. This table also shows information gleaned from the SQR readings.

Table 11: 'everyday life' shortlist items

item	SQR score	Theme	Geography	Method
Johnson and Jent (2007)	6	IL and libraries	Global	literature review
Head and Jackson (2011)	6	developing IL frameworks	Europe	discussion
Rahanu et al. (2015)	5	lifelong learning	Europe	discussion
Martzoukou and Burnett (2018)	5	refugees	Europe	qualitative

4.1.2 Section conclusions

Key overall themes within 'everyday life' IL research include libraries, lifelong learning and definitions/meanings of IL. Within this longlist, the largest geographical class is 'global' and the largest methodological class is 'literature review'. However, it does not follow that literature reviews are the most effective method of delivering societal change. For example, in-depth qualitative research into the factors affecting a socio-cultural group (Martzoukou & Burnett, 2018) can both 'baseline' IL skills and suggest ways to achieve positive change. A methodological limitation, seen in the paper by Martzoukou and Burnett (2018) but also found in several shortlisted papers, is provision of a snapshot of IL skills. Further review is needed to find whether subsequent changes in IL skills have been investigated. In common with other classifications, very little information was found on barriers to IL research apart from those that affect social research in general.

The geographical comprehensiveness of IL research is increasing but there is still a focus on the anglosphere/first world (Johnson & Jent, 2007, and related publications). IL research can also step into national policy arenas (Head & Jackson, 2011).

Enablers of information literate societies include national IL frameworks (Head & Jackson, 2011; Irving, 2011 - see the following section), so long as these continue to have suitable influence, e.g. by linking stakeholders and processes. Further enablers include improvements to teaching methods and programmes (Rahanu et al., 2015) and working around socio-cultural and religious barriers (Rahanu et al., 2015). Relevant government action is recommended by all four shortlisted 'everyday life' items. However, Martzoukou and Burnett (2018) note that such actions may well need to take into account the contexts of individuals or socio-cultural groups.

Barriers to information literate societies can be manifold (Rahanu et al., 2015), although such works can also describe means of overcoming such barriers, which can be seen as enablers.

4.2 Citizenship

The themes allocated to the 28 'citizenship' longlist full-texts are:

- addiction, parenting
- advocacy, IL frameworks, IL as a means of social improvement
- algorithms and IL
- citizenship, education, curriculum development
- cultural proficiency
- ethics, business, IL frameworks
- fact-checking/fake news
- fake news
- hate speech, misinformation, disinformation
- hate speech, national unity
- IL and emotion, misinformation, IL frameworks
- IL and trust in government information
- IL frameworks (4 occurrences, one including 'IL as a public good')
- IL policy, IL as a human right
- information needs, IL frameworks, critical IL
- information seeking, health information
- misinformation, bots
- misinformation, education
- misinformation, information-sharing, COVID
- plagiarism
- post-truth/fake news, IL frameworks
- social justice
- social justice, IL frameworks
- source evaluation, government information
- workplace

The gross geographies and research methods of the 'citizenship' longlist items are in Table 12.

Table 12: geographies and methods in 'citizenship' longlist

Geography	Number of items
Europe	3
Americas	11
Africa	1
Asia	4
Oceania	1
global	8
Total	**28**

Method	Number of items
discussion	13
literature review	4
mixed	1
qualitative	6
quantitative	4
Total	**28**

As with 'everyday life', very little material on barriers to research were found in the SQR reviews. The three items found were (1) limitations caused by convenience sampling, (2) the usual limitations of survey methods, (3) the limitations of the 'scoping review' method.

4.2.1 Citizenship shortlist

The items in Table 13 obtained SQR scores of 5 and 6. This table also shows information gleaned from the SQR readings.

Table 13: 'citizenship' shortlist items

Item	SQR score	Theme	Geography	Method
Leung and Lee (2012)	5	addiction, parenting	Asia	quantitative
Irving (2011)	6	IL frameworks	Europe	discussion
Haras and Brasley (2011)	5	IL frameworks, IL as a public good	Americas	discussion
Lloyd (2019)	6	algorithms and IL	global	discussion
Lee et al. (2020)	5	IL and trust in government information	Asia	quantitative
Nzomo and Fehrmann (2020)	6	advocacy, IL frameworks, IL as a means of social improvement	global	literature review

4.2.2 Section conclusions

Key overall themes within 'citizenship' IL research include IL frameworks, social justice and the fake news/post-truth/misinformation/disinformation nexus. Within this longlist, the largest geographical class is 'Americas' and the largest methodological class is 'discussion', but it does not follow that this method necessarily results societal change. In common with other classifications, very little information was found on barriers to IL research.

Concerning the comprehensiveness of IL research, shortlisted items point to the impact of digital IL in the contexts of both absorption and creation of content (Leung & Lee, 2012), of national IL frameworks (Irving, 2011) and relevant policy considerations (Haras & Brasley, 2011), human variation (Lee et al., 2020) and use of IL skills in different walks of life (Nzomo & Fehrmann, 2020).

Enablers of information literate societies include 'good' parenting (Leung & Lee, 2012), national IL frameworks (Irving, 2011) while these continue to have suitable influence, co-ordination of support for national policies (Haras & Brasley, 2011), and advocacy of examination of new issues stemming from evolving technology (Lloyd, 2019). Barriers include lack of relevant government action and polices as implied by Irving (2011) and (Lee et al., 2020), *realpolitik* (Haras & Brasley, 2011), lack of updating IL teaching to take in modern developments (Lloyd, 2019) and lack of updating teaching syllabi to meet social needs as implied by Nzomo and Fehrmann (2020).

4.3 Primary education

The themes allocated to the 24 ‘primary education’ longlist full-texts are

- computing and IL
- critical pedagogy and MIL instruction
- digital citizenship and information-seeking
- I-LEARN IL framework, project-based learning
- IL assessment (two occurrences)
- IL assessment frameworks
- IL curricula
- IL in primary school teaching
- IL in primary schools
- IL instruction and assessment, relevant software
- IL instruction using VLEs
- IL of teachers, training, IL frameworks
- information use from pictures
- inquiry-based learning, Big6 IL framework (two occurrences)
- integration of IL into teacher instruction
- literacies in the digital age
- parental support
- picture-seeking
- school librarian-teachers
- teacher-training
- web-based IL instruction, inquiry-based learning
- Wikipedia in teaching

The gross geographies and research methods of the longlist full-text items are in Table 14.

Table 14: geographies and methods in 'primary education' longlist

Geography	Number of items
Europe	6
Americas	3
Africa	2
Asia	13
Oceania	0
global	0
Total	**24**

Method	Number of items
discussion	1
literature review	0
mixed	10
qualitative	4
quantitative	9
Total	**24**

No material on barriers to research were found in the SQR reviews, apart from a single mention of the normal limitations to survey methods.

4.3.1 Primary education shortlist

The items in Table 15 obtained SQR scores of 5 and 6. This table also shows information gleaned from the SQR readings.

Table 15: 'primary education' shortlist papers

Item	SQR score	Theme	Geography	Method
Streatfield et al. (2011)	6	IL in primary schools	Europe	mixed
Kingsawat et al. (2015)	5	IL instruction using VLEs	Asia	quantitative
Baji et al. (2018)	5	IL assessment	Asia	mixed
Wade et al. (2020)	5	web-based IL instruction, nquiry-based learning	Americas	mixed
Silajdžić et al. (2022)	5	critical pedagogy and MIL instruction	Europe	qualitative

4.3.2 Section conclusions

Key overall themes within 'primary education' IL research include IL assessment and teacher-training. Within this longlist, the largest geographical class is 'Asia' and the largest methodological classes are 'mixed' and 'quantitative'. Mixed-method research that illustrates the history of IL education provision (Streatfield et al., 2011) may be effective in drawing attention to necessary actions, but it is then up to the powers-that-be to heed such lessons. In common with other classifications, very little information was found on barriers to IL research apart from those that affect social research in general.

Concerning the comprehensiveness of IL research, shortlisted items point to government (in)action (Streatfield & Markless, 2023), IT and the internet for teaching (Baji et al., 2018; Kingsawat et al., 2015; Wade et al., 2020), the importance of researching outwith the anglosphere/first world (Baji et al., 2018) and the impact of global events and the philosophical underpinnings of IL education (Silajdžić et al., 2022).

Enablers of information-literate societies would include delivering relevant facts to stimulate appropriate government action and funding (Streatfield et al., 2011), appropriate IL teaching frameworks and IT systems (Baji et al., 2018; Wade et al., 2020), and teaching of critical thinking (Silajdžić et al., 2022)

Barriers to information-literate societies can include inappropriate government action that leads to reduction in funding for school libraries and concomitant loss of librarians teaching IL skills in formative years (Streatfield et al., 2011) and other unwelcome human actions (Silajdžić et al., 2022).

4.4 Secondary education

The themes allocated to the 29 'secondary education' longlist full-texts are

- assessment of computing and information literacy
- assessment of IL (5 occurrences)
- assessment of IL knowledge and attitudes
- assessment of information sources, production of information sources
- blended e-learning for teaching programming
- blended learning
- blended learning, relevant ICT
- collaboration among school and academic librarians
- computer literacy (2 occurrences)
- computer literacy, learning communities
- computer-based scaffolding, virtual field-trips
- curricula, lack of IL skills
- game-playing and IL
- ICT as a promoter of IL
- ICT literacy scales
- IL and critical thinking
- information services' support for IL
- inquiry-based learning
- learning about green chemistry
- patterns of group-work
- public librarians role in IL
- self-efficacy and IL of teachers
- teachers' computer use in class
- teachers' IL

The most commonly featured IL assessment tool is the now-discontinued Tool for Real-Time Assessment of Information Literacy Skills (TRAILS), archived at https://trails-archive.org. Four of the papers that arrived on this longlist had no connection with IL as such, but were about computer literacy skills such as using MS Office and the internet.

The gross geographies and research methods of the longlist full-text items are in Table 16.

Table 16: geographies and methods in 'secondary education' longlist

Geography	Number of items
Europe	7
Americas	6
Africa	4
Asia	9
Oceania	1
global	2
Total	**29**

Method	Number of items
discussion	0
literature review	0
mixed	5
qualitative	9
quantitative	15
Total	**24**

No material on barriers to research were found in the SQR reviews, apart from a single mention of the normal limitations to survey methods.

4.4.1 Secondary education shortlist

The items in Table 17 obtained SQR scores of 5 and 6. This table also shows information gleaned from the SQR readings.

Table 17: 'secondary education' shortlist papers

item	SQR score	Theme	Geography	Method
Julien and Barker (2009)	5	curricula, lack of IL skills	Americas	qualitative
Korobili et al. (2011)	5	teachers' IL	Europe	quantitative
Kim et al. (2022)	5	computer-based scaffolding, virtual field-trips	Americas	mixed
Majid et al. (2016)	5	assessment of IL	Asia	quantitative

4.4.2 Section conclusions

Key overall themes within 'secondary education' IL research include IL assessment, somewhat matching 'primary education'. Within this longlist, the largest geographical classes are 'Europe' and 'Americas', while the largest methodological classes is 'quantitative'. Quantitative papers form half of the 'secondary education' shortlist. In common with other classifications, very little information was found on barriers to IL research. However, it may be that observation of implantation of potential IL enablers would contribute to delivery of desired societal change (Julien & Barker, 2009).

Concerning the comprehensiveness of IL research, shortlisted items point to government policy (Julien & Barker, 2009; Majid et al., 2016), the potential impact of literature reviews (Korobili et al., 2011), and IT considerations (Kim et al., 2022).

Enablers of information literate societies would include providing spurs to undertake IL teaching (Julien & Barker, 2009), school leaderships that support IL teaching including 'scaffolded' methods (Kim et al., 2022; Korobili et al., 2011) and taking advantage of suitable relationships within and outwith formal education (Majid et al., 2016).

Barriers to information literate societies can include inappropriate teaching and examination policies and methods (Julien & Barker, 2009; Korobili et al., 2011), and 'contrary' human characteristics (Kim et al., 2022).

4.5 Tertiary education

The themes allocated to the 19 'tertiary education' longlist full-texts are

- Online assessment
- academic libraries and IL initiatives
- IL for oral health students
- electronic resources for universities
- IL assessment
- IL assessment for medical students
- Engineering teaching
- online health information seeking
- IL pedagogy
- web-based collaborative learning
- IL assessment frameworks
- information portals
- academic librarians IL practices
- integration of IL courses into general teaching
- cognitive development and IL
- learning IL
- primary source' literacy
- librarians as IL teachers
- teaching IL

The gross geographies and research methods of the longlist full-text items are in Table 18.

Table 18: geographies and methods in 'tertiary education' longlist

Geography	Number of items
Europe	4
Americas	4
Africa	2
Asia	5
Oceania	2
global	2
Total	**19**

Method	Number of items
discussion	5
literature review	1
mixed	2
qualitative	4
quantitative	7
Total	**19**

There was no material on barriers to research apart from a note in a longlist paper that research on Chinese internet use was afflicted by China's banning of certain websites, so that research that is limited to unbanned sites may not give a full picture (Zhang et al., 2021).

4.5.1 Tertiary education shortlist

The items in Table 19 obtained SQR scores of 5 and 6. This table also shows information gleaned from the SQR readings.

Table 19: 'tertiary education' shortlist papers

Item	SQR score	Theme	Geography	Method
Iton (2006)	5	academic libraries and IL initiatives	Americas	discussion
Sanches et al. (2022)	5	IL pedagogy	Europe	qualitative
Baro and Zuokemefa (2011)	6	academic librarians IL practices	Africa	quantitative
Maitaouthongn et al.(2011)	5	integration of IL courses into teaching	Asia	mixed
Bangani et al. (2020)	5	librarians as IL teachers	Africa	quantitative

4.5.2 Section conclusions

This section also covers conclusions from the 'unclassified education' shortlist.

Key overall themes within 'tertiary education' IL research include IL assessment, matching other 'education' longlists. Within this longlist, the largest geographical class is 'Asia', while the largest methodological class is 'quantitative'. A barrier to research seen in a longlist paper (Zhang et al., 2021) was government banning of certain websites hampering gathering of a full picture of internet use. Gathering data from gatekeepers rather than students (Sanches et al., 2022) might be a methodological barrier to societal impact.

Concerning the comprehensiveness of IL research, shortlisted items mention human-centric tropes (Iton, 2006) and critical thinking (Sanches et al., 2022). They consider librarians' views on teaching methods (Tumbleson & Burke, 2010), step outwith the anglosphere/first world (Bangani et al., 2020; Baro & Zuokemefa, 2011; Maitaouthongn et al., 2011), and move beyond gatekeeprs to the actual recipients of IL education (Bangani et al., 2020).

Enablers of information literate societies include supportive university leadership and positive actions by university librarians and their colleagues (Bangani et al., 2020; Iton, 2006; Maitaouthongn et al., 2011), education around critical thinking (Sanches et al., 2022), provision of suitable resources and staffing for IL teaching (Baro & Zuokemefa, 2011) and collaboration between librarians and their teaching colleagues (Baro & Zuokemefa, 2011; Tumbleson & Burke, 2010).

Barriers to information literate societies include not teaching the full range of IL skills and not using IL models, lack of resources, university support and collaboration (Baro & Zuokemefa, 2011).

4.6 'unclassified' education

The themes allocated to the 24 'unclassified education' longlist full-texts are

- core IL concepts, teaching IL
- curriculum mapping
- cybersecurity risks
- digital competences
- educational technology
- effect of ICT use on IL
- evidence-based learning, IL evaluation
- ICT
- ICT and IL
- IL models
- IL of medical students
- IL self-efficacy
- IL teaching (3 occurrences)
- Images in IL
- information credibility
- learning as a social experience
- learning strategies and motivation of e-learners
- media literacy
- MOOCs for teaching IL
- multilingual learners
- teaching IL
- values and IL

Hence key areas include IL teaching and ICT.

The gross geographies and research methods of the longlist full-text items are in Table 20.

Table 20: geographies and methods in 'unclassified education' longlist

Geography	Number of items
Europe	3
Americas	10
Africa	0
Asia	3
Oceania	1
global	7
Total	**24**

Method	Number of items
discussion	11
literature review	0
mixed	2
qualitative	5
quantitative	6
Total	**24**

There was no material on barriers to research.

4.6.1 'unclassified education' shortlist

During SQR reading, 12 were found to cover tertiary education, 1 secondary education, 8 all levels. For 3 it was not possible to find which level(s) the papers covered. This again reinforces the predominance of tertiary education in IL research.

The item in Table 21 obtained an SQR score of 5. (No papers in this classification scored 6.) This table also shows information gleaned from the SQR readings.

Table 21: 'unclassified education' shortlist papers

Item	SQR score	Theme	Geography	Method
Click or tap here to enter text.Tumbleson and Burke (2010)	5	IL teaching	Americas	discussion

4.7 Workplace

The themes allocated to the 28 'workplace' longlist full-texts are

- assessing
- translators' IL
- assessing clinicians' IL
- assessing teachers' IL
- Barristers' IL
- digital financial literacy
- doctors' information-seeking
- embedding IL into university curricula
- evidence-based nursing practice and IL
- IL and KM, IL frameworks, effective information use by nurses
- IL and nurses' evidence-based practice
- IL and teaching competency
- IL assessment (teachers)
- IL assessment, relationship between LLL and IL in teachers
- IL experience and activity theory
- lecturers' IL experiences during COVID
- librarians' views on IL
- library outreach in a UK health authority
- LIS professionals' IL
- medical librarians and family physicians
- medical libraries and information-seeking
- organisational culture and IL
- proxy assessment of students' IL
- public servants' IL
- public service values though IL
- teacher-training
- teachers' IL
- teachers' IL self-efficacy

The gross geographies and research methods of the longlist full-text items are in Table 22.

Table 22: geographies and methods in 'workplace' longlist

Geography	Number of items
Europe	5
Americas	5
Africa	2
Asia	14
Oceania	0
global	2
Total	**28**

Method	Number of items
discussion	1
literature review	2
mixed	4
qualitative	7
quantitative	14
Total	**28**

Noted barriers to research were lack of time to do in-depth research into causes of phenomena; lack of generalisability from small, localised studies; lack of longitudinal studies; lack of investigation of impacts of teachers'/lecturers' IL development on students; small sample sizes; bias-creep in qualitative research.

4.7.1 Workplace shortlist

The items in Table 23 obtained SQR scores of 5 and 6. This table also shows information gleaned from the SQR readings.

Table 23: 'workplace' shortlist papers

Item	SQR score	Theme	Geography	Method
Trinder et al. (2007)	5	library outreach in a UK health authority	Europe	mixed
Dixon et al. (2017)	5	assessing clinicians' IL	Americas	mixed
Chen et al. (2023)	6	assessing teachers' IL	Asia	quantitative
O'Farrill (2010)	5	IL and KM, IL frameworks, effective information use by nurses	Europe	qualitative
Sales and Pinto (2011)	5	assessing translators' IL	Europe	mixed

4.7.2 Section conclusions

Key overall themes within 'workplace' IL research include assessing IL, teaching and lecturing, medicine. Within this longlist, the largest geographical class is 'Asia', while the largest methodological class is 'quantitative'. However, the dominant methodological class in the 'workplace' shortlist was 'mixed'. This may be because quantitative studies often 'baseline' IL skills at a certain time (e.g. Chen et al., 2023), without undertaking longitudinal studies to probe changes and the factors causing them. A qualitative method that was shown to be effective in documenting how IL development depends on human factors such as learning from colleagues is phenomenography (O'Farrill, 2010)

Barriers to IL research other than those that impact qualitative research in general include lack of investigation of teachers' and lecturers' impacts on their students (e.g. Trinder et al., 2007) and the need for better IL assessment tools (Dixon et al., 2017).

Concerning the comprehensiveness of IL research, shortlisted items cover the impact of IL and IL training in healthcare (Dixon et al., 2017; O'Farrill, 2010; Trinder et al., 2007), teachers' IL across China (Chen et al., 2023) and a profession (translation) that routinely processes information (Sales & Pinto, 2011).

Enablers of information literate societies include workplace IL training (Trinder et al., 2007), in-work training and context-specific IL frameworks (O'Farrill, 2010). Barriers to information literate societies include poor presentation of information and overwhelming other aspects of healthcare roles (Dixon et al., 2017) and lack of training, immediate resources and support resources (Sales & Pinto, 2011), various demographic factors (Chen et al., 2023) and possibly over-generalised IL frameworks (.O'Farrill, 2010).

During SQR reading, it was seen that many of the papers covered the impact of *already having* IL, rather than methods to develop IL. For example, Dixon et al. (2017) state that doctors and nurses who have higher IL are more able to use clinical software. A longlist paper by Toroghy et al. (2022) states that those who have greater IL skills can achieve more in the workplace. There are also considerations of communities of practice (O'Farrill, 2010; Sales & Pinto, 2011).

4.8 Health

The themes allocated to the 24 'workplace' longlist full-texts are

- assessment of medical students' IL
- childbirth
- COVID health IL
- delivering research skills to nurses
- e-health literacy
- e-learning for nurses
- evidence-based practice for nurses
- evidence-based medicine and IL (for doctors)
- Health IL and barriers to health information seeking
- Health IL and the internet
- HIL and dietary behaviours
- ICT access for HC professionals
- IL frameworks for therapists' training
- IL of medical students
- IL training for nurses
- integrating IL into nurses' training
- junior doctors' IL
- library use by nurses
- on-the-job learning for nurses
- ophthalmologists' IL
- talent quality management systems and nurses' IL
- teaching IL skills to nurses
- teaching IL to nurses
- trust in clinical research

The gross geographies and research methods of the longlist full-text items are in Table 24.

Table 24: geographies and methods in 'health' longlist

Geography	Number of items
Europe	1
Americas	6
Africa	2
Asia	9
Oceania	2
global	4
Total	**24**

Method	Number of items
discussion	4
literature review	2
mixed	4
qualitative	3
quantitative	11
Total	**24**

Noted barriers to research were studying self-reported (i.e. not objective) IL scores.

4.8.1 Health shortlist

The items in Table 25 obtained SQR scores of 4. No papers in this classification scored 5 or 6, implying that workplace IL studies may not be reported (or undertaken) very well. This table also shows information gleaned from the SQR readings.

Table 25: 'Health' shortlist papers

Item	SQR score	Theme	Geography	Method
Janke et al. (2012)	4	IL training for nurses	Americas	discussion
Fuzhi et al. (2019)	4	Health IL and barriers to health information-seeking	Asia	quantitative
Li et al. (2022	4	COVID health IL	Asia	quantitative
Cullen et al. (2011)	4	junior doctors' IL	Oceania	qualitative
Ullah and Ameen (2019)	4	teaching IL skills to nurses	Asia	qualitative

4.8.2 Section conclusions

Key overall themes within 'health' IL research include evidence-based medicine, and training of medical professionals. Within this longlist, the largest geographical class is 'Americas', while the largest methodological class is 'quantitative'. However, this class did not dominate the shortlist.

Barriers to IL research other than those that impact qualitative research in general include a mention of a lack of objectivity in research.

Concerning the comprehensiveness of IL research, shortlisted items cover training of nurses (Janke et al., 2012), whether doctors retain IL skills after leaving medical school (Cullen et al., 2011), health IL (Li et al., 2022) and factors affecting senior citizens' IL (Fuzhi et al., 2019).

Enablers of information literate societies include service-learning methods including group projects, 'scaffolded' teaching methods reminiscent of work by Kim et al. (2022), collaboration between librarians and teaching colleagues (Janke et al., 2012; Ullah & Ameen, 2019), compulsory undergraduate IL education (Cullen et al., 2011), socio-demographic factors (Li et al., 2022), and demonstrating the relevance of IL to practice (Janke et al., 2012)

Barriers to information literate societies include lack of respect for librarians (Janke et al., 2012) and lack of university education (Fuzhi et al., 2019), which may go hand-in-hand with lack of IL education at and before university (Ullah & Ameen, 2019), lack of government action on misinformation (Fuzhi et al., 2019), and socio-demographic factors including being older or male (Li et al., 2022).

4.9 Summary of 'core' research

4.9.1 Summary of shortlists

It is assumed that the shortlisted items in this review are representative of the core, highest-quality IL research undertaken from 2005 to early 2023. The shortlisted items had an average SQR score of 5, with five items scoring 4, twenty-two scoring 5 and eight scoring 6. This implies that even some of the best, most relevant IL research could be presented better. The geographies and methods of the shortlist items are given in Table 26.

Table 26: shortlist items' geographies and methods

Geography	Number of items
Europe	11
Americas	8
Africa	2
Asia	10
Oceania	1
global	3
Total	**35**

Method	Number of items
discussion	8
literature review	2
mixed	8
qualitative	7
quantitative	10
Total	**35**

Hence significant proportions of key IL research appear to cover Europe, Asia and the Americas, while all methods apart from literature reviews have significant presence.

The themes allocated to all shortlist items are

- academic libraries and IL initiatives
- academic librarians' IL practices
- addiction, parenting
- advocacy, IL frameworks, IL as a means of social improvement
- algorithms and IL
- assessing translators' IL
- assessing clinicians' IL
- assessing teachers' IL
- assessment of IL
- computer-based scaffolding, virtual field-trips
- COVID health IL
- critical pedagogy and MIL instruction
- curricula, lack of IL skills
- developing IL framework
- Health IL and barriers to health information-seeking
- IL and KM, IL frameworks, effective information use by nurses
- IL and libraries
- IL and trust in government information
- IL assessment
- IL frameworks (three occurrences)
- IL as a public good
- IL in primary schools
- IL instruction using VLEs
- IL pedagogy
- IL teaching
- IL training for nurses
- integration of IL courses into general teaching
- junior doctors' IL
- librarians as IL teachers
- library outreach in a UK health authority
- LLL
- refugees
- teachers' IL
- teaching IL skills to nurses
- web-based IL instruction, inquiry-based learning

Thus key themes in the shortlisted items range from academic librarians/libraries, to assessment of IL, to development of IL frameworks (including examination of their philosophical underpinnings), to IL teaching in different contexts and formats. There is a noticeable amount of research into medical matters, presumably due to the selection of 'health' as a classification.

4.10 Chapter conclusion

There does not appear to be a relationship between IL research methods and (potential) societal change. For example, qualitative (e.g. Martzoukou & Burnett, 2018), quantitative (Li et al., 2022) and discussion methods (e.g. Tumbleson & Burke, 2010) all may lay some foundations for societal change.

Many of the papers reported above are 'snapshots' of IL skills at a single time. Further review could investigate subsequent changes and their causes.

The geographical comprehensiveness of IL research is increasing but there is still a focus on the anglosphere/first world. Non-geographical comprehensiveness is demonstrated by the shortlisted items' ranges of themes and topics.

Enablers of information literate societies include: national IL frameworks; improvements to teaching and lecturing methods and programmes, along with collaboration between teachers/lecturers and librarians; working around socio-cultural and socio-demographic barriers; relevant, nuanced government action and school leadership, including provision of appropriate resources; 'good' parenting, advocacy around new issues; suitable IT/IL-teaching systems; workplace training; and relevant IL frameworks.

Barriers to information literate societies include: government inaction and *realpolitik*; inappropriate or out-dated teaching, along with lack of resources and support and with lack of IL teaching in earlier phases of education; overwhelming other aspects of work; poor presentation of information; and various socio-cultural factors.

5 Discussion

This chapter presents answers to the review's research questions (see section 2.2 above), before setting out other matters derived from close-reading the shortlist items.

5.1 What is the core research that investigates the role IL plays for different user groups in society?

As described in chapter 3, over 4000 peer-reviewed research items were found in database searches, using keywords designed to find 'impactful' IL research. Ideally, it would have been possible to find which user group each item covered, then tally the numbers of items covering each group. Then tallies, SQR scores and citation counts would have been used to ascertain the most important, impactful IL research.

However, finding a simple set of individual user-groups based on ability, age, profession, social situation etc was not possible. Instead, classifications based on topics in the CILIP definition of IL (CILIP, 2018) were used. Hence, this review may not answer main RQ1 in the way that was desired by the project sponsors. Instead, the findings confirm the already well-known fact that a preponderance of IL research focuses on tertiary education – see Table 2 and Table 5.

Answers to RQ1's sub-questions are in the following subsections, which are based on the findings from the shortlisted items.

5.1.1 How comprehensive is this core research?

Over the years, the *geographical* comprehensiveness of IL research has increased, but still concentrates on the anglosphere and the first world (Rader, 2000a; other publications in the 'information literacy and library instruction' series). It is clear that better coverage of Africa, Oceania and 'global' IL research is needed.

The 'information literacy and library instruction' series further confirms the predominance of tertiary education in IL research. IL research covering public libraries, which have the widest 'constituency' – all of society – is a very poor relation. The shortlisted items include reports on the creation of the Welsh and Scottish IL frameworks (Head & Jackson, 2011; Irving, 2011). It may be desirable to research the later impact of these frameworks, and to collate research on research on other national and sub-national IL frameworks, to complete this picture of IL research comprehensiveness.

The comprehensiveness of the core IL research can be seen in the range of topics covered by the shortlist items:

- **policy and government**
  - design of government websites and the recognition that humans are not homogenous (Lee et al., 2020)
  - factors behind and effects of IL policy at different levels (Julien & Barker, 2009; Maitaouthongn et al., 2011; Majid et al., 2016)
- **education**
  - barriers to teaching and learning (Bangani et al., 2020; Baro & Zuokemefa, 2011; Rahanu et al., 2015)
  - librarians' preferences for IL teaching (Tumbleson & Burke, 2010)
  - high-school teachers' IL skills (Korobili et al., 2011)

- librarians' preferences for IL teaching (Tumbleson & Burke, 2010)
- routes to ensuring universities teach IL (Iton, 2006)
- decline of UK school library funding and importance (Streatfield et al., 2011)
- political and philosophical underpinnings of IL education (Sanches et al., 2022; Silajdžić et al., 2022)
- teachers' IL (Chen et al., 2023)

- **digital and IT**
  - technology for teaching IL (Kim et al., 2022; Kingsawat et al., 2015; Wade et al., 2020).
  - algorithms (Lloyd, 2019)
  - impact of digital IL and parenting styles (Leung & Lee, 2012)

- **health**
  - healthcare professionals IL and IL training (Cullen et al., 2011; Dixon et al., 2017; Janke et al., 2012; Trinder et al., 2007; Ullah & Ameen, 2019)
  - IL and knowledge management in a healthcare context (O'Farrill, 2010)

- **professions**
  - IL for translators (Sales & Pinto, 2011)
  - senior citizens' IL (Fuzhi et al., 2019; Li et al., 2022)

- **personal and citizenship**
  - needs of forced migrants (Martzoukou & Burnett, 2018)
  - senior citizens' IL (Fuzhi et al., 2019; Li et al., 2022)
  - advocacy (Nzomo & Fehrmann, 2020)

The above grouping is rather arbitrary. For example, the paper by Cullen et al. (2011) could also be seen as 'policy and government', as could the paper by Streatfield et al. (2011). Comprehensiveness is enhanced by the realisation that IL skills might be transferred from subject to subject, although some researchers argue for subject-specific IL frameworks (O'Farrill, 2010; Sales & Pinto, 2011).

5.1.2 Which themes are absent from this core research?

According to the 'CILIP classification' data, the least amount of IL research concerns citizenship (118 of 5104 items) and primary education (55 of 2825 education items). Similarly, according to the 'library instruction and information literacy series', public libraries receive very little research.

Clearly absent from the longlisted items are significant bodies of research into individual occupations, apart from the healthcare, teaching/lecturing and library professions. Only one shortlist item explicitly mentions information gathering by talking with colleagues (O'Farrill, 2010), rather than gaining information from textual and/or digital sources.

In the 'post-truth era', it might have been expected that more work explicitly tackling misinformation and related themes would have arrived in the shortlists but there are only two: (Fuzhi et al., 2019; Lloyd, 2019). However, such topics are seen in the longlist items' themes.

5.1.3 Which factors prevent these themes being researched?

Very little information on the factors preventing research into any theme was found in shortlist items. One possibility is funding, in the cases of public libraries (Johnson & Jent, 2007) and school libraries (Streatfield et al., 2011). Another suspicion, not proven here, is that researchers stay in their comfort-zones. Finally, given that some of the shortlist items cover IL and educational policy-makers and decision-makers, it is conceivable – but not proven here – that such senior figures avoid commissioning research that might criticise them.

5.1.4 Which themes are over-represented?

As well as the preponderance of tertiary education in IL research, shortlist-item themes that receive much attention range from academic librarians and libraries, to assessment of IL, to development and philosophical underpinnings of IL frameworks, to IL teaching in different contexts and formats. There is a noticeable number of items covering medical matters, presumably due to the selection of 'health' as a classification.

5.2 According to this core research, what are the barriers to and enablers of shaping information literate populations?

Almost all the shortlist items do not explicitly mention such barriers and enablers. To enable information-literate societies, research would need to travel from academic researchers to the librarians who are often charged with teaching IL skills, and it is known there is a research-practice gap in the library arena (e.g. Hall et al., 2022). Having said that, many of the shortlist items mention ways to teach or instil IL skills. Collating the enablers noted above leads to the following sets of enablers:

- **use of frameworks**
  - national IL frameworks (Head & Jackson, 2011; Irving, 2011)
  - using appropriate IL-teaching frameworks well, including scaffolding, and mandating this in curricula (Baji et al., 2018; Kim et al., 2022)
  - context-specific IL frameworks (O'Farrill, 2010; Sales & Pinto, 2011).
- **stakeholder buy-in and collaboration**
  - government funding/buy-in and political will (Haras & Brasley, 2011; Head & Jackson, 2011; Irving, 2011; Streatfield et al., 2011)
  - linking with relevant stakeholders and processes (Head & Jackson, 2011)
  - engagement with curriculum-developers and national teacher-training bodies (Irving, 2011)
  - collaboration between teachers/lecturers and school/university librarians (Bangani et al., 2020; Iton, 2006; Korobili et al., 2011; Tumbleson & Burke, 2010; Ullah & Ameen, 2019)
  - supportive school/university leaders (Iton, 2006; Korobili et al., 2011; Maitaouthongn et al., 2011)
- **improving IL teaching and training**
  - improving teaching methods and programmes, including workplace IL training (Bangani et al., 2020; Baro & Zuokemefa, 2011; Cullen et al., 2011; Janke et al., 2012; Maitaouthongn et al., 2011; Majid et al., 2016; Rahanu et al., 2015; Trinder et al., 2007)
  - accurate knowledge about people (Rahanu et al., 2015)

- step-by-step help that acknowledges individuals (Martzoukou & Burnett, 2018)
- provision of detailed relevant information (e.g. on housing) (Martzoukou & Burnett, 2018)
- help to cope with varying degrees of literacy (Martzoukou & Burnett, 2018)
- help to overcome confusion, especially as demands come thick and fast when refugees need to time to adapt (Martzoukou & Burnett, 2018)
- help for refugees to learn things are done in the new country (Martzoukou & Burnett, 2018)
- developing suitable teaching software (Kingsawat et al., 2015; Wade et al., 2020)
- appropriate teacher training (Baji et al., 2018; Silajdžić et al., 2022)
- compulsory IL assessment in exams and coursework (Julien & Barker, 2009)
- integrating IL into teaching (Iton, 2006; Korobili et al., 2011)
- raising teachers' own motivations (Korobili et al., 2011)
- Starting IL education earlier (Ullah & Ameen, 2019)

- **raising the status and profile of IL**
  - raising the status of the teaching profession (Rahanu et al., 2015)
  - showing how and why learning will help people and society (Rahanu et al., 2015)
  - advocacy (Haras & Brasley, 2011; Irving, 2011)
  - optimising government websites (Lee et al., 2020)
  - supporting school, academic and public librarians, including empowering these librarians and raising their statuses (Nzomo & Fehrmann, 2020)

- **addressing inequalities**
  - budgetary support of travel to and other physical access to (IL) learning opportunities (Rahanu et al., 2015)
  - tackling lack of self-esteem (Rahanu et al., 2015)
  - support around health and disability (Rahanu et al., 2015)
  - intergenerational support and working around barriers stemming from gender, class, race, culture and religion issues (Rahanu et al., 2015)
  - providing equal access to technology (Rahanu et al., 2015)
  - various demographic factors, including lack of secondary education that includes IL education (Ullah & Ameen, 2019), or university education of any form (Chen et al., 2023; Fuzhi et al., 2019; Li et al., 2022)

- **expanding the remit of IL concern**
  - 'good' parenting, e.g. monitoring children's internet use (Leung & Lee, 2012)
  - engagement with algorithmic culture Click or tap here to enter text.(Lloyd, 2019)
  - teaching and support of critical thinking (Silajdžić et al., 2022)

Barriers to information literate societies are generally the opposite of the above enablers, e.g. lack of political will and government support for school libraries (Streatfield et al., 2011). Another barrier, beyond the scope of IL practitioners to prevent, is war and its aftermath (Silajdžić et al., 2022).

5.3 What research methodologies in this core research are most effective at delivering impact/societal change, and why are these methods effective?

In subsection 4.9.1, it can be seen that all research methods apart from literature review contribute significantly to the core research identified in the shortlists.

The shortlist items themselves contain almost no explicit information on why their methods are effective. Further, many of the shortlist items are snapshots that do not demonstrate impact/societal change, e.g. the assessment by Li et al. (2022) of then-current levels of IL skills during lockdown. There is a need for longitudinal studies that demonstrate which research methods and types of IL teaching project best deliver or increase IL skills in various contexts and geographies. Along with quantitative work to demonstrate increases in IL skill levels, qualitative work – perhaps interviews with IL teachers, librarians, policy-makers and above all those who are learning IL skills – would be needed to understand why IL skill levels are changing. See Kim et al. (2022) for an example of such mixed-methods approaches. Hence this review has not been able to answer this question in exactly the way that was desired.

However, the following lessons about delivery of IL education and training that might *eventually* deliver societal change can be drawn from the shortlist items:

- IL education and training should be structured, integrated and collaborative (Baji et al., 2018; Iton, 2006; Tumbleson & Burke, 2010), and yet compulsory (Korobili et al., 2011). However, it should also take into account learners' needs and existing abilities (Iton, 2006; Ullah & Ameen, 2019).
- IL educators should question their own practices (Tumbleson & Burke, 2010)
- Research into IL needs to be well written, and include detail of syllabi, lesson-plans, research instruments etc. The paper by Wade et al. (2020) is perhaps the best example in this review.
- A focus on politics and philosophical underpinnings of (IL) education may well help (Silajdžić et al., 2022).Click or tap here to enter text.
- Naturally, there needs to be assessment of which IL teaching methods work (Bangani et al., 2020; Maitaouthongn et al., 2011).et al., 2011).
- Collaboration between schools, between teachers/lecturers and librarians and between learners can be productive (Baji et al., 2018; Baro & Zuokemefa, 2011; Iton, 2006; Janke et al., 2012; Kingsawat et al., 2015; Korobili et al., 2011; Majid et al., 2016; Streatfield et al., 2011; Tumbleson & Burke, 2010)
- All of the above are to differing extents dependent on government funding, policy and syllabus guidance (Baji et al., 2018; Fuzhi et al., 2019; Haras & Brasley, 2011; Head & Jackson, 2011; Irving, 2011; Johnson & Jent, 2007; Julien & Barker, 2009; Kingsawat et al., 2015; Lee et al., 2020; Majid et al., 2016; Martzoukou & Burnett, 2018; Rahanu et al., 2015; Streatfield et al., 2011)

A methodology that can help analyse how IL is being operationalised is phenomenography (O'Farrill, 2010). However, this author casts doubt on the generalisability of IL frameworks, i.e. what might lead to societal benefit in one context may well not do so in others. Further, whatever is done to deliver IL education that can deliver social benefits, it needs repetition and reinforcement (Cruickshank et al., 2022; Ullah & Ameen, 2019).

5.4 Other points derived from close-reading the shortlist items

Of itself, IL intervention may only prepare the ground for societal impact, in that it enables people to work with information that will benefit their own skills and interests. See, for example, Sales and Pinto's (2011) work on IL for translators, where IL training only directly benefits a relatively small group of people.

Moreover, much IL research is about tertiary education. IL education at university may only directly benefit individual students, in that they may improve their understanding of their subject, receive better grades and thus become more employable. IL education can later *indirectly* deliver benefits to wider society when those students enter public-facing careers. The obvious examples are healthcare professionals (e.g. Cullen et al., 2011; Janke et al., 2012; Ullah & Ameen, 2019), but such 'delayed' benefits from IL education could arise in any walk of life,

In any case, IL education may well need to start earlier – and be continuously reinforced – if it is to deliver wider societal benefits such as improved healthcare via professionals having or not having the IL needed to get better at their jobs. For example, Ullah and Ameen (2019) note that Pakistani medical students may well receive no IL education at school, so they lack the foundations to learn to deliver evidence-based medicine. Here, the lack of IL is 'in' these students, but negative impacts would be on their future patients.

Moreover, there is missed *potential for impact* of IL on society. For example, elderly people, especially if they are poor, uneducated, or unable to go out to consult people because of COVID lockdown (Li et al., 2022), may well lack health IL. This has consequences for both physical and mental health.

There are roles for communities of practice in IL education and training. Papers by (O'Farrill, 2010) and Sales and Pinto (2011) mention this explicitly, but it is implicit in the calls for collaboration between teachers/lecturers and librarians.

6 Conclusions, limitations and next steps

This review has classified, longlisted, shortlisted and then analysed core, impactful IL research. Key conclusions are the wide range of topics and themes IL research tackles, and the need for IL research to cover areas outwith the anglosphere/first world. It was not possible to isolate fine-grained groups (e.g. elderly, different professions) that are covered by significant bodies of work. Instead classifications based on the CILIP definition of IL were used. It has established that there is very little evidence on why various IL themes are not researched, and that it is difficult to find robust evidence of which research methods are effective in delivering societal change. These both point to further areas for research and policy engagement.

Practice-level recommendations include creation of national IL frameworks, various improvements to teaching methods and syllabi, raising the status of IL and its teaching and support for IL learners. (See sections 5.2 and 5.3 for detail.)

Some key components of impactful IL projects have been validated, namely 'ensuring integration and relevance of the intervention', 'collaboration between stakeholders', design of content and delivery methods', 'repetition and follow-up' and 'management buy-in and budget'.

6.1 Limitations to this review

Concerning methods, one potential criticism is that of the over 3000 items remaining after classification (see section 3.2), only 197 items were longlisted and 35 reviewed in detail. It is possible that slightly different overall findings would have emerged if a different selection method had been used. However the process was designed to ensure the papers were broadly representative and the selection was as bias-free as possible in this context. Further, the SQR method used to generate shortlists may have benefitted from third-party review of disagreements. It may have been helpful to record separate 'S', 'Q' and 'R' scores. Also, a significant number of 'tertiary education' full-texts were unavailable, thus potentially skewing this classification's results. Finally, there is an overlap of the classifications used to create longlists and shortlists, although this is perhaps inevitable. For example, papers about training of healthcare professionals are both 'education' and 'health'.

Concerning the findings, it is possible that information on ineffective methods is unavailable because people might understandably be reluctant to write about why their work was not as successful as they initially hoped. A number of items in the shortlists are snapshots of IL skills in different contexts from almost two decades ago. It may have been helpful to investigate changes – and their causes – since these snapshots were published.

Factors beyond the reviewers' control include the possibility that societal impacts well be unreported because researchers have only been able to demonstrate outputs, e.g. increases in various IL scores. Alternatively, societal impact may be reported in grey literature rather than peer-reviewed academic publications. Further, societal impact may well be reported as 'library impact' rather than as 'IL impact', and hence have been excluded by the *information literac* the filtering stage. For example, (NHS Health Education England, 2021) defines impact as 'the influence of libraries and their services on individuals and/or on society'. Such impact might rise from libraries providing healthcare professionals with IL education. Similarly, two of the authors appearing in this review and in the ILIF report have recently published a guide on how to

evaluate library impact (Streatfield & Markless, 2023). However, these publications did not appear in the database hits.

6.2 Future work

The robustness of the findings could be broadened by evaluating a larger sample (or all) of the selected papers. Depth could be added by following up on developments after the snapshots reported in the evaluated papers, to identify the impact of the research on participants and on IL policy development. This would provide evidence to inform IL proponents and policy makers.

Other areas that may be worthwhile researching include: the extent to which the core IL research identified in this review engages with theory; the under-representation of public libraries in IL research, and whether this leads to unanswered research questions of importance to society; the specific role of governments in promoting or preventing IL research (cf Streatfield et al., 2011).

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Appendix 1: Shortlisted papers

Table 27: shortlisted papers

Reference	Title	Classification	Geography	Method of study
Baji et al. (2018)	Developing information literacy skills of the 6th grade students using the Big6 model	primary education	Asia	mixed
Bangani et al. (2020)	Students' perceptions of librarians as teachers of information literacy at a large African university	tertiary education	Africa	quantitative
Baro and Zuokemefa (2011)	Information literacy programmes in Nigeria: A survey of 36 university libraries.	tertiary education	Africa	quantitative
Chen et al. (2023)	Investigating teachers' information literacy and its differences in individuals and schools: a large-scale evaluation in China	workplace	Asia	quantitative
Cullen et al. (2011)	Evidence-based information-seeking skills of junior doctors entering the workforce: An evaluation of the impact of information literacy training during pre-clinical years	health	Oceania	qualitative
Dixon et al. (2017)	Measuring practicing clinicians' information literacy: An exploratory analysis in the context of panel management	workplace	Americas	mixed
Fuzhi et al. (2019)	Information Literacy and Barriers of Online Health Information Seeking Among Digital Immigrants in Rural China: A Preliminary Survey	health	Asia	quantitative
Haras and Brasley (2011)	Is Information Literacy a Public Concern? A Practice in Search of a Policy	citizenship	Americas	discussion
Head and Jackson (2011)	The Welsh information literacy project: First steps in developing an information literate nation	everyday life	Europe	discussion
Irving (2011)	National Information Literacy Framework (Scotland): Pioneering Work to Influence Policy Making or Tinkering at the Edges?	citizenship	Europe	discussion
Iton (2006)	Breaking into Unexplored Territory: A case study of the information literacy initiative at the Cave Hill Campus of the University of the West Indie	tertiary education	Americas	discussion
Janke et al. (2012)	Promoting information literacy through collaborative service learning in an undergraduate research course	health	Americas	discussion
Johnson and Jent (2007)	Library instruction and information literacy 2005	everyday life	Global	literature review
Julien and Barker (2009)	How high-school students find and evaluate scientific information: A basis for information literacy skills development	secondary education	Americas	qualitative
Kim et al. (2022)	Influence of Scaffolding on Information Literacy and Argumentation Skills in Virtual Field Trips and Problem-Based Learning for Scientific Problem Solving	secondary education	Americas	mixed

Reference	Title	Classification	Geography	Method of study
Kingsawat et al. (2015)	Components and Factors in Integrating Information Literacy Instruction in Elementary Education Using a Virtual Learning Environment	primary education	Asia	quantitative
Korobili et al. (2011)	A paradigm of information literacy for greek high school teachers	secondary education	Europe	quantitative
Lee et al. (2020)	The effects of information literacy on trust in government websites: Evidence from an online experiment	citizenship	Asia	quantitative
Leung and Lee (2012)	The influences of information literacy, internet addiction and parenting styles on internet risks	citizenship	Asia	quantitative
Li et al. (2022	Current Status and Associated Factors of Health Information Literacy Among the Community Elderly in Central China in the COVID-19 Pandemic: A Cross-Sectional Study	health	Asia	quantitative
Lloyd (2019)	Chasing Frankenstein's monster: information literacy in the black box society	citizenship	global	discussion
Maitaouthongn et al.(2011)	Factors Affecting the Integration of Information Literacy in the Teaching and Learning Processes of General Education Courses	tertiary education	Asia	mixed
Majid et al. (2016)	Auditing information literacy skills of secondary school students in Singapore	secondary education	Asia	quantitative
Martzoukou and Burnett (2018)	Exploring the everyday life information needs and the socio-cultural adaptation barriers of Syrian refugees in Scotland	everyday life	Europe	qualitative
Nzomo and Fehrmann (2020)	Advocacy engagement: The role of information literacy skills	citizenship	global	literature review
O'Farrill (2010)	Information literacy and knowledge management at work: Conceptions of effective information use at NHS24	workplace	Europe	qualitative
Rahanu et al. (2015)	The role of information literacy in overcoming obstacles to learning and lifelong learning	everyday life	Europe	discussion
Sales and Pinto (2011)	The professional translator and information literacy: Perceptions and needs	workplace	Europe	mixed
Sanches et al. (2022)	Critical Thinking in Information Literacy Pedagogical Strategies: New dynamics for Higher Education throughout librarians vision	tertiary education	Europe	qualitative
Silajdžić et al. (2022)	Media and information literacy as critical pedagogy? Case study of the Sarajevo Hasan Kikić elementary school	primary education	Europe	qualitative
Streatfield et al. (2011)	Information literacy in United Kingdom schools	primary education	Europe	mixed

Reference	Title	Classification	Geography	Method of study
Trinder et al. (2007)	Evaluating the impact of library user training programmes across Thames Valley Strategic Health Authority in the UK	workplace	Europe	mixed
Tumbleson and Burke (2010)	Embedded librarianship is job one: Building on instructional synergies	'unclassified' education but actually tertiary education	Americas	discussion
Ullah and Ameen (2019)	Teaching information literacy skills to medical students: perceptions of health sciences librarians	health	Asia	qualitative
Wade et al. (2020)	Developing information literacy skills in elementary students using the web-based inquiry strategies for the information society of the twenty-first century (Isis-21)	primary education	Americas	mixed

Appendix 2: longlist full-texts précises; their contributions to answering research questions

Everyday life

Johnson and Jent (2007)

This item is one of a series started in 1973, providing annual selected bibliographies of English-language resources published in the previous calendar year on library instruction and information literacy, as précises of relevant academic papers, monographs and exhibition catalogues. Thus the series may be used as a quick reference to relevant literature. That is, while the series does not report its own original research, each paper provides an entrée into a year's worth of original research publications.

Hereon, the series is treated as a single item. The range of geographies covered by the series considerably widened, as shown in the tables in appendix 3. The overall volume of IL research has increased from 29 items in the 1973 paper, which was written by the series' originator alone, to 427 items in the 2021 paper, which has 14 authors.

In each paper, the précises are classified according to the types of library at their foci. In line with the findings in section 3.4 above, there is a clear preponderance of 'academic' research each year, followed by 'school' education. Medical/health topics have some showing, as do everyday life and work-related topics. However, the clear poor relation is public libraries.

As might be expected, a significant number of items in the 2021 update were concerned with detecting and/or tackling 'fake news', 'post-truth', 'misinformation' and similar recent issues.

In terms of this review's research questions, the series shows that *geographical* comprehensiveness of IL research is increasing, but there is still a concentration on the anglosphere and the first world. Academia/tertiary education predominates over the other classifications, while IL research focussing on public libraries (which have the opportunity impact to impact the whole of society) is minimal.

A more general concern is whether publications such as this series, the research it reports on, or any IL research can reach outside of academia to have positive impacts on society. To do so presumably would need research to reach to policy- and decision-makers, library management and library staff. However there is evidence (e.g. Hall et al., 2022) that there is a library research-practice gap.

Head and Jackson (2011)

This paper is an account of the initial work of the Welsh Information Literacy Project, which aimed to create an IL framework for Wales. It describes how funding was obtained (but not how much), and how the project was steered by relevant stakeholders. This was followed by gathering relevant case studies and publicising the potential benefits from the framework. A draft framework was based on the SCONUL Seven Pillars project and examples of good practice. This framework covered from entry into education (which in this paper includes 'the workplace') to doctoral level. The paper ends with anticipated next steps, including gaining external approval for the framework, creating approved 'units of learning', supporting IL advocacy in schools, and conducting a benefits analysis of IL in the workplace.

In terms of this review's research questions, the work reported covers a very broad range of society (as can be seen from the case-studies mentioned), albeit being used to influence policy within a rather

localised setting. The paper does not mention any barriers to IL research. By implication, enablers of information-literate populations include national IL frameworks, government funding/buy-in (thus validating one of the findings from the ILIF project), and linking with relevant stakeholders and processes. No barriers to information-literate societies are mentioned. Because this paper has no information on the framework's impacts it is not possible to draw any conclusions on this paper's discursive method.

Rahanu et al. (2015)

This paper collates case-studies to show how IL can 'help disadvantaged groups in both the developed and developing worlds improve their opportunities for developing their intellectual potential'. The introduction summarises social changes that call for IL development, barriers to participation in learning, literacy as a human right, and the call for *lifelong* learning (LLL). It then notes the impact of the internet on LLL, and the interplay between IL and LLL, and then-current IL models.

It notes obstacles to learning such as increasing age; lower levels of formal educational qualifications; lack of employment; economic issues (which may be related to health and/or disability; gender; living remotely and other barriers to accessing educational opportunities; information illiteracy; lack of self-esteem, confidence and motivation; barriers stemming from class, culture and religion, poorly designed programmes, and the poor status of teaching as a profession. These barriers are supported with references, and three brief case-studies are provided to substantiate the points: one from the western Balkans, two from the UK.

The paper then suggests some best practices for IL projects, all of which match key findings from ILIF, apart from the suggestion that IL projects should have mission statements and outreach activities. There is then a detailed, but not reference-supported, table of suggested actions to overcome barriers to learning. The paper concludes that

> Simply throwing technology at the issue of illiteracy and information illiteracy cannot in itself bring about social and economic equality. Any vision of a technological utopia requires complete and accurate assumptions about race, class, and gender.

In terms of this review's research questions, the work is quite comprehensive, going by the barriers to (IL) learning it mentions. The paper does not mention any barriers to IL research. Its theme is the very general topic of overcoming barriers to learning. The enablers of information literate societies this paper suggests include improving teaching methods and programmes; raising the status of the teaching profession; tackling lack of self-esteem; budgetary support of travel to and other physical access to (IL) learning opportunities, showing how and why learning will help people and society; support around health and disability; intergenerational support, working around barriers stemming from gender, class, race, culture and religion issues; providing equal access to technology; accurate knowledge about people. All of these, to some extent, depend on government buy-in and people having the wherewithal and willingness to support each other. Technology of itself is not an enabler. The barriers are basically the opposite of the enablers. The paper's methodology is a balance of literature review (the reference-supported information on barriers) and discussion (the suggestions of how to overcome these barriers.

Martzoukou and Burnett (2018)

This paper presents findings from the 'Syrian New Scots' project, exploring their information needs, practices and the barriers and enablers they encounter in their new settings. The introduction points out a lack of understanding of the needs of refugees, and that there is confusion around refugees, asylum seekers and other migrants. Refugees may well have 'fractured' information landscapes, and hence need support to reconstruct them via gaining understanding of their new locations' socio-cultural norms.

Data was gathered firstly by interviewing local authority leads for Syrian resettlement, then by focus groups with Syrian refugees. In the focus groups, a drawing exercise was used to draw out their main information needs, possible resolutions, factors that helped with this, and sources of difficulties, how the refugees looked for, gathered and shared information.

The main needs are around learning English, to address health, well-being and community engagement needs. Barriers included social-cultural differences. There is a need for a more structured approach to supporting the new Scots, acknowledging personalised information needs The findings are hopefully useful to those supporting New Scots, including libraries.

In terms of this review's research questions, this work is an in-depth examination of the needs of a particular class of forced migrants, so it may be erroneous to assume the findings will be generalisable to other classes, although the methods used to in this paper may well be used with others. The paper reports conditions at the time, so an unspoken limitation is lack of longitudinality, i.e. investigation of how these people's information needs and IL change over time. The enablers of information literate societies reported here include: step-by-step help that acknowledges individuals; provision of detailed relevant information (e.g. on housing), help to cope with varying degrees of literacy; help to learn how things are done in the new country; help to overcome confusion, especially as demands come thick and fast when people need time to adapt to their new situation. Languages classes and written 'helpful' documents alone may well not help with IL and information-needs, so providing them alone may be a further barrier. Another barrier is that some of the forced migrants may not be able to go outwith their groups. The methodology employed in this paper, which set out to understand an urgent human need to enable positive change, is qualitative and human-centric.

Citizenship

Leung and Lee (2012)

This paper examines how demographics, addiction symptoms, information literacy, parenting styles and internet activities can predict 'internet risks', using face-to-face interviews with a probability sample of Hong Kong adolescents and teenagers, and investigates, inter alia, whether 'The more information literate adolescents perceive themselves to be, the fewer internet risks the adolescents will experience in terms of (a) being the target of harassment, (b) privacy exposure, and (c) pornographic and violent content consumed.' IL was measured as self-efficacies: how confident the participants were in performing various tool, critical, publishing, emerging technology and socio-structural tasks.

The conclusion mentions that 'IL is a multi-dimensional construct', which needs not only technological competency but having the knowledge to interpret and evaluate information. It concludes that the more information literate people perceive themselves to be, they fewer internet risks they will

encounter. Specifically, higher levels of (perceived) tool- and socio-structural IL lead to lower levels of internet risks, from knowing how information is socially situated, and from having 'deeper connections to the internet'. However, those who are more publishing-literate encounter more privacy risks, because they tend to use social media 'to socialise, interact, seek recognition, and for entertainment to satisfy their social and psychological needs and for a narcissistic fascination with self-display'. However, technical literacy, rather than critical IL, is likely to be the strongest influence on internet risks, at least for adolescents.

In terms of this review's research questions, this work is in part about the impact of digital IL. It considers both absorbing and creating content, which would correspond to SCONUL's 'presenting' IL pillar (SCONUL, 2011). The enablers of information literate societies reported here include 'good' parenting, i.e. monitoring children's internet use. Such research may contribute to impact/social change by enabling parents to guide their offspring in effective manners. However, this paper is from 2012 when, presumably, fewer children owned cellphones and so were less able to hide their internet use from concerned parents.

Irving (2011)

This paper recounts and reflects on the creation of the Information Literacy Framework for Scotland, and is written by one of the driving forces of this framework. The framework was inspired by the finding that, at the time, school pupils might gain some IL skills in early secondary schooling but that these were not reinforced in later school years, thus hindering further IL development in tertiary education. A petition led to a government consultation of relevant educational bodies. A draft framework was then created, linking to a national qualifications framework. The draft also took into account the workplace. The creators (Irving and her colleague John Crawford) then evaluated the draft's use, leading to a restructuring into a more flexible version that linked with a new curriculum (the 'Curriculum for Excellence, (Education Scotland, n.d.)) and a government lifelong learning strategy. The paper then gives some examples of practical and advocacy use of this version of the framework, along with examples of government not knowing the term IL.

In terms of this review's research questions, this paper is a 'historical' account of how to create a national IL framework. The framework itself comprehensively covers education from early school to postdoctoral and lifelong learning (one of Irving and Crawford's key interests), but does not explicitly cover everyday life, workplace, citizenship or health IL, presumably because these conceptualisations were made 7 years later. There is no mention of barriers to such research in this paper, even though there are in Irving and Crawford's other works. The enablers of information-literate societies mentioned include advocacy, political will, engagement with curriculum-developers and national teacher-training bodies. A significant barrier is governmental ignorance of IL. Work such as this paper can be effective in delivering societal change when it flows from advocacy and individuals' determination.

Overall, this paper, and the other work on the framework, indicate a valid way to handle opportunities that were being missed earlier this century.

Haras and Brasley (2011)

This paper considers whether IL is a 'legitimate public interest', and hence deserving of public policy. At the time, IL had gained attention at high levels, e.g. UNESCO, President Obama, Governor

Schwartzenegger, driven by libraries organisations (described as 'a narrow band of stakeholders'). However, this had not led to IL receiving policy backing or funding. The paper then posits that IL is at least a partly private good, in that possessing it brings financial and other benefits to private individuals (unlike clean water for all, which is a purely public good). To enter the policy realm, IL would need firstly a problem definition, which is problematic because there are many IL models and definitions, because IL means little to the general public, because it is not clear who 'owns' the term 'information literacy', because recent educational reforms prioritised not libraries but technology, and because it was not clear who should teach IL. The overall question is: what value is lost if we do not have an information-literate society? The paper then recommends various data-gathering exercises to drive policy research and hence begin to formulate a national IL policy.

In terms of this review's research questions, this paper examines reasons for the USA of 2011 not having a national IL policy, and ways to bring IL into public consciousness, taking into account contemporary American *realpolitik*. The paper might be seen as a precursor to creating national IL frameworks (cf. Head & Jackson, 2011; Irving, 2011): commonalities include national organisations and advocacy, which can be seen as enablers of information-literate societies along with machinations to co-ordinate support for a national IL policy. Corresponding barriers mentioned are the lack of such co-ordinated support, while there is no mention in this this paper of barriers to IL research. (Again, longitudinal research is needed to record what happened subsequently, and why.) This paper's discussion methodology may be effective in beginning to deliver impact because it documents in detail the matters to be overcome before a national IL policy can be created.

Lloyd (2019

This paper, by one of the giants of IL research, introduces the concept of algorithmic literacy, and explores it in relation to IL. It starts by noting that IL is contextual and social, so that what matters is how we do IL. However, algorithms are now ubiquitous in our information gathering and so have become part of IL. This has the potential to create shifts in our understanding. The problem Lloyd focuses on is that algorithms 'contain' politics yet it is not possible to see how they operate. Hence there are questions of trust when delegating to algorithms that are entangled within culture, and algorithms privilege certain discourses, such as misinformation. Lloyd posits that algorithmic culture resists emotional, embodied views of the world such as Lloyd's information landscapes. This leads to the question of how algorithmic culture and agency affect the construction of these landscapes, e.g. by filtering results of searches and presenting info. Hence Lloyd recognises a need for relevant education, so that we question and understand what algorithms do. This in turn calls for critical IL and reflexivity.

In terms of this review's research questions, this paper extends IL into the present, but does not focus on any specific user-group. However, it addresses a modern 'hole' in IL themes. Being a discussion/position paper, it does not explicitly state any factors preventing such themes being researched. While classified in this review as 'citizenship', it might also add to the preponderance of 'education' IL research. The clear barrier to information-literate societies in this paper is the lack of understanding and engagement with algorithms. Concerning effective methodology, this discussion paper is a wake-up call for all of society. Hence it can be seen as a warning of a *potential* missed opportunity.

Lee et al. (2020)

This paper notes that people can only directly benefit from government ICT systems if they use these systems. However, people are not homogenous: for example, there are digital divides. Building on the Technology Acceptance Model, the authors note that personal factors around inequalities matter, for example self-efficacy (which is related to IL), information overload. Hence the authors tested hypotheses such as 'high perceived IL will lower perceived information overload on government websites'. All of the hypotheses were confirmed, leading to findings that IL can lead to use of government websites, and there are *cognitive* barriers to using them. Hence improvement of e-government systems is needed as well as IL on its own, to generate trust that leads to increased use of these websites and systems. Part of the solution includes education around digital IL, programming and problem-solving. It is also noted that information overload can amplify public apathy: this calls for make government websites easy to understand by using plain language and responding to varying cognitive abilities.

In terms of this review's research questions, this paper does not refer to specific user groups, but does recognise that humans vary in abilities. It provides some practical considerations for government web-designers. It is welcome that this research covers part of the 'mega-theme' of government-citizen engagement. While no overall barriers to IL research are explicitly mentioned, limitations on this research include not (yet) delving into e-government adoption models; some lack of control for other variables (e.g. distraction, location, time); that the findings are based on self-reported data. Barriers to information-literate societies include sub-optimal government websites hindering access to information, and such websites not recognising that humans' abilities vary. Such research can be effective in delivering for society because it takes into account the realities of our species.

Nzomo and Fehrmann (2020)

This paper investigates the skills, knowledge and behaviours in advocacy that are associated with IL skills, using a scoping review method. In this context, advocacy is speaking out about issues of concern, supporting a cause or idea to change policy and similar, rather than a specific legal profession. The authors began by examining definitions of IL and advocacy, then conducted a literature search using search-terms derived from these definitions, followed by an analysis of the 270 items thus obtained. These items were mostly from the USA, and mostly covered health/patient advocacy, self-advocacy, legislative/policy, education and lastly social advocacy. It was found that IL skills such as communication are crucial for effective advocacy, including in the workplace. Necessary knowledge included that of legislative processes, and how to speak to power. Necessary behaviours include passion about that being advocated for, and it was noted that information and motivation support each other. The authors conclude that IL instruction beyond education and academia is needed, and that librarians need to equip the public and pupils with such skills so they can advocate. In higher education, there needs to be teaching beyond research skills.

In terms of this review's research questions, this work also does not focus on a specific user group. It adds to the comprehensiveness of IL research by highlighting a particular benefit of having IL skills that may be used in any walk of life, and does not add to the preponderance of 'education' IL research. No specific barriers to IL research are noted, apart from this being a scoping review, laying the ground for further research. Enablers of information literate societies include school and public librarians teaching

IL, in this case as a basis for advocacy. This work of may help deliver impact/social change by leading to enhanced advocacy skills.

Primary education

Streatfield et al. (2011)

This paper reviews evolution of information skills and IL work in UK schools from the late 1970s to 2011. It notes a lack of consolidation, i.e. lack of such work being consistently part of teaching, and that there was no requirement for UK schools to have libraries, and no standards for such school libraries that existed. It sketches the history of school library funding and related research in the UK, including a loss of IL research focus as responsibility was devolved from the British Library to less education-centric quangos. The paper then reports on recent research by the authors using focus groups and interviews with head teachers, other teachers and school library staff. It finds that UK primary schools rarely have dedicated librarians, so little attention is paid to systematic development of IL, while there is a movement to research and internet skills becoming prominent, with some emphasis on computer skills. Primary education often includes topic/project-work, but this is hampered by teachers restricting choices and lack of suitable books. IL work is not necessarily based on school libraries: it might take place in IT suites or in classroom book-corners. In any case, the main issue is the lack of curriculum time, leading to pupils entering secondary school unprepared to use libraries. There are also concerns about pupils becoming IT-centric, relying on others (via social media) to obtain information. Teachers may well be unsure how best to use libraries to prepare pupils for secondary- and tertiary-education information-work. At the time of writing, library funding was already low, and set to decline further. The authors find that 'IL work in UK schools cannot be said to be in a good state', and suggest that a possible way forward is collaboration between schools. (The rest of the paper covers secondary schools, so not described further in this review.)

In terms of this review's research questions, this work substantiates the decline of UK primary school library funding and importance, which clearly will have had impact on pupils' IL. The paper is rather critical of government decisions leading to this, i.e. it adds to the comprehensiveness of IL research by stating causes. A clear barrier to IL research is the lack of government recognition of IL's importance: it was devolved to a non-focussed body, and steadily defunded. By implication, a missing theme in IL research, at least in this review, is the role of government in promoting or demoting IL research. Similarly, barriers to information-literate societies include reduction of government support for IL development in primary schools, including 'divide and conquer' allocation of responsibility, and reduction of government funding for schools in general. Hence enablers would be the opposite: increasing government backing for IL education. (Of course, this support would need to be implemented well.) Such research may deliver impact/social change by presenting well-supported facts.

It may be worthwhile researching the history of UK primary schools libraries and IL education after 2011, and the government decisions behind this history. (Such research might also delve into local education authority and devolved government decisions.) In the meantime, this paper validates the ILIF finding that 'senior' buy-in and funding are necessary for impactful IL interventions, and provides a tale of missed opportunities to promote IL education.

Kingsawat et al. (2015)

This paper starts by noting that Thailand expects IL to be an outcome of primary education, but it is not a formal part of the curriculum and so is left to individual teachers. Overall, the paper identifies 'components and factors' enabling integration of IL teaching via a virtual learning environment (VLE). The findings comprise components outwith the proposed VLE (e.g. setting learning outcomes, collaboration between teachers and librarians, use of appropriate teaching methods), components to be brought into the VLE (e.g. learning outcomes around the importance and ethical use of information, management of content, links to national goals and legislation, multiplicity of approaches including self-learning, co-operative teaching including small-group work and virtual field-trips – reminiscent of the paper by Kim et al. (2022) in the 'secondary education' section below) and success factors (e.g. competent administrators and suitable budgets, teachers and librarians knowing the importance of IL and able to use IT, collaborative learners who are able to ask questions of their teachers, varied and suitable learning activities, high-speed internet).

In terms of this review's research questions, this paper adds to IL research comprehensiveness by providing an evidenced wish-list for technology to teach IL in primary schools. The paper might be seen as requirements engineering by representatives of developers' clients. Absent, at least from this paper, is reportage of the impact of the completed VLE. This is simply because such research had not yet been undertaken, rather than it being prevented. Enablers of information-literate populations include developing tools such as the proposed VLE, based on a clear, if flawed, government steer that IL is important. It is not clear that this research methodology will have delivered impact/social change. Hence further work again includes investigating the actual impacts of the implemented VLE.

Meanwhile, it can be noted that this work supports several ILIF findings: ensuring integration and relevance of the intervention, collaboration between stakeholders, design of content and delivery methods, management buy-in and budget.

Baji et al. (2018)

This paper evaluates an IL intervention in a 6th-grade Iranian science classroom. At the time, the Iranian government was promoting resource-based teaching methods and LLL in K-12 education. Previously, Iranian education had been text- and memorisation-based (cf Seifi et al., 2020, in the ILIF report), so that teachers did not feel a need to use resource-based teaching, hence weakening school libraries. This set the scene for an IL intervention using the Big6 method. The research methodology consisted of a pre-intervention assessment of control and experimental groups of pupils; teaching using and not using Big6; a post-test immediately after the intervention; a further test 2 months later. It was found that integrating the Big6 method into the curriculum does develop some IL skills (e.g. defining research problems, using proper search strategies, note-taking, information-extraction, citations and legal use of information) However, other aspects of IL (e.g. source evaluation, information-synthesis) were not enhanced, perhaps due to lack of time. However, use of Big6 did change attitudes to research processes and library services. The study showed the importance of specialised librarians and equipped libraries, and of co-operation between libraries and teachers in IL instruction. It also demonstrated some retention of IL skills 2 months after the intervention.

In terms of this review's research questions, this paper extends IL research comprehensiveness by moving out of the anglosphere/first world, and by nodding to internet use in primary education. While this paper of itself does not demonstrate any missing themes from IL research, it notes the need for

related research into curriculum design. The paper does not state a reason for this research gap. Enablers of information-literate societies include using appropriate IL-teaching frameworks well, mandating this in curricula, and appropriate teacher training. While the methodology of this paper does not of itself comment on effectiveness at delivering impact/societal change, it does provide further evidence that structured, integrated, collaborative IL education can be successful.

Wade et al. (2020)

This paper investigates the impact of the authors' own ISIS-21 software, using pre-intervention and post-intervention tests. The paper's literature review notes the lack of curricula addressing teaching of online information skills, in part because *teachers are not required to develop such skills*, and hence an apparent worldwide lack of IL skills. It also provides a recent history of IL interventions for young children. The software itself was designed using an iterative process. The software has planning, searching and using information stages, and does not prevent users from returning to previous stages and substages. It is linked to a multimedia software tool (ePEARL) that enables pupils' self-regulation and feedback provision. The authors found, using the now defunct TRAILS method of evaluating IL skills, that use of the software led to a significant increase in IL skills such as planning*, but not* in post-research reasoning. There was correlation between TRAILS scores and progress through the software's stages.

In terms of this review's research questions, this further extends the comprehensiveness of IL research by highlighting the importance of good design processes in developing software for IL education. The history of IL interventions on its own may be a starting point for IL practitioners and decision-makers. The paper does not of itself demonstrate any absent themes in IL research, apart from a need for further research with more participants. Enablers of information-literate populations include quality IL-education software that mandates feedback from teachers. While it is clear that research into IL-education software can hone software that delivers impact/social change, arguably the most welcome feature of this paper is a model to other researchers of writing clear, informative, suitably illustrated papers.

Silajdžić et al. (2022)

This paper starts from a position that education, leaching and learning are political processes. It notes that critical pedagogy aims to understand deep causes, ideology and personal consequences, and states that education should be around liberation via dialogue. It further states that schools and curricula are sites of struggle over meaning and power relations. The paper reports how control of schools in Bosnia and Herzegovina (BiH) was divided among the factions controlling different geographical areas, leading to fracturing of teaching methods, political structures, society and other unfortunate consequences. The research is about using workshops to introduce teachers and librarians in a BiH school to the hybrid model of multicomponent integration of media and Information literacy (MIL) into education. The conclusion appears to be that having the skills to teach MIL alone is insufficient to counter oppression, but that such teaching does open the door to critically thinking about one's own position as a professional in education.

In terms of this review's research questions, this paper extends the comprehensiveness of IL research into nakedly political, war-torn contexts, questioning the philosophical underpinnings of MIL education. Such questioning appears to be otherwise absent from other papers in this review. One of the factors preventing IL research in this arena is the war's aftermath. Enablers of information-literate

societies include teaching of critical thinking, which requires teachers able to do so. While the paper does not report any social change stemming from the workshops, the method used in this paper (a case-study, albeit with a. very small number of participants) may deliver impact/social change by focussing on politics and philosophical underpinnings affecting society.

Secondary education

Julien and Barker (2009)

This paper examines relationships between secondary science curricula, which may support development of IL and actual skills, to question whether curriculum-mandated IL development leads to demonstrable development. The authors point out that secondary schools need to develop IL skills because not everyone goes into tertiary education. The authors also note that secondary school pupils generally do not have metacognitive skills. The findings are that most pupils used Google for information-searching, because it's 'reliable' and faster, and because they can copy and paste from search results. Pupils also see school-issued textbooks as reliable but not very accessible. A few pupils gather information from university websites.

In terms of this review's research questions, this paper adds to the comprehensiveness of IL research by reporting on the effects of a government IL policy, albeit in a single Canadian province, and focussing on the teaching of a single subject. Limitations to this research also include gathering data by interviewing pupils and analysing their courseworks. Triangulation by observing teaching or interviewing teachers may have enhanced the research. Barriers to information-literate societies include lack of IL assessment in exams, i.e. not providing concrete spurs to IL development. Hence a research method that might deliver impact/social change might be interventions that observe pupils' forced development of IL skills.

Korobili et al. (2011)

This paper examines high school teachers' IL skills, and the extent of IL instruction in Thessaloniki, where rights to information and to participate in the information society are 'protected by the State'. However, at the time the paper was published, few Greek public secondary schools had libraries, and even fewer had librarians. Also, there was no research into Greek high school pupils' or teachers' IL. The researchers found that 44% of teachers did not undertake information-retrieval, that a larger proportion of men than of women undertake it, and that information-retrieval is undertaken more by teachers with postgraduate qualifications. Teachers sought help with information-retrieval from colleagues and/or friends, not librarians, and had self-taught IL skills. A further finding was that pupils do not know how to distinguish between important and unimportant information.

In terms of this review's research questions, while the actual research concentrates on a single geographical area, the literature cited considers relevant research worldwide. Hence literature reviews can enhance the comprehensiveness of the *impact* of IL research. An absent 'theme' in this paper is IL skills beyond information-retrieval. A barrier to IL research mentioned by the paper is potential participants' reluctance to be 'evaluated'. Enablers of information-literate societies include supportive school leaderships, collaboration and individual teachers' motivations to be information-literate, which may be enhanced by having postgraduate qualifications. A related barrier is teachers not passing on their IL skills to pupils. Of itself, the method in this paper cannot lead to social change, but

'baselining' and understanding sources of motivations to become information-literate may be a first step in delivering such change.

Kim et al. (2022)

This paper is based on the idea that learning may be driven by problem-based learning, which may be enhanced by virtual field-trips, to avoid issues stemming from actual travel. The IT underpinning virtual field-trips may enhance learning of IL skills via conceptual scaffolding (dynamic feedback), strategic scaffolding (prompts around information-search, validation and use), and metacognitive scaffolding (supporting reflection and reasoning). The researchers gathered data from a virtual field trip to collect air-quality data, in which pupils IL skills were investigated. It was found that the three types of scaffolding generally support skills development, albeit with some limitations.

In terms of this review's research questions, this paper adds to the comprehensiveness of IL research by investigating the impact of a multi-featured IT-based teaching aid that has built-in prompts to help pupils undertake different stages of the IL 'process'. In short, it shows that well-written software IT can support IL skill development. The paper does not mention any missing themes in IL research. Enablers of information-literate societies include teaching people to break IL tasks into small steps, and prompting them to take these steps. Barriers include pupils' desires to be simply told the answers to questions. According to this research, mixed methods (quantitative investigation of how much each phenomenon occurred), qualitative investigation of pupils' thinking) can lead to heightened understanding of how social change (that is, generation of information-literate people) can be delivered.

Majid et al. (2016)

This paper audits IL skills of secondary school pupils in Singapore. The authors note that IL teaching in Singapore started in 1997, and IL teaching is now included in curricula and text-books. Hence the researchers aimed to ascertain the success of IL teaching, using a large quantitative survey of IL abilities. It was found that visits to libraries are rare and hence use of library resources is 'disturbingly' low. Pupils will primarily consult classmates, friends, teachers, family, or no-one rather than librarians. They assess themselves as having significantly greater IL skills than they actually have, according to an objective test of these skills. There is a weak correlation between self-efficacy and IL skill levels. The latter are enhanced by attendance at well-funded private schools, in female pupils, in those who have domestic internet access and in those who visit libraries, even though many pupils believe that librarians are only book-issuers, and that information is available elsewhere. Overall, IL of Singaporean secondary pupils has increased since 2014, implying that integration of IL teaching into curricula is successful but much more improvement remains to be achieved.

In terms of this review's research questions, this paper enhances the comprehensiveness of IL research by building on a previous IL assessment to show the impact of government IL education policy. Absent 'themes' from this paper include qualitative research into the causes of the phenomena. The paper does not state factors preventing research into such themes. In fact, a gestalt of the reading for this review implies that Singapore's government welcomes IL research. Enablers of information literate societies include teachers, classmates, friends who have IL skills; syllabi and other mandates/messages from government; textbooks that promote IL; promotion libraries as sources of IL skills; being female; and collaboration between teachers and librarians. The method used in this paper can be a foundation

to delivery of societal change, in that such research can ascertain whether policies designed to deliver IL skills are successful. This again suggests that longitudinal research is necessary.

Tertiary education

Iton (2006)

This paper focuses on an IL intervention in a Caribbean university, in which IL instruction was added to a library orientation programme, and the lessons learnt from the first year of this version of the programme. The authors note that new students have little knowledge of libraries and IL skills, because most West Indies high schools do not have libraries, let alone qualified professionals. Prior to the intervention, attendance at library orientation, which included a 1-hour laboratory session on IL, was voluntary; many students did not attend. In response, IL sessions were made compulsory, and included tutorials as well as lectures. Because lecturers didn't take part in IL sessions in the first year of the programme, the university hired full-time instructors and instituted assessments of students, taught lecturers to integrate IL with other teaching, and enabled collaboration between lecturers and librarians. Durations of IL sessions were also changed to avoid overwhelming students, and group-work was added. The authors concluded that trial and error, and consideration of students' needs and abilities resulting from their school education, are key to progress. Further, top-down management does not work – instead librarians need to 'seduce' their colleagues into teaching IL, and create critical masses of IL advocacy from the bottom up.

In terms of this review's research questions, this research adds to comprehensiveness of IL research by adding a human-centric trope. The paper does not mention absent themes from IL research, or any factors preventing their presence. The barriers to information-literate societies include top-down university management denying room for development of IL teaching. Enablers include librarians experimenting with IL teaching methods, to build a critical mass of IL advocates; collaboration between librarians and lecturers; integrating IL teaching with other teaching;, making IL learning compulsory in tertiary education. The method of this research can deliver impact by recording and analysing improvements to IL teaching delivery. In this instance, participant observation/analysis showed both enablers and barriers, including issues with other powerful stakeholders,

Sanches et al. (2022)

This paper investigates academic librarians' pedagogical strategies for teaching IL, using critical thinking as a research lens. The researchers developed a theoretical framework by mapping critical thinking problem-solving steps to the ACRL conceptual frames, in order to develop interview questions. From the interviews and their analysis, the researchers found that metacognition is enhanced by database searching. Students do undertake reflection and analysis, assessment, inference and are resilient when IL activities hit barriers. Hence combining critical thinking and IL in teaching can be successful.

In terms of this review's research questions, this paper adds to the comprehensiveness of IL research by including an external factor (critical thinking) into IL theory. However, a barrier to such research may be seen in the researchers gathering data from gatekeepers (librarians) rather than students so that it only truly shows how academic librarians teach IL, not the impact this has on the students. With that said, enablers of information-literate societies include instilling critical thinking to underpin the

steps of the IL process. The underpinning method of this paper, examining an alternative way to instil IL, may point a way to deliver social change.

Baro and Zuokemefa (2011)

This paper is a survey of IL programmes in 36 Nigerian academic libraries, in response to the low prevalence of IL skills in Nigerian students. It was found that most respondents could basically define IL, but few know about analysis, lifelong learning or creating new information. Most university libraries provided some IL education for students, but the majority of this was about recognising information-needs and information-searching. No IL education covered analysis, and little covered information-management and referencing; synthesis, search-tools, research skills, LLL, or creating new information. Most IL education was based on the then-current ALA, CILIP and New Zealand IL models. Most IL education programmes were delivered face-to-face, due to lack of IT equipment. Most librarians would have been happy to share their IL education methods. About half of the programmes were integrated well into the curriculum, and developed with subject-teachers. IL was promoted via library publications, 1-2-1s with staff and students, public lectures, orientation talks and library tours, skills courses, and IT instruction. Barriers to IL education included poor attendance, lack of HR ability to support, lack of staff able to teach IL, lack of IT equipment, unstable electricity supplies, and lack of support from teaching staff. Enablers of IL training included embedding librarians in teaching.

In terms of this review's research questions, this paper extends the comprehensiveness of IL core research into a major African nation's tertiary education system, and the barriers facing those who would instil IL. A missing 'theme' is the actual impact of the IL education then being delivered due to lack of gathering data from the recipients of IL education. Barriers to an information-literate society (at the time) included not teaching the full IL 'process', lack of time, lack of suitably trained staff, lack of university commitment, lack of collaboration, lack of IT equipment, lack of other resources; IL models not being used in all cases. Enablers of information-literate societies included promotion of IL via library publications, 1-2-1s with staff and students, public lectures, orientation talks and library tours, skills course, IT instruction. This methodology – surveying gatekeepers – may be effective by showing why IL education was not successful under the then-current conditions.

Maitaouthongn et al.(2011)

This paper focuses on integration of IL into teaching in Thailand, looking at university-level policy-makers and surveying lecturers and librarians. The starting point is that in 2009, national standards for tertiary education were implemented following a 'crisis' in tertiary education in Thailand. Integration of IL into teaching was not yet mandatory in Thailand. Interviews were undertaken with two senior university policy-makers, and 123 lecturers and 42 librarians were surveyed. All were at a single Thai university. It was found that there are clear factors at policy level around resources and infrastructure, around learning sources and learning support programmes, around development and evaluation of lecturers. The survey showed that the most important factors are teaching methods, roles of students, teaching plans, learning activities, roles of lecturers, instructional media, perceptions of lecturers and librarians, co-operation between lecturers and librarians, and learning outcomes. The most effective teaching approach was found to be small-group teaching, followed by problem-based or case-study teaching and self-learning.

In terms of this review's research questions, this research extends the comprehensiveness of IL research by investigating the factors behind university policy, and by moving beyond the

anglosphere/first world. The missing 'themes' are the lack of qualitative investigation of the reasons behind lecturers' and librarians' opinions of which teaching methods are effective. Also, the research does not gather empirical data from students about which methods are effective, e.g. examining which methods gave rise to higher grades. Enablers of information-literate societies, assuming that IL learning persists after university, include **g**ood teaching practices, backed up by management support and appropriate policies. The methodology in this paper, an assessment of which IL teaching methods work, may help determine which IL teaching methods can deliver impact. However, it is known from the earlier ILIF project that IL teaching needs regular, ongoing reinforcement.

Bangani et al (2020)

This paper focuses on students' perceptions of the usefulness of IL training delivered by librarians at a South African university, and of the effectiveness of such teaching. It was found that most students think IL training is useful, and either good or very good, and that librarians were generally easy to understand in IL classes, and perceived as facilitators and trainers. Students want more IL training, delivered at a rate at whichx it can be taken in, and for it to be delivered in 1st year, not final year. Each session should focus on a single aspect of IL, and cover several different reference managers. Students react strongly against deficiencies in IT equipment, and request presentation slides, so they can self-teach after the sessions. A further request is for training in the students' mother-tongues.

In terms of this review's research questions, this paper extends the comprehensiveness of IL research by going past gatekeepers to the recipients of IL education to understand their satisfaction with it, hence delivering hints on how such education is best delivered. Absences from this research include the content of the IL education, whether attendance was compulsory, and whether attendance/participation affected grades. Enablers of information-literate societies include librarians as IL teachers in universities; these librarians having classroom presence; not cramming all IL teaching into a single session, IL teaching not being dull. This paper's research method – involving the recipients of IL education – may help deliver social change by helping future IL education to be effective, so long as the effects of IL education persist into later life.

'unclassified' education

Tumbleson and Burke (2010)

This paper, which covers tertiary education, discusses 5 methods of IL instruction: reference service (where a student just asks a librarian for help), one-shot sessions (where a librarian gives a lecture to students), credit courses (which run throughout a term), library websites and embedded librarians. It concludes that embedded librarians make the most 'sense and cents' for investment of librarians' time. Students can access librarians when and where they prefer. Content created by librarians can be repurposed for other courses. Embedded librarians can do traditional, online-only or hybrid teaching to reach the vast majority of students. However, these conclusions stem from the authors' own experience as academic librarians, rather than from any robust data on, for example, whether students perceive benefits from this method, or whether such benefits can be objectively demonstrated.

In terms of this review's research questions, this paper enhances the comprehensiveness of IL research by propounding experienced librarians' views on the best methods to teach IL. There is no mention of factors preventing any IL themes being researched. The enablers of information literate societies the authors mention include embedding librarians, to make best use of their efforts. An implication of such

embedding is some collaboration with subject teachers, and ongoing availability/IL teaching throughout a course. In terms of delivering societal change, this paper may prompt others to question their own IL education practices.

Workplace

Trinder et al. (2007)

This paper sought evidence that NHS library outreach projects were effective and hence financially justified, by assessing whether IL skills training for health professionals impacted their confidence and skills in using electronic health information sources. The researchers used a pre-project test to establish a baseline, a post-project test to ascertain immediate perceptions of training, and a follow-up test 6 weeks later, to assess impact. The researchers found that while around two fifths of participants had already had some information skills training, nearly three quarters wanted more after this training scheme. The scheme had potential for impact in that almost all participants stated that they would use their new learning to support patient care, inform patients, develop guidelines, for personal development and/or for teaching. Confidence in information skills was still high 6 weeks after the training. Use of simple Google searches decreased considerably, while use of medical databases increased. This is important because much professional health information is not available via Google searches.

In terms of this review's research questions, this research enhances the comprehensiveness of IL research by ascertaining impact of IL training in the medical arena. The paper does not mention any absent themes from IL research, or reasons for their absence. However, the paper reports a small-scale quantitative study that did not assess the impact of the training in terms of improved medical outcomes. Barriers to information-literate societies include the need for very robust argument that IL training will work before it can be provided. Enablers include workplace IL training. Concerning methods that may deliver societal change, this was a simple study of increased IL abilities that did not explore the factors behind the training's success.

Dixon et al. (2017)

This paper explores an IL intervention around primary healthcare professionals, focussing on two digital information-tools. The research followed a restructuring of primary care teams which included the addition of non-clinical staff who would mainly use information tools to aid the healthcare professionals: an almanac and a patient-data system. Data was gathered by interviewing team members at baseline, 16 weeks and 2 months after the intervention, and by a survey of all relevant healthcare professionals. It was found that for both teams that had been restructured and teams that had not, after the intervention, IL levels were 'modest'. However, there were major problems with the tools, which may well have affected uptake of IL learning. Despite this, the authors contend that these healthcare professionals need better IL skills, not least because IL skills lead to better use of digital health information tools.

In terms of this review's research questions, this research extends IL research into a real-life healthcare/workplace arena, to find that relevant professionals have 'modest' IL skill levels. Concerning barriers to relevant IL research themes, there is a need for better IL-assessment tools, studies with larger sample sizes and other ways to generalise findings. Further, there is a need for objective tests of IL abilities to assess the impact of any IL training, rather than reporting self-perceived

impacts. Barriers to information-literate societies include lack of interest in information tools, stemming from professionals being very busy and information not being presented well. This research's method appears not to have delivered impact.

Chen et al. (2023)

This paper reports a large-scale evaluation of Chinese teachers' IL, using an online questionnaire that investigated all of China except Hong Kong, Macao and Taiwan, using stratified random sampling. An overall IL score of 75% was found, while **f**emale teachers have slightly higher IL than male teachers, older teachers have lower IL scores, teachers of English have higher IL scores than teachers of other subjects, primary and middle school teachers have slightly lower IL scores than high-school teachers, urban teachers have higher IL scores than others, and that teachers in eastern regions have slightly higher IL scores than teachers in central regions, and about 10% higher scores than teachers in western regions.

In terms of this review's research questions, this research enhances IL research's comprehensiveness by investigating the IL of over 150,000 participants in a country representing 20% of the world's human population. Barriers to information-literate populations include being male, being older, teaching subjects other than English, being a primary or middle school teacher rather than a high-school teacher, teaching in a non-urban area or teaching in a central or western region of China. The research does not investigate the causes of these findings. This research's method of itself cannot deliver social change, but it provides a robust baseline for future longitudinal studies.

O'Farrill (2010)

This paper explores workplace IL and its connections to knowledge management, and the applicability of mainstream IL frameworks. The method was interviews with NHS24 staff around the questions 'What does being effective mean in your job?' and 'What is using information effectively in your job?'. It was found, inter alia, that conceptions of effectiveness did not foreground information-work, even though key factors included development of information systems, knowledge-bases and appropriate decision-making. Conceptions of effective information-use included: awareness of events that affect NHS24 and its services; awareness of health information and knowledge sources; sourcing appropriate information for decision-making; giving appropriate advice and information to callers; controlling information such as patient records; sharing knowledge and info; using information to learn; using information systems. The researchers' interpretation is that the 'main job' consumes attention, and information-seeking is semi-automatic and subsidiary to deciding what to do for a patient. Information work depends on informal support between workers, i.e. collaboration, and hence knowing who to ask (analogous to source-evaluation in 'traditional' IL) The overall findings were that NHS24 staff are information-literate, and that being information literate is a key component of being effective.

The authors criticise IL frameworks' assumptions that information-use and problem-solving skills can be moved from context to context, e.g. sense-making does not come from prior skills but from dialogue on the job. Hence context-specific IL frameworks are needed. Further, IL frameworks (at the time) omitted social and cultural practices, and the sharing/collaboration of knowledge management practices.

In terms of this review's research questions, this paper extends IL research's comprehensiveness by examining an area of considerable social importance, by linking IL to knowledge management, by

acknowledging that IL is not solely about textual sources, and by critiquing one-size-fits-all IL frameworks. In common with Silajdžić et al. (2022), it questions the underpinnings of IL. Hence barriers to information-literate societies include generalised IL frameworks, while enablers include on-the-job training and context-specific IL frameworks. If such findings later have impact, this will be due to the research's qualitative method: phenomenography.

Sales and Pinto (2011)

This paper reports translators' views of IL, and the information-competencies they need, as a first step in developing an IL framework for translators. The authors state that translators not only process information from one language to another, they also produce it. The authors also query the generic conceptions of IL stemming from Library and Information Science. 20 Likert questions and 6 free-text/open-ended questions were used to gather data from science-technical, literary, audio-visual and legal or administrative translators, and from interpreters. It was found that participants rank knowing how to access and retrieve online information as the most important skill, followed by knowing how to use a computer professionally, knowing how to take decisions, awareness of existing information sources, having skills to analyse and synthesise information, and knowing how to use encyclopaedias, dictionaries and databases. Translators' needs were around source-verification, translating words not yet in dictionaries, specialist information, cultural information around the contexts of translations, and difficulty in accessing experts. Potential ways forward include creation of a community of practice or recognised professional body that fulfils practitioners' needs.

In terms of this review's research questions, this paper extends IL research's comprehensiveness by covering a profession that processes information and thus needs IL, and that is important to professional and cultural exchange. The paper speaks to humans as information sources, as does O'Farrill (2010). Barriers to information-literate societies include lack of training, lack of professional tools, resources and bodies. Concerning delivery of impact, this paper's mixed method was effective at ascertaining both issues and ways to tackler them. However, the paper does not report the outcome of attempts to implement solutions.

Health

Janke et al. (2012)

This paper focuses on promoting IL through collaborative service learning for undergraduate nurses. It notes some relevant issues around the goals of IL learning facing both students and staff, including lack of status and respect for university librarians. To tackle such issues, the authors developed a scaffolded course to enhance students' IL and appreciation of the relevance of evidence. The course focussed on obtaining and synthesising literature, and centred on service-learning group projects to write literature reviews. It included a 75-minute class from a librarian on literature searching using Boolean operators and a specific vocabulary for a large medicinal research database[5]. Some student-groups also received short, informal seminars. It was found that major challenges to IL learning were around the nature of group work, the difficulty of the projects (some of which were commissioned by senior healthcare

[5] vocabulary: Medical Subject Headings (MeSH); database: PubMed (https://pubmed.ncbi.nlm.nih.gov).

practitioners), scheduling, and conflict management. However, as well as learning IL skills, the students also learnt how to work in teams and how to apply research to practice. Other findings were around the need for individualised help and shorter, focussed classes (rather than a single long one-shot session) that are integrated with relevant teaching, the desirability of involving librarians sooner, and of having regard to the other pressures students face. Practical impact was seen in one group-project creating a caregiver support group, in another revising an emergency department clinical procedure, and in a third summarising best evidence on injection procedures.

In terms of this review's research questions, this research adds to IL comprehensiveness by considering a workplace area of significance to much of society, and by examining how to improve IL education to achieve relevant benefits. There was no material in the paper on absent IL research themes or barriers to researching these themes. Enablers of information-literate societies include: service-learning educational methods involving group projects; collaborations between lecturers and librarians; good IL course design (including scaffolding: cf Kim et al. (2022) that involves students working with experienced practitioners; and demonstrating the relevance of IL learning to practice. Barriers included lack of respect for university librarians. The research method obtained data directly from those affected by the IL training; the impact of the research (provided it continues) on healthcare could be widespread.

The 'good course design' finding echoes an ILIF finding.

Fuzhi et al. (2019)

This paper is an evaluation of health IL (HIL) and influencing factors among digital immigrants in rural China, and the barriers to online health information-seeking. The researchers surveyed residents of a rural community who were aged 45 to 65, had at least basic reading and writing skills, and were both mentally and physically able to participate. The survey questions covered self-reported health information-seeking ability, health information evaluation ability, health information consciousness, and health information application ability. Semi-structured interviews were then undertaken with 5% of the survey participants who had used the internet for more than 3 years. It was found that those who were younger, university educated, worked in professional or technical professions or used the internet more had higher information abilities and higher information-consciousness. Of these factors, education was the most influential. The interviews showed, *inter alia*, that there were many difficulties in understanding health information and storing digital information, and that many people do not know how to evaluate information, leading to susceptibility to false advertising. Hence there is a desire for government to focus on HIL teaching, and to control online distribution of health information.

In terms of this review's research questions, this research enhances IL research's comprehensiveness by investigating the factors affecting senior citizens' IL. That is, it directly evaluates the IL of a significant proportion of society. The paper does not directly report any missing themes from IL research, but the authors note limitations on this research: that it covered only Anhui province, that better HIL evaluation tools are needed, and that data are self-reported rather than objectively measured. Barriers to information-literate populations include lack of university education, which echoes the preponderance of IL research into tertiary education, and lack of government action to control misinformation.

Li et al. (2022

This paper investigates the health IL of the elderly in China during the COVID pandemic, so might be seen as a follow-on to work by Fuzhi et al. (2019). The authors note that there were large increases in anxiety and depression since March 2020, perhaps linked to people being unable to go out *inter alia* to obtain health information, while continuing to be unable to obtain health information online. The authors undertook a survey of 6 randomly chosen communities in Chenzhou, using a convenience sample of people aged 60 or older, assessing health information cognition, search, evaluation and application. It was found that health information literacy overall was low, while cognition was the most prevalent aspect of HIL, perhaps because of communal activities stimulating thought. Variance of HIL is due to: educational levels; family income; living alone, with a spouse or with children; and chronic disease status. Being female was associated with higher HIL. Respondents rated the following as reliable health information sources: doctors, health programs on TV, family and friends. In response, the authors suggest that communities should organise health education programs that teach IT use.

In terms of this review's research questions, this research enhances the comprehensiveness of IL research by demonstrating a major need for HIL, exacerbated by recent global conditions. It provides further evidence that people of higher socio-economic and educational statuses are less likely to experience barriers to developing IL. The paper does not directly report any missing themes from IL research. The barriers to information-literate societies include being older, male, less educated or poor, and not living with children. While the method used in this paper cannot of itself deliver impact/social change, it provides a benchmark against which to assess efforts to deliver such change.

Cullen et al. (2011)

This paper investigated whether junior doctors in their first clinical employment retained IL skills learnt as undergraduates. The researchers used interviews to ascertain what junior doctors recalled of medical school IL training, the techniques and databases they now used for information-searching; whether the junior doctors undertook any further IL learning; and their perceived information-searching, retrieval and appraisal skills. Participants' information-searching abilities were also objectively assessed. It was found that junior doctors had 'reasonable' recall of skills, and broadening pf search strategies, but very little further IL learning. In the objective test, junior doctors were most able to locate randomised controlled trials and systematic reviews, but could not use more advanced database search functions. It was also found that those who had had more evidence-based medicine (EBM) training at medical school used evidence-based sources less. Further, junior doctors own assessment of their skills were higher than the levels they demonstrated in the objective test. The authors state that 'clinicians often identify and apply what they believe to be reliable and relevant information from a set of sources that does not truly represent the best evidence available.' The authors concluded that there was no correlation between level of IL instruction and current IL skills, that developing IL/EBM skills was much needed, that undergraduate IL instruction had not yet resulted in continued use of IL skills, nor had embedding IL training into the curriculum. Instead, IL training needed more complex interventions.

In terms of this review's research questions, this work extends the comprehensiveness of IL research further into the medical arena. The paper does not directly report any missing themes from IL research, but it does note that this research is limited by small sample sizes. Enablers of information-literate societies include making IL education compulsory in undergraduate courses. While this research of

itself cannot deliver social change, the method used triangulates qualitative and quantitative research to give a snapshot of the low IL of doctors a decade ago, which may have a significant impact on society over many years.

The research further validates the ILIF finding that repeated interventions are needed to maintain IL skills.

Ullah and Ameen (2019)

This is paper reports on Pakistani librarians' perceptions of teaching IL skills to medical students. Structured interviews were undertaken with 20 head librarians of academic health science libraries who had previously stated that they had good understandings of IL. It was found that most participants believe that medical students' IL skills are inadequate, due to lack of training, lack of internet-searching ability, lack of money leading to lack of IT devices. There is a lack of IL teaching at the participants' universities, in part because librarians do not offer formal IL programmes. This is exacerbated by traditional teaching methods and curricula that deprioritise use of IL skills by library users, and by Pakistani secondary schools not teaching IL. The participants' suggested solutions included continuous IL training by librarians, development of IL courses that are part of the curriculum by librarians and faculty (i.e. faculty-librarian collaboration), promotion of EBM, repetition of training, IT training, getting senior buy-in. Participants disagreed on whether faculty or librarians should take charge of delivery of IL education. However, IL training needs to be 'sold' to university and policy decision-makers.

In terms of this review's research questions, this paper further extends IL research into the medical arena outwith the anglosphere/first world. The paper does not directly report any missing themes from IL research, but it does note that this research is limited to a small sample of librarians, and does not gather data from faculty or the students they teach. Barriers to information literate societies include lack of IL teaching before university and at university, while enablers include collaborative, integrated repeated IL education. Concerning impact on society, this paper documents a present-day *missed opportunity for impact*: if students do not have IL skills, they cannot undertake evidence-based medicine, thus depriving their patients in the same way that Cullen et al. (2011) prophesied.

This research supports several ILIF key components of impactful IL research, namely ensuring integration and relevance of the intervention, collaboration between stakeholders, design of content and delivery methods, repetition and follow-up, management buy-in and budget.

Appendix 3: details of 'Library Instruction and IL' series

Table 28: research locations in (Johnson & Jent, 2007)

Country	number of items about that country
USA	81
UK	21
Canada	11
Australia	8
Botswana	2
South Africa	2
Belgium	1
Brazil	1
Dominican Republic	1
India	1
Malaysia	1
Taiwan	1
Saudi Arabia	1
West Indies	1
Unclear or multiple	155
Total	**288**

Table 29: countries mentioned in 'Library Instruction and IL 2021'

Country	Number of items	Country	Number of items
Australia	3	Korea[6]	2
Bangladesh	3	Kuwait	1
Belgium	1	Malaysia	2
Cambodia	1	Mexico	1
Canada	7	Namibia	1
China	15	Netherlands	1
Czech Republic	1	New Zealand	2
Egypt	1	Nigeria	14
Ethiopia	1	Pakistan	12
Fiji	1	Philippines	1
Finland	2	Poland	2
France	1	Russia	1
Germany	6	Slovakia	1
Ghana	5	South Africa	4
Hong Kong	2	Spain	5
India	19	Sweden	1
Indonesia	4	Taiwan	3
Iran	1	Tanzania	3
Israel	1	Thailand	2
Italy	1	UK	6
Japan	2	USA	46
Jordan	1	Unclear or multiple	236
Kazakhstan	1		

[6] It was not clear whether these works covered North Korea, South Korea or both.

Table 30: data about the 'Library instruction and information literacy' series

Year	Citation	Academic	Public	School	Special	All types	Total	Number of authors of this paper
1973	Not obtained	19	0	5	3	2	29	Not obtained
1974	Not obtained	23	0	6	6	3	38	Not obtained
1975	Not obtained	30	0	11	5	3	49	Not obtained
1976	Not obtained	51	1	11	3	2	68	Not obtained
1977	Not obtained	63	1	19	11	10	104	Not obtained
1978	Not obtained	85	0	27	9	11	132	Not obtained
1979	Not obtained	91	5	40	17	15	168	Not obtained
1980	Not obtained	67	1	23	6	12	109	Not obtained
1981	Not obtained	99	3	18	8	16	144	Not obtained
1982	Not obtained	80	1	15	8	15	119	Not obtained
1983	Not obtained	87	3	38	13	20	161	Not obtained
1984	Not obtained	165	6	34	8	26	239	Not obtained
1985	Not obtained	71	0	31	5	16	123	Not obtained
1986	Not obtained	79	2	23	12	26	142	Not obtained
1987	Not obtained	91	1	17	6	15	130	Not obtained
1988	Not obtained	101	4	22	14	8	149	Not obtained
1989	Not obtained	105	8	18	14	13	158	Not obtained
1990	Not obtained	102	2	17	6	5	132	Not obtained
1991	Not obtained	118	5	33	16	23	195	Not obtained
1992	Not obtained	140	4	56	11	6	217	Not obtained
1993	Not obtained	131	3	28	12	12	186	Not obtained
1994	Not obtained	78	1	58	9	18	164	Not obtained
1995	Not obtained	197	5	38	18	13	271	Not obtained
1996	(Rader, 1997)	107	4	45	19	15	190	1
1997	(Rader, 1998)	110	5	49	7	24	195	1
1998	Not obtained	138	2	87	28	31	286	Not obtained
1999	(Rader, 2000b)	120	6	80	8	18	232	1
2000	(Johnson, 2001)	125	5	65	18	24	237	1
2001	(Johnson & Rader, 2002)	155	4	78	27	17	281	2
2002	(Johnson, 2003)	151	3	102	10	21	287	1

Year	Citation	Academic	Public	School	Special	All types	Total	Number of authors of this paper
2003	(Johnson & Jent, 2004)	148	3	98	9	20	278	2
2004	(Johnson & Jent, 2005)	159	4	69	20	18	270	2
2005	(Johnson & Jent, 2007)	131	2	95	39	21	288	2
2006	(Johnson et al., 2007)	211	4	62	9	31	320	3
2007	(Johnson et al., 2008)	216	3	90	28	34	371	3
2008	(Johnson et al., 2009)	291	8	123	22	73	517	3
2009	(Johnson et al., 2010)	274	10	107	51	68	510	3
2010	(Johnson et al., 2011)	258	9	53	33	55	404	3
2011	(Johnson et al., 2012)	308	12	84	59	62	522	3

Year covered	Citation	Academic	Public	School	Medical	Legal	All types/other	Total	Number of authors of this paper
2012	(Johnson et al., 2013)	312	14	88	60	6	65	545	3
2013	(Detmering et al., 2014)	313	13	59	58	6	52	501	5
2014	(Detmering et al., 2015)	314	6	51	55	7	50	483	5
2015	(Reynolds et al., 2016)	356	4	53	51	1	23	488	4
2016	(Reynolds et al., 2017)	370	6	52	45	4	46	523	5
2017	(Johnson et al., 2018)	395	24	69	37	3	67	595	9
2018	(Withorn et al., 2019)	262	6	57	42	3	42	412	9

Year covered	Citation	Academic and professional programs	Everyday life, community and the workplace	K-12 Education, children and adolescents	Libraries and health IL	Other IL research and theory	Multiple library types	Total	Number of authors of this paper
2019	(Withorn et al., 2020)	257	30	31	23	16	13	370	11
2020	(Withorn et al., 2021)	303	45	34	26	15	11	434	13
2021	(Caffrey et al., 2022)	290	40	35	29	23	10	427	14