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# Artificial intelligence skills and knowledge in libraries: Experiences and critical impressions from a learning circle

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## Abstract

The rapid expansion of artificial intelligence (AI) poses challenges as well as opportunities for anyone or anything dealing with digital technologies, including libraries. Libraries and librarians have a twofold challenge in that they simultaneously must consider AI applications in library operations as well as AI skills and knowledge as part of the information literacy (IL) training they provide for their users, whether it be in IL programmes or informal learning contexts.

This study follows a learning circle in which 123 librarians in Sweden did a pre-existing online course about AI and met up at regular intervals to discuss its contents in a library perspective. The increased knowledge about AI and libraries and the confidence to pass on this knowledge to library users is measured through a self-efficacy test conducted on three separate occasions during the learning circle. The result from the test shows an increase in AI knowledge during the learning circle, although the small sample makes it difficult to draw definitive conclusions. A focus group from the learning circle was interviewed to get an in-depth understanding of librarians' core topics of concern and excitement regarding AI and libraries. The results from the interview showed that there was a mainly positive view of AI in relation to making library collections more accessible and easier to manage, while there was more concern regarding AI's impact on the media landscape and how this could impact library users. Introspectively, the focus group perceived challenges in including AI when teaching IL to users as well as in the lack of AI skills among colleagues that could make it difficult to apply or discuss AI in relation to the workplace and the library profession.

This paper presents a method of increasing AI knowledge among librarians and library staff. It highlights topics relevant for several library types when faced with the development and application of AI in libraries and in society that based on the results of the study are difficult to escape. The insights may prove useful when planning educational endeavours and when considering library development and strategy related to AI and their implications for libraries and library users.

## Keywords

artificial intelligence in libraries; information literacy; information literacy education; professional ethics; Sweden

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## 1. Introduction

Artificial intelligence (AI) has rapidly become an important part of our everyday life, whether we are aware of it or not. While our thoughts may go to science fiction or self-driving cars—or a cross-section between the two—AI is now embedded in tools we use and rely on daily: web search engines, social media applications, speech recognition services from government agencies and enterprises, and smart home devices. The opportunities AI brings to society is

accompanied by risks, and the largest risk may be identified as its creators, humans, who ultimately govern everything AI is and does.<sup>1</sup>

In a preliminary study on the ethics of AI, UNESCO World Commission on the Ethics of Scientific Knowledge and Technology noted that while “AI can strengthen the free flow of information and journalistic activity [it] can also be used to spread disinformation,” which “can have negative effects on norms of civil and informed discussion, on social trust and public debate or even on democratic processes” (UNESCO, 2019, p. 17). In UNESCO’s (2021, p. 8) second version of their *Media and Information Literacy Curriculum for Educators and Learners* (this target group includes librarians) AI is described as a challenge to IL, stating that while AI brings “benefits to our day-to-day lives”, it also “begs many questions about risks.”

Acknowledging this strong role of libraries as IL educators, it can be concluded that AI is an important component of IL and that librarians and library staff may be in need of skill development in this area. This study explores the development of AI skills among Swedish librarians and library staff through a nationwide learning circle, and delves further into ethical issues regarding AI in library settings.

The study aims to answer the following questions:

- How and how much did the learning circle increase AI knowledge among the participating library staff? Was the learning circle a successful method for AI skill building?
- What thoughts, perceptions, and questions on the topic of AI and libraries were generated among the learning circle participants as a result of the learning circle?
- How did these thoughts, perceptions, and questions relate to a broader, international perspective on AI in society and AI in libraries?

The study is therefore a twofold effort, one part focuses on pedagogical methods for teaching library staff AI skills, and the other part focuses on AI and libraries with an endeavour to map important topics to consider in future library operations development as well as in library and information science research relating to AI in libraries.

## 2. Background and theoretical framework

The impact of AI on society redraws the blueprint for many of our social structures on all levels. It has implications on everyday interactions between people and technology. Ethics, surveillance, privacy, trust, transparency, and public debate are concepts that are being renegotiated in an information society development fuelled by AI. This development is covered in this section, along with AI in relation to libraries, AI as an IL component, and their role in these societal renegotiations. Thereafter the theories of learning circle and self-efficacy are presented as ways of approaching the research questions.

### 2.1 AI in society: ethics, surveillance, privacy, and trust

The emergence of AI in society has created implications on many levels. Its innate need of data to perform its tasks means that the data people provide through their usage of for instance social media or web search engines are contributing to AI development. Zuboff (2019, p. 75) called this data (collected by a service even though it is not immediately useful to the maintenance of the service) behavioural surplus and noted that it is a valuable and powerful currency.

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<sup>1</sup> While science fiction and prognoses for the future forecast a general AI that is self-aware and makes its own decisions we are not at this stage yet and humans still play an active role in any outcomes of AI applications.

The use of large quantities of personal data to develop AI, whether it is knowingly or unknowingly by the data providers (i.e. the people), raises ethical questions. UN Special Rapporteur David Kaye (2018, p. 12) noted that “[a] lack of clarity about the extent and scope of AI and algorithmic applications online prevent individuals from understanding when and according to what metric information is disseminated, restricted or targeted.” Alongside the insecurity that follows the lack of transparency, we may also consider issues regarding labour (by using platforms users provide data, making it a valuable transaction of goods, which is not remunerated in an obvious manner), and the risk of surveillance (whether it is conducted by corporate or governmental bodies).

In a global study on AI ethical guidelines Jobin et al. (2019) concluded that there seem to be a “global convergence emerging around five ethical principles (transparency, justice and fairness, non-maleficence, responsibility and privacy)”. Andras et al. (2018) wrote that transparency and benevolence are necessary components to create trust in an intelligent machine (i.e. an AI), and that in writing an algorithm one could use “operators that make decisions which can subsequently be presented to the user in a manner that shows their contribution to the final solution.” This supports the idea that transparency needs to be understandable to the user, and that understanding AI is a shared responsibility between provider and user.

National and international bodies are creating guidelines and legislation for AI governance and these tend to strive for a balance between ethical considerations and entrepreneurial value. The Santa Clara Principles on transparency and accountability in content moderation (2018) have been endorsed by many major tech companies, including Apple, Meta, and Google. Another strategy that has emerged to counter negative effects of AI (e.g. systematic biases) is algorithmic auditing, which is “the collection and analysis of outcomes from a fixed algorithm or defined model within a system” that can “incentivize corporations to address the algorithmic bias present in data-centric technologies that continue to play an integral role in daily life” (Raji & Buolamwini, 2019). This kind of auditing is an external evaluation that is unknown to the corporation that operates the AI systems. The strategy is fairly new and its impact has not yet been determined. A weakness of the method is that it may put the auditors at risk of breaching company terms of service when conducting the audit (Raji & Buolamwini, 2019).

## **2.2 Transparency, debate, and impact on the public sphere**

While embedded and maybe even omnipresent in everyday life, AI is non-transparent for most people, either by design (e.g. by not being open source) or by complexity. As Haider and Sundin (2022, p. 5) noted “[i]t is becoming increasingly important to understand how algorithmic systems work and how they are trained to perform in specific situations, while at the same time they are becoming ever more elusive and embedded in society and everyday life at all levels.”

This societal impact of AI complicates interaction within the public sphere, which is defined by Habermas (1989, p. 4) as an area where individuals come together to discuss societal issues. The development of media has throughout history changed the conditions of the public sphere; for instance, the printed newspaper extended the public sphere beyond the physical restraint of tea salons, and the internet and social media broaden the space for public discussion even more. However, the increased accessibility and possibility for publication also decreases transparency, whether it is through technological design or the sheer mass of information which is published every minute. In a recent essay Habermas (2022) warned about “commercial exploitation of the currently almost unregulated internet communication” and took a pessimist stance against the new medium despite its potential for emancipatory public debate. Still, maybe this stance was formed already when he wrote his foundational work in 1962, because there he stated that “[t]endencies pointing to the collapse of the public sphere are unmistakable, for while its scope is expanding impressively, its function has become progressively

insignificant” (Habermas, 1989, p. 4). Thus, there is an historical pattern of public expansion disrupting the forms of public debate. As part of this expansion of the public sphere we should now count AI, because its presence has an impact on our information behaviour.

One example of risks posed by AI to the public sphere is unintended censorship, where a European Parliament (2020) report has questioned whether an AI could recognise “nuance, satire or irony, critical analysis, fair use, as well as broader cultural contexts in efforts to distinguish between legitimate speech and illegal or infringing activities” which could lead to “over-blocking and removal of legal content, potentially infringing on the principles of legality, legitimacy and proportionality of freedom of expression limitations.” What must we do to protect intellectual freedom from AI, or rather from our own zealous application of AI?

### 2.3 AI and libraries

There are many connections between AI and libraries. Firstly, the values libraries uphold (which may or may not be governed by library legislation, depending on the country) contain human rights; specifically intellectual freedom (encompassing freedom of access to information and freedom of expression) and privacy (cf. Francis et al., 2023; IFLA, 2009, 2012, 2020). Secondly, the daily operations of libraries are impacted by technological developments in AI, and libraries make use of AI systems for digitisation of collections, service to users, and management of circulation and collections (Cordell, 2020; Padilla, 2019).

In October 2020, the international library organisation IFLA (2020) issued a statement on libraries and artificial intelligence that underlined the rapid development of AI and stated that while AI and machine learning offers “new dimensions and approaches to knowledge management processes in libraries” there is a concern about “negative impacts on quality of service and staffing” as well as AI applications built on extensive data collection which “must not override patron privacy choices or equity considerations.” In the statement, IFLA recommended adhering to the *IFLA Code of Ethics for Librarians and other Information Workers* (IFLA, 2012) when using AI technologies in libraries.

While AI provides many opportunities for library services, it is necessary to consider the risk of error when applying AI solutions. If the AI is not monitored, already existing errors could escalate. It is also necessary to be able to distinguish between the types of errors that can be caused by humans vis-à-vis machines, for instance machines lack the type “common sense” that humans may apply when problem solving. Library staff need a certain level of knowledge about AI to be able to make these distinctions (Nyberg Åkerström & Andersdotter, 2021, p. 33).

### 2.4 AI in IL

Knowledge and skills regarding AI is becoming increasingly important in the library profession as well as in other professional contexts. In the 2022 update of the EU DigComp framework (European Commission: EU Science Hub, 2022) it is presented as a useful general skill in the future job market. This notion is also supported by the Swedish national AI approach that stated “relevant AI knowledge is not only essential for technical experts but also for leaders, managers and other professionals who interact with technology” (Ministry of Enterprise and Innovation, 2018).

The term “AI literacy” is sometimes used to describe AI knowledge and skills. Long and Magerko (2020) defined AI literacy as “a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace.” In IFLA’s AI statement (IFLA, 2020) four components of AI literacy are defined: “understanding of how AI and [machine learning] work, understanding the potential impacts of AI, personal data management skills, general media and information literacy” and it further concluded that the benefits of an AI literate general public are

public participation in decision-making, encouraging transparency, and creating a demand for accountability regarding AI.

The impact of AI on IL is discussed by Lloyd (2019) who argued that the non-human aspect of algorithms has serious implications for IL since the conditions for the making and shaping culture change drastically when the creator of the information is not human. For instance, the algorithms' agency over information seeking and retrieval impacts the filtering, presentation, and archiving of the information, demanding of a user to consider not just the logic of human knowledge organisation (e.g., a classification system) but also the logic of an algorithm.

Lloyd (2019), like Sundin (2017) before her, used the term "algorithmic literacy" to describe this specific IL skill and argued that this literacy differs from digital literacy, "which focuses on core information literacy skills in the digital context, because it requires examination of culture (in both analogue and digital spaces)." Haider and Sundin (2020, p. 11) described algorithm awareness as "a type of critical information literacy [...] broader and more profound than merely assessing the sources".

There are good examples and arguments for using specific terms for related literacies or subliteracies of IL (Bawden, 2001; Coiro et al., 2008) and terminology can be useful to highlight new literacies as technologies change. However, a challenge may be an overlap of terms and terms becoming obsolete as quickly as they are established. As Coiro et al. (2008, p. 14) wrote, "new literacies of the Internet and other ICTs are not just new today, they will be newer tomorrow and even newer next week, and they will be continuously renewed on a schedule that is limited by only the human capacity to keep up."

Since this article does not aim to make a theoretical statement regarding the organisational relations of literacies, nor to make definite distinctions between similar literacy terms (e.g., "AI literacy" and "algorithmic literacy"), I choose not to use "AI literacy". As Bawden (2001, p. 251) wrote "the labels attached to these concepts do not matter; the concepts themselves, and their significance for practice, do." Therefore, I will write about AI knowledge and skills as part of IL and the competencies and components listed by Long and Magerko (2020) and IFLA (2020) will be referred to interchangeably as "AI skills" and "AI knowledge".

## **2.5 Theoretical perspectives on collective and individual learning processes**

The format and method of the learning circle was based a model popularised in Sweden the early 20<sup>th</sup> century after being successfully tried out as a new pedagogical method by Oscar Olsson in 1902. The model favours a smaller number of participants (5–30 participants, and if the number rise above this the learning circle can be divided in two circles), emphasises co-creation of schedule and themes, and are led by a circle leader rather than a teacher (Olsson, 1902). Müller (2018, pp. 21–23) wrote that these early learning circles "mainly consisted of three parts: the self-education, the book-circulation and the socialization" and both Müller (2018, pp. 34–36) and Edquist (2017, p. 150–151) emphasised the importance of immaterial structures for learning, meaning that the social part of the learning circle is equally important as the content studied.

Modern uses of learning circles draw on similar principles, although in some applications the learning circles facilitators are trained by professionals before leading a circle (Trout et al., 2018, p. 399). The method has been used for skill building in libraries, for example in research circles (Rydbeck, 2010), journal clubs (Kraemer, 2007), and study groups (Coleman, 2020), and they usually take place in a specific workplace or physical space.

Learning circles have also been rediscovered and further developed as a method of making online learning resources accessible to more people through peer learning (Peer 2 Peer University & Chicago Public Library, 2016). Putting learning circles in the digital context of open

educational resources (OERs) and massive online open courses (MOOC) introduces the question of how the learning circle format is impacted by the digital context. For example, MOOCs tend to have a large drop-out rate (Yang et al., 2013) that at a first glance looks like a failed educational effort. But it is not necessarily an indicator that the individual MOOC student did not gain new knowledge from the course—it may just be an example of how educational methods and measurements are disrupted by the digital format. An interview study (Jacobsen, 2019, p.1) of MOOC dropouts noted that “informants would in fact put some of the material and ideas from the MOOC to use. Even if they dropped out, this indicates a gain from the course.” The digital learning circle could possibly counter the drop-out rate through its socialisation aspect, but it could also be that the learning circle’s social structure suffers from the drop-out rate related to MOOCs, even though individuals may have gained knowledge from their participation before dropping out.

Shifting focus from the group learning method to the individual’s experience of their learning process and outcomes, this could be measured in several ways. In this study perceived self-efficacy is used as measurement, because it emphasises the actionable knowledge of the individual, which is relevant in relation to the role of librarians as IL educators. Being able to transpose one’s knowledge to the educational setting of a library (that can be both formal and informal) therefore becomes a necessity for librarians and library staff.

Bandura (1995, p. 2) explained perceived self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to manage prospective situations.” According to Bandura, these beliefs influence how people feel, think, motivate themselves, and act. Self-efficacy differs from self-esteem in that the latter is a general perception of the self while the former relates to performing a specific task (e.g., explaining what AI is to another person). A common method to measure self-efficacy is through questionnaires where the respondents rate tasks on a Likert scale according to their confidence in completing them successfully (Andersdotter et al., 2017; Kungliga biblioteket, 2021a; Nordén et al., 2017; Nordén & Mannila, 2021; Zajacova et al., 2005). An important feature of self-efficacy questionnaires is that they contain positively worded statements that express actions rather than expressing specific knowledge (Nordén et al., 2017), for instance “I could explain an application of AI in a library setting to a colleague” is preferred over “I know what AI is”.

Zajacova et al. (2005) stated that high self-efficacy is linked to better academic performance in college, and that a student’s level of self-efficacy has a greater impact on academic performance than stress. They also linked stress and whether a task is perceived as a “threat” or a “challenge” to the student’s self-efficacy level, underlining the role psychological and emotional state plays when stating oneself (cf. Bandura, 1995).

Pinning onto the role of psychology and emotions, a previous example of the use of self-efficacy tests to measure the development of digital competencies among public librarians in Sweden (Nordén & Mannila, 2021; Andersdotter et al., 2017) was done not only to measure the success of a digital educational programme for librarians but also to boost their digital confidence by asking them to track the changes in their responses the first and the last time they did the self-efficacy test.

### **3. Methods**

This study followed a seven month long learning circle about AI and libraries and presents the skill development among the participants throughout the learning circle, measured through self-efficacy tests. Through an interview with a focus group consisting of participants in the learning circle it identifies key AI and libraries topics that are cause for concern or elation among the interviewed library staff. This section contains an overview of the organisation and execution of the learning circle and a description of the self-efficacy testing and the focus group interview.

### 3.1 Finding participants for the learning circle

In late January 2021 a call for participants in the learning circle was sent out to the Swedish library mailing list Biblist and by the registration deadline on 19 February 2021 123 people had signed up. The participants represented many parts of the Swedish library sector, with a majority of them working in research libraries (see Table 1).

**Table 1.** Learning circle participants by library type

Library type	Participants
school library	5
public library	12
special library	1
research library	93
regional library services <sup>2</sup>	8
Swedish national agencies	4
<b>Total</b>	<b>123</b>

Because of COVID-19 the meetings were digital. This had the advantage of more people being able to participate, but it posed a challenge for the group engagement and the co-creative traits of a learning circle. Since the total number of participants by far exceeded 30 participants, they were divided into smaller groups for discussions during the meetings. The smaller groups were usually 6–7 people but sometimes as few as 2 and as many as 12 depending on if the groups were split into equally sized groups or divided according to certain topics of discussion. The organisation of the discussion groups changed between meetings in accordance with the learning circle's collective decisions.

An organising committee (formed by six people also participating in the learning circle, among them the author of this study) worked actively with involving participants in choices on literature, format of discussions, and suggestions for speakers. The leader versus teacher role was at times difficult to navigate for the organisers; some participants expected more guidance from the organising committee than was available. Another challenge was running the learning circle while simultaneously conducting a study on its results, the main difficulty being finding volunteers to contribute to the research alongside their participation in the learning circle.

### 3.2 Outline of the learning circle

The learning circle organised according to online course *Elements of AI*, an open educational resource created by MinnaLearn and University of Helsinki in 2018 (Reaktor & University of Helsinki, 2022). This course introduces AI in six thematic chapters and is designed for individual online study. It was selected as the theoretical foundation of the learning circle because one of the organisers thought its contents was sometimes hard to understand and that their understanding of it (in itself as well in relation to libraries) would increase if they could discuss it with other librarians or library staff.

The learning circle consisted of seven meetings, one for each thematic chapter in *Elements of AI* plus a wrap-up session (see Table 2). The chapters constituted the thematic frame for each meeting and the readings for each meeting were recommended by participants and selected and communicated by the organisers (most often no selection process was necessary as recommendations were few). Before each meeting a participant was expected to do the

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<sup>2</sup> Regional library services promote collaboration, service development and quality in relation to the public libraries operating in the region.



*Elements of AI* course chapter, familiarise themselves with the readings, and be prepared to engage with other participants in discussion.

The meetings took place monthly and lasted for 90 minutes. The interval between meetings was decided based on the knowledge that many participants from public libraries would not have the time to attend meetings more often. The extensive timespan had the disadvantage of causing an increased drop-out rate. The attendance (see Table 2) was highest at the first meeting, followed by a decrease in attendance at each consecutive meeting with the largest gap after the summer holidays (25 August).

**Table 2.** Learning circle outline and attendance

Date	Theme	Attendees (max)
17 March	What is AI?	108
21 April	AI problem solving	80
12 May	Real world AI	67
2 June	Machine learning	67
25 August	Neural networks	41
15 September	Implications	35
20 October	Wrap-up session	36

Each meeting had the following structure: 1) introduction (by a circle leader from the organising committee) and (where applicable) presentation by invited guest speaker, 2) discussion in smaller groups, and 3) general discussion with all participants. The first part was very short (~5–10 min) with exception of the meetings where guest speakers were invited, and parts two and three formed the main part of the meeting. The social aspect of the discussions in parts two and three was key to creating the immaterial structure of the learning circle (previously explained as one of the key components of this particular pedagogical method).

In addition to the course content, readings (a mix of academic articles, news articles, podcasts, and videos) were assigned before each meeting with library and/or society related aspects of AI. Between sessions participants were able to communicate, ask for help with the course, and share resources and links on a private and collaborative online platform (Microsoft Teams).

An example of the collective learning process is how participants used online notice boards, the video conference chat and the collaborative online platform to take notes and introduce new topics of discussion for the next meeting. For instance, a prompt from the organisers could be “Where do we encounter AI in our everyday work?” or “What notions of AI based on popular culture do we have, and how do they influence our understanding of the technology?” and responses could be “Can we find out how Google really works and how can we teach that to users?”, “Will the emotional labour of librarians increase as more and more functions and services are replaced by AIs?” or “Most popular culture references seem to be dystopias and that is interesting to our work.” These interactions influenced the choice of readings and discussion topics for the following meetings.

### 3.3 Self-efficacy questionnaire

To measure the success of the learning objectives of the learning circle the participants were asked to respond to a questionnaire where they could rate their self-efficacy in AI related tasks. The questionnaire was sent to the learning circle participants on three occasions: before the learning circle started (March 2021, the questionnaire was available for 7 days), after half of the

learning circle had passed (May/June 2021, 9 days), and at the end of the learning circle (October 2021, 12 days).<sup>3</sup>

The questionnaire consisted of two parts: the first part gathered data about the participants and their work situation (type of library, amount of employees at the library, amount of years employed in the library sector, municipality) and the second part contained 19 AI/library related tasks where participants could rate their self-efficacy a 7-point Likert scale (1 = I couldn't do this at all, 4 = I could probably do it, 7 = I could do it with no problem). The tasks were divided into seven subheadings: one general category and six categories to match the chapters in the *Elements of AI* course. The tasks in the *Elements of AI* chapter categories were extracted and modified from the listed learning outcomes of each chapter in the online course.<sup>4</sup> The full list of tasks is presented in Table 3.

**Table 3.** AI and library related tasks in the questionnaire

General AI questions - I could...	Q1	... give an example of how AI is used in society.
	Q2	... give an example of how AI is used in a library setting.
	Q3	... give an example of how AI could be used or have an impact on the library setting in which you work.
	Q4	... explain an example of how AI is used in society to a library user.
	Q5	... explain an example of how AI is used in a library setting to a colleague.
	Q6	... problematise AI in relation to a library setting and/or the role of libraries in society.
	Q7	... lead a scoping study for an AI project at your own workplace.
	Q8	... find out how a service's AI works by reading the manual and/or the terms and conditions of the service.
1. What is AI? - I could...	Q9	... explain the difference and relationship between artificial intelligence and machine learning.
	Q10	... give an example of the use of deep learning.
	Q11	... distinguish between realistic and unrealistic AI (science fiction vs real life)
2. AI problem solving - I could...	Q12	... formulate a simple game (such as tic-tac-toe) as a game tree.
3. Real world AI - I could...	Q13	... give a simple explanation of what probability theory is.

<sup>3</sup> The second and third time the questionnaires were available for a longer period, partly so that the deadline would coincide with the following Friday, and partly to encourage more responses as significantly fewer responded in the second and third rounds.

<sup>4</sup> For instance, chapter 2. *AI problem solving* lists the learning outcome “formulate a simple game (such as tic-tac-toe) as a game tree” and this is mirrored in the self-efficacy questionnaire. By contrast, chapter 3. *Real world AI* lists the learning outcomes “apply the Bayes rule to infer risks in simple scenarios” and “explain the base-rate fallacy and avoid it by applying Bayesian reasoning”. In the chapter these concepts are explained with the real world application of spam filters, and therefore the self-efficacy questionnaire use the more concrete statement “explain how a spam filter works”, a statement that is also (assumedly) more relevant to libraries and library practices.

	Q14	... explain how a spam filter works.
4. Machine learning – I could...	Q15	... explain how a filter bubble works.
	Q16	... distinguish between unsupervised and supervised machine learning scenarios.
5. Neural networks - I could...	Q17	... explain what a neural network is.
6. Implications - I could...	Q18	... explain why and how AI can be a political issue (e.g., privacy and data protection legislation).
	Q19	... explain why and how AI can be an ethical issue (e.g., privacy, discrimination).

### 3.4 Focus group interview

The focus group interview is a method to gather data that “are sensitive to the unique personal experiences, perceptions, beliefs and meanings related to individuals” (Sim, 1998, p. 345). This is a relevant perspective to present since many librarians and library staff work independently with innovative programmes and consultations with library users, therefore their personal experiences and perceptions guide how librarians and library staff act in situations that arise. Focus group interviews may “reveal aspects of experiences and perspectives that would be not as accessible without group interaction [...] participants respond to each other: providing agreement and disagreement, asking questions and giving answers” (Morgan, 1997, p. 20). This information can help to contrast and compare different experiences and perceptions for both researcher and focus group participants, which in turn may help in finding common denominators within the library context. While the size of a focus group may make findings less representative than a survey or less in-depth compared to individual interviews, it has the advantage of bringing out several distinct voices who together create a negotiated and varied narrative—a small sample or a case study may provide valuable qualitative information (Flyvbjerg, 2006).

A semi-structured interview was conducted with a focus group consisting of four participants of the learning circle who volunteered to be interviewed and signed informed consent forms. The interview was conducted in Swedish and all quotes in this article have been translated by the author of the article. The aim of the interview was to have an in-depth discussion about AI and libraries based on topics raised in the learning circle discussions. Two of the interviewees worked at research libraries, one at a public library, and one at regional library services. The interview was held through a video conference call in August 2021, a few days after the fifth learning circle meeting. The length of the interview was 69 minutes. The interview questions were:

- After having gone through more than half of the learning circle, do you perceive AI as more or less relevant for libraries and your profession than before the learning circle started?
- Can you give examples of when the topic of AI has appeared in a discussion at your workplace?
- Can you tell me your thoughts about AI in relation to libraries and their users?
- Do you think librarians need more knowledge about AI? Why/why not?
- What are your thoughts on the use of AI in libraries vis-à-vis ethics, privacy, data collection, and similar aspects?
- Are there any aspects you’ve heard in the learning circle group discussions that you’ve given a lot of thought to afterwards?

The interview was transcribed in oTranscribe. The transcript was then encoded in Taguette, and because of the inductive approach and the fact that only one researcher worked with transcription and encoding, no coding manual was created. The codes (presented in Table 4

with further explanations) were formed through an inductive process where common themes were found in statements throughout the interview. These themes related to perceptions (*attitude, own interest*), library work (*privacy, library practice, information literacy, library relevance*) and societal implications (*societal relevance, neutral technology, privacy, change, negative aspects*). Because the codes often overlapped in the same statements, these overarching themes (perceptions, library work, and societal implications) were not used as categories in the analysis. Instead, the coding process helped discern narrative themes (see Table 5) that were covered in the interview.

**Table 4.** Codes and descriptions

Code	Description
societal relevance	Connections to society, being a citizen, etc.
neutral technology	Is technology neutral or not? How does bias work?
privacy	AI, privacy and libraries
library practices	Practical, everyday work in libraries
attitude	Attitudes to AI (self, colleagues, people)
information literacy	AI in relation to IL (learning and teaching)
change	How do libraries change in the information society?
own interest	Why is AI interesting, according to self?
library relevance	How is AI relevant to libraries?
negative aspects	What are the negative aspects of AI in libraries?

**Table 5.** Narrative themes in the focus group interview

Narrative themes
transformed collections and catalogues
changes in the media landscape
teaching information literacy
AI in the physical spaces of libraries
attitudes towards AI

The narrative themes will be discussed further in the presentation of the focus group interview results in section 5.

#### 4. Self-efficacy test results

Out of the 123 participants, 71 responded to the first self-efficacy test (T1). This amounts to 57.7% of the total number of participants. The second test (T2) had 25 responses (20.3 % of participants) and the third test (T3) had 32 responses (26 % of participants). The baseline 123 is based on the amount of participants who had signed up in the beginning of the learning circle (March 2021). Participation in both meetings and self-efficacy tests was voluntary, so it is difficult to say how many of the 123 who signed up that were active participants. When comparing the amount of test samples with the attendance at the meeting closest in time to the questionnaire the percentage changes (see Table 6). Taking into account the possible drop-out rate, the decrease in responses (and attendance) may be explained by an overall lack of participation.

**Table 6.** Amount of questionnaire responses compared to meeting participation

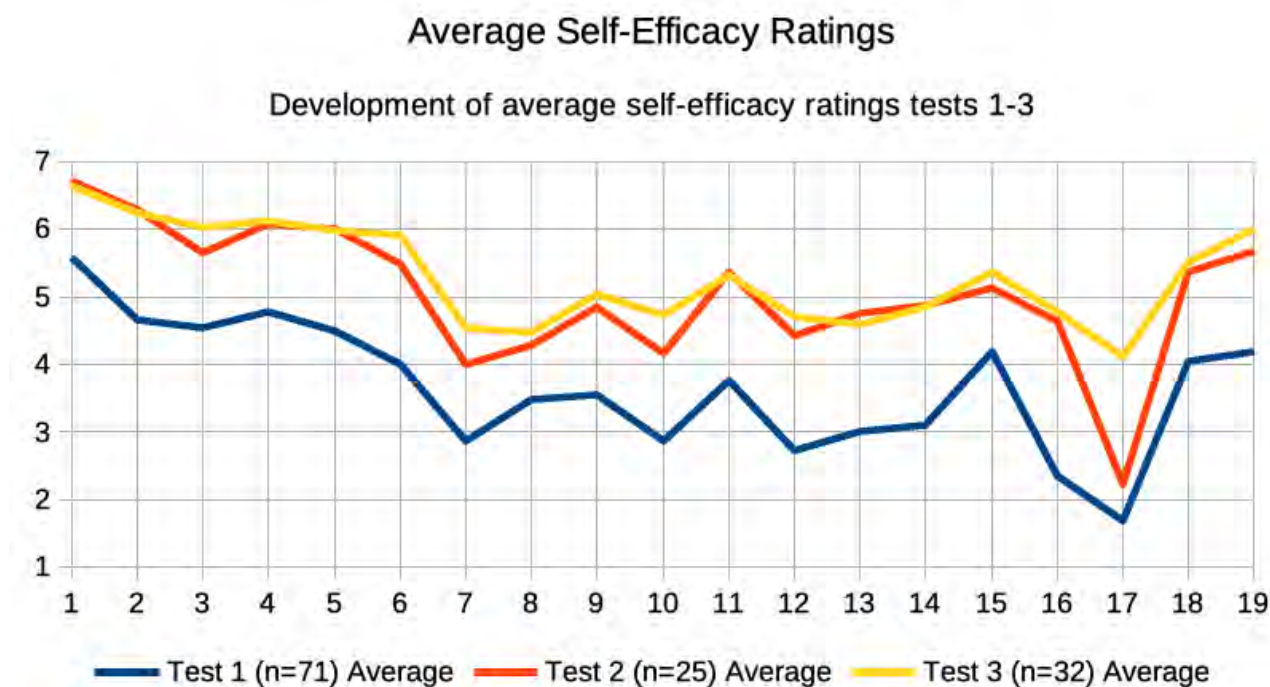
Meeting	Active participants	N (T1–3)	% N (T1–3) of active participants
1	108	71	65.7%
2	80		
3	67		
4	67	25	37.3%
5	41		
6	35		
7	36	32	88.9%

The small amount of responses makes it difficult to present generalised assumptions on whether the learning format and materials were successful in increasing the AI literacy of the participants. However, the responses still give an indication of how the respondents' self-efficacy changed over time and that at least some of the participants experienced an increase in AI literacy. This conclusion is also supported by the author's impressions: as an active participant in the learning circle; of the focus group interview; and of the general positive feedback given by participants to the organising committee.

Because of the low response rate, the personal data provided in the first part of the questionnaire (type of library, amount of employees at the library, amount of years employed in the library sector, municipality) is excluded from the presentation of the results. For instance, the majority of participants, as well as respondents in the tests, worked at research libraries, but the data does not provide any useful insights as an analysis shows no significant variation an aggregated and a separated level. The same situation applies to geographical location and size of the workplace where a hypothesis was that these factors could have an impact on the learning environment, opportunities to test and discuss, degree of specialisation, and on time available to spend on the learning circle.

Bearing in mind the reliability of any generalisations based on the test results, this section presents the average self-efficacy rating development over three tests (T1–3) (see Figure 1). Most notable is perhaps that self-efficacy increased a lot between T1 and T2, and that the averages in most cases show an equal increase of 1–1.5 points on the Likert scale. The exceptions are Q16 (distinguish between unsupervised and supervised machine learning scenarios) and Q17 (explain neural network) where studying the matter seems to have improved the self-efficacy among respondents (Q16: from T1 2.36 to T3 4.77; Q17: from T1 1.68 to T3 4.13). However, Q15–19 were centred on chapters 4–6, where the learning circle had a large drop in attendance, so this could also show that only participants who found the learning content easy remained and responded to the self-efficacy test. As previously stated, it is possible to form theories, but difficult to find definite answers with the method that was applied in this study.

**Figure 1.** Average self-efficacy ratings T1–3.



Based on the responses to T1 (where more than half of the participants responded), it is interesting to note that the self-efficacy regarding Q15 (filter bubble), Q18 (political issues) and Q19 (ethical issues) were high among the participants before those specific chapters had been dealt with in the learning circle. A possible explanation is that these topics are ingrained in the library profession to a larger extent than the other tasks.

## 5. The focus group: delving deeper into the role of libraries and AI

The focus group provided many insights into what AI topics are cause for concern and excitement in relation to libraries and society. The participants' interest in AI and libraries when signing up for the learning circle was centred around understanding what it was, how it related to their work and their libraries, and curiosity on how they could include it in their everyday pedagogical work (the two interviewees from research libraries work with IL instruction). The conversation featured both internal work (e.g., library operations, collection management, professional development) and public work (e.g., IL, information ethics in relation to library services and users, AI in society).

In this section the results are presented through narrative themes formulated through the inductive process described in 3.4. The narrative themes are *transformed collections and catalogues*, *changes in the media landscape*, *teaching IL*, *AI in the physical spaces of libraries*, and *attitudes towards AI*.

### 5.1 Transformed collections and catalogues

The interviewees concluded that participation in the learning circle had allowed for them to see new opportunities for library operations in their own workplaces. One interviewee noted that libraries seem to be using AI systems without realising it:

*Suddenly you have an AI system, but you haven't realised you do. And it's just because that word, AI, is a little bit 'future'. But the applications exist here and now. Like this system they're using in Malmö.*

One interviewee noted that it wasn't clear to them whether a person's insistence that the IMMS (*intelligent material management system*) in Malmö was *not* AI was a fact or whether it just was a way to distance themselves from AI as a phenomenon (the system uses an algorithm to manage the library collection). Either way, the system is a step from manual collection management, towards AI collection management.

The potential of AI solutions was recognised especially in connection with collection management, and how automatic cataloguing and tagging of books, images, and other media (both analogue and digital) could increase the access to library collections for the library users. One interviewee noted that many digital resources created in libraries are executed as small project that become fragmented and less available from a metadata and information seeking point of view. They saw potential for AI to make cultural heritage collections more accessible.

A potential problem with AI-supported cataloguing that was recognised in the interview was how it might pose a challenge for librarians to explain to library users how collections are sorted and displayed, especially with the risk of inherent bias:

*How do I explain how something happened? It's like being asked why a book is on a specific SAB or Dewey shelf. I can explain that. Why do I get such bad results when I search in a catalogue which doesn't even use AI? Well, I could maybe explain that, but sometimes I don't understand at all how you can search for a specific title and not have it appear in the first 100 search results. I can't understand that. So, it's getting harder and harder for me to explain how things go wrong.*

The changed role of librarians when AI is used to improve library operations was also discussed. For instance, a question that was raised was that if AI can catalogue media with 99% accuracy and librarians only with 95% accuracy, should librarians do cataloguing work at all? And if they do not, how will their role transform, and will we have need for cataloguing or cataloguing rules at all? One interviewee suggested that the librarian could develop into a human interface between the catalogue and the library user—someone who instructs the user on how to use the catalogue, rather than being the one that makes the catalogue.

Despite the impact AI can have on library collections and catalogues, the focus group agreed that users would not necessarily acknowledge these benefits, nor associate them with AI. The general consensus seemed to be that users focus on how well library services meet their needs, rather than *how* they meet their needs.

## **5.2 Changes in the media landscape**

According to the interviewees, the disruptions (caused by AI, but also by digitisation at large) in the media landscape and how media is consumed has had a clear impact on library services. Users come to the library to use computers with an internet connection, they want to check out e-books as well as physical books, and use digital tools to create, communicate, and collaborate. While centralisation of these tools and services may increase accessibility and efficiency they also cause concerns regarding sharing and protection of personal data that were smaller issues when data management was done locally (for example the data in a library system running on local servers is easier for library staff to contain and control than the data in a national or international e-book lending system that the library has purchased access to).

An issue with some e-book service providers has been how data is saved and tracked when accessing the e-book services. User privacy and confidentiality of user interactions with a library is protected by law, but more difficult to enforce in a digital environment. The general data protection regulation (GDPR) has made it easier to identify which user data is personal data, but

it is still problematic for libraries to review agreements with service providers due to lack of access to legal expertise. One interviewee described the situation regarding e-books:

*In the hectic GDPR period there was a lot of talk about this. But then one signed all the agreements and that was that, and maybe we thought we had secured everybody's rights. [...] But libraries are quite far down in the food chain and we are dependent on other service providers that we can sign agreements with [... There] is some sort of data economy that one does not really understand, nor how the library fits into this by using these services. So, it's a bit complex. Because of course we have to offer e-books.*

The same thought circulated regarding software used in teaching, where the discussion had been quite extensive due to the quick shift to remote teaching when COVID-19 arrived. While university lawyers may have had rejected the use of some software due to GDPR, the same software were still used internally at the library, although with caution regarding what data they share with the service provider. There was constantly a balance between convenience and privacy concerns.

The development of media services is another challenge for libraries. Users may prefer to receive information in other formats than what the library can offer. An example from the discussion is how a user who wants to learn origami prefers watching online videos to reading books. The interviewee said that this challenges the role of the library, because the library cannot include the material of interest in its collection, but it can provide guidance for finding such material on the internet.

There was also a worry that the commercial services with a high degree of personalisation that users may use in their everyday life may impact how library services develop in the future:

*Will we act like companies who sell things? That's not really my view of libraries, even if we talk frequently about our user services, customers, and providing services... but I would consider it a bit strange if we became like [two audio book service providers] and collected specific data about age, gender, what they liked before. But on the other hand, it is from [an audio book provider] I get the best literary recommendations. I don't get those when I go to the city library.*

### 5.3 Teaching IL

The role of teaching IL to library users is another practice which is heavily influenced by the increase of AI in society. Libraries need to match this societal development with relevant knowledge dissemination on *what* AI is and *how* it has an influence over people's lives and society as a whole. One interviewee expressed frustration with libraries being too slow to adapt to meet this need:

*We've just adapted to the fact that everyone needs to learn to understand programming, and this has become increasingly common in public libraries. And then when you start reading about AI you realise that what's important about it is that it differs a lot from traditional programming since you don't set up general rules, but let the computer do the job. And thus, we're suddenly one step behind. When we [recently] started with programming workshops for children and teens we felt we were very modern but then we realise that 'yes, but this is not the way systems will work in the future, they will work like this', so maybe what we should be having are AI workshops? In that way, you always think... there's this public library anxiety. You never do what you're supposed to do.*



Teaching public library users about privacy in relation to information seeking and internet use is difficult in an everyday setting. One interviewee noted that it is difficult to approach a user who is occupied with a task (e.g., sending in an application or paying a bill) and start a spontaneous discussion about how a search engine's algorithm works, because the user is focused on completing a task and an IL discussion does not meet their information need.

A solution to approaching the topic in public libraries may be an educational programme. For example, some regional libraries have coordinated a temporary exhibition, *Data Detox*, to raise awareness about these issues. This exhibition can tour public libraries and there is also related educational material for librarians. At the moment of the interview, the touring exhibition had been put on pause due to COVID-19, but activities were expected to resume after the pandemic.

Data bias was mentioned several times during the interview, and there seemed to exist an ongoing informal discussion about data bias and trust in technology on the interviewees' respective workplaces. One of the university library interviewees had worked with their colleagues to include filter bubbles in their IL instruction sessions. However, the interviewee felt they did not have enough knowledge about filter bubbles, such as not knowing how to explain how the algorithms worked, and this impeded their instruction on the issue. They worried that this would eventually lead to the topic being excluded from the IL sessions. The interviewee said they are frustrated to have come so far as including filter bubbles in the instruction only to find that their colleagues are "uncomfortable talking about it." As a response to this, they have started talking about including "data literacy" or "digital literacy" on a more general level in their sessions, in the hope that this will make more sense than the more specific subject of filter bubbles.

The other university library interviewee noted that it was interesting how their IL instruction sessions were presented as teaching general skills when they teach something as specific as searching in a scientific database:

*Most of the students we meet will never do this again because they don't have access to these services unless they go to a library or work in an organisation [that has access to these databases]. And I'm like: we're presenting this as general skills, but we don't mention how Google works in comparison to other search engines! What is general about instructing students on how to make a systematic search in Web of Science? It's not a general skill!*

#### **5.4 AI in the physical spaces of libraries**

AI and data collection practices in physical spaces were also discussed in the interview. AI's impact on physical spaces, perhaps most notable through the internet of things, is becoming more common also in the physical spaces of libraries. In some cases, this has an impact on the people using the physical space.

One interviewee had read about sensors being placed in a library to see in which areas people moved around most frequently, and another interviewee had read about a public library using a software which registered how many mobile phones were inside and moving around in the library. One interviewee compared this data collection to user experience methods in libraries, where librarians collect information about users by observing them in a physical library space (e.g. what route do users take to the return machine, by what shelves do they stop and browse).

The general response to these stories from the focus group was mild concern, and the discussion was centred around what type of data is collected, and to what extent. One interviewee thought tracking mobile phones was okay because it is quite anonymous, another

interviewee argued that a person observing library users move around was less intrusive than both mobile phone tracking and CCTV (surveillance cameras). The benefits of collecting user data from physical spaces are that it can help develop the physical spaces of the library to provide better services. On the other hand, the surveillance can infringe on the freedom of library users (whether they are aware of it or not). As with the discussion on software use, the balance between convenience and privacy was a prominent matter.

## 5.5 Attitudes towards AI

In the interview, the interviewees mentioned that many of their colleagues seemed to be wary about AI, especially its application on internal library operations. One interviewee said they suspected AI in cataloguing would pose a threat to the identity and sense of usefulness of cataloguing librarians at the workplace:

*I think that if someone comes in and say: well, what you're doing right now, we thought we'd... we shake up that whole paradigm. And they think: this is not relevant anymore, and you've done this for ten to fifteen years. [...] I think that's very threatening to people.*

The other interviewees agreed on this perspective and one of them brought up a group discussion from a learning circle meeting as an example of a librarian feeling threatened by AI. In this discussion, centred around an article about automatic classification (Deiss et al., 2018), a participant had become fixated with the idea of right and wrong in the classification technique, seemingly unable to grasp the dissimilarities between AI classification (which in the case of the article that was being discussed worked as a discovery tool) and the classification for cataloguing practices of librarians. The interviewee noted that “maybe it isn't right and wrong we're looking for when we use AI in [classification and similar practices]” and that this ambiguousness posed a potential challenge to the information authoritativeness of a library.

At the same time, the focus group mentioned that the challenge of AI in libraries also was met with a positive attitude. Librarians acknowledge that AI is new and difficult but also see the potential of it and embrace the challenge of making its various applications as good as possible for the library and its users.

## 6. Discussion

This study aimed to answer the questions:

- How and how much did the learning circle increase AI knowledge among the participating library staff? Was the learning circle a successful method for AI literacy skill building?
- What thoughts, perceptions, and questions on the topic of AI and libraries were generated among the learning circle participants as a result of the learning circle?
- How did these thoughts, perceptions, and questions relate to a broader, international perspective on AI in society and AI in libraries?

Regarding the first question, the results of the self-efficacy questionnaires show an increase in the average rating among respondents. The participation in the questionnaires and the learning circle dropout rate together make the data insufficient for generalisations, but the analysis still indicates that the AI knowledge and skills increased among some of the participants. As Jacobsen (2019, p.1) stated in his study on MOOC dropouts, it is not unlikely that the drop-outs

of the learning circle also gained some new knowledge on the topic even though they didn't participate throughout the whole circle (nor completed the course<sup>5</sup>).

There are reasons to question whether a general measurement of increased AI skills (or any type of IL) is a useful one on an aggregated level or whether self-efficacy tests are more useful for an individual who wants to track their own progress in a certain field. Going back to Bandura's (1995, p. 2) explanation of self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations" this method may be less useful for research on educational progress and more useful for self-reflection and empowerment when the participant face AI related challenges in their workplace (e.g. information ethics, intellectual freedom and privacy (cf. Francis et al., 2023; IFLA, 2009, 2012, 2020) or in new workflows of library services and collection management (cf. Cordell, 2020; Padilla, 2019).

While not providing perfect research statistics this study's results of the self-efficacy questionnaire may have been valuable for strengthening librarians and library staff in their everyday work. Additionally, the format of the learning circle may have supported the knowledge and empowerment through discussion, peer-to-peer learning, and collegial encouragement. A flaw of this study is perhaps that this aspect cannot be measured or confirmed with data. However, as the author also was a participant, the general impression is that the learning circle as method supported and encouraged the learning process of the participants—especially when facing obstacles that would have been hard to solve on one's own, for instance understanding the mathematical logic of the nearest neighbour classifier—and the focus group interview also support this notion of empowerment through gained knowledge as the narrative themes reflect a deeper understanding of AI in practice and its impact on libraries, librarians, and library users. On several occasions the interviewees reflect back on the learning circle meetings as sources of information and reflection on their own part.

This study shows that the opportunity for reflection on one's self-efficacy (through the questionnaire and the learning circle) can contextualise and support the use of their knowledge in a work context, whether it is through implementing an AI project or guiding a user through the use of web search engines, and presented on aggregated level it may strengthen and acknowledge the knowledge and competences librarians and library staff possess as generalists, boosting their roles as mediators and educators (cf. UNESCO, 2021) in the intersection of society and technology.

The second question is partly answered through the focus group interview. Findings from the interview indicate that users' trust in libraries as public institutions may be altered by the application of AI in libraries: a librarian who cannot explain how catalogues or search functions select and present the results of a search query may by extension transfer a sense of information insecurity into a diminished trust for the library as an institution (the loss of trust in public institutions is reflected upon from a broader perspective by Haider & Sundin, 2020). However, by being able to critically assess AI or other types of algorithmic results as well as explaining this assessment to a library user the risk of losing trust can be decreased.

The cross-sectoral perspective of this study has helped to identify common AI challenges and opportunities, pointed out what practices different library types do and do not have in common, and shed light on the societal implications that information professionals must be aware of when communicating with library users. An observation from a learning circle participant after four meetings summarises the development quite well: "we seem to have gone from asking the

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<sup>5</sup> Course completion rate wasn't tracked in this study since the *Elements of AI* OER (where one can keep track of one's individual progress) wasn't hosted by or accessible to the learning circle organising committee. With this in mind there is also a possibility that a learning circle participant attended all meetings, but didn't finish the course.

question ‘*what is AI and how does it relate to what we do?*’ to ‘*what is our next step in this area and how can it be applied in library operations?*’” This development is also evident in the maturity of the focus group interview, where the increased AI knowledge among the interviewees after participating in the first half of the learning circle was the foundation for their analyses on AI and libraries.

In contrast to the perceived worries, the interviewees own motivations to participate in the learning circle show that there is a curiosity and interest in learning more about AI in libraries and that acquiring and teaching AI skills is an important and sometimes even prioritised task in Swedish libraries today. This provides a tentative answer to the third question on how AI in libraries relates to AI in society: the interviewees provide positive outlooks on the application of AI in both libraries and society and note that continued integration and use of AI must be followed by knowledge and critical thinking about AI among library staff as well as library users. Knowledge about AI may counter many of the negative effects of AI, for instance the perceived loss of control over one’s behavioural surplus (cf. Haider & Sundin, 2022, pp. 46–47; Kaye, 2018, p. 12; Zuboff, 2019, pp. 11, 21, 53).

If libraries are to be trusted places in the intersection of society and technology (the general importance of making sense of this intersection being stressed by Haider & Sundin, 2022, p. 5) that can help people navigate the large impact AI already has and will continue to have on communications, technology and society (Raji & Buolamwini, 2019; Kaye, 2018) there is a need for a higher degree of AI knowledge since this is key to developing the needed trust, transparency, and accountability in AI (cf. Jobin et al., 2019; Andras et al., 2018). If the general public does not have trust in AI, at least to some extent, the opportunities for interaction within the public sphere (as defined by Habermas, 1989, p. 4) may be harmed, which is a problem for democratic society as a whole.

As this study is based on Swedish conditions, where the national library law states that publicly funded libraries shall work for the development of the democratic society by contributing to freedom of information and freedom of opinion (SFS 2013:801, 2 §), it is easy to argue for the role of libraries to ensure a functioning public sphere (Habermas, 1989, p. 4). Despite the technological advances that in Habermas’s (2022; 1989, p. 4) argumentation may be about to cause a collapse of the public sphere through its commercialisation, lack of regulation, and lack of relevance, society and technology are ultimately intertwined and so opportunities must be created for meaningful interaction and debate within this simultaneously digital and physical public sphere. Libraries, with their information expertise (and sometimes legal obligation), are not bad places to start.

## **7. Conclusions and further research**

The findings from the interview provides useful insight into topics that could be further explored within library research and in library development. A question for future research are whether the same observations are common among all librarians and library staff or just those with a special interest in the topic. It would also be interesting to explore whether the observations are shared among librarians internationally or if different challenges and opportunities present themselves in other local contexts. As for library development, the identified narrative themes suggest places to start when planning educational endeavours for staff and considering strategies and applications related to AI and its implications for libraries and library users.

The themes emerging from the learning circle and the focus group interview connect local practice with the global values and norms presented in the introduction, supporting IFLA’s (2012) description of librarianship as a profession with ingrained ethical values regarding the use and dissemination of information. In the light of this study, there is a question about how library and information professionals—and libraries as institutions—can uphold and share these

values and what skills they need to do that. Do *all* librarians and library staff need more AI skills to ensure that the application of AI in both digital and physical public spaces can be done in a responsible, sustainable, and resilient manner?

In a broader perspective, it might be interesting to explore the role of libraries as promoters of democracy and participation, whether they are legally required to do so or not. If national legislations do not require this, are the ethics and norms of libraries as stated by IFLA (2012) or national library associations (e.g., CILIP, 2023) enough to justify this role for libraries, and is it a role libraries and library staff want to take on?

While this article mainly deals with the development of AI skills and knowledge of librarians and library staff, a further step to consider is how they as educators can share this knowledge with library users. The political and technological changes prompted by the expansion of AI need an educated society who can form an opinion on matters relating to their personal data and interactions and to policies regarding healthcare, economics, or any other field where AI may be applied. Informed citizens are key to good governance; libraries are key to informed citizens.

## Dataset

The dataset for this article is available at <https://zenodo.org/doi/10.5281/zenodo.10160350>.

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