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Research Paper

AI literacy in the public sphere: a theory-informed exploratory study

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ABSTRACT

Existing research on Artificial Intelligence (AI) literacy primarily focuses on educational, STEM, business, and institutional settings. A research gap exists in terms of how AI concepts are framed in the public sphere. This study analyzes seventeen (N=17) TED talks from 2020 to 2025 to explore how experts publicly communicate core ideas related to AI. It draws upon a four-factor model of AI literacy that includes the dimensions of knowing and understanding, using and applying, creating and evaluating, and AI ethics. Thematic analysis is used to examine how these four dimensions are reflected in public-facing expert discourse. Results showed that in addition to the four core factors, there were two additional identifiable themes: reflect on and critique AI, and advocacy and lifelong learning. Themes and subthemes are illustrated with examples and quotes capturing how speakers convey key ideas and concerns. This study provides novel insights on how expert-led discourse on AI contributes to deepening public AI literacy.

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1. INTRODUCTION

Being AI literate is as essential as being literate, if not more. AI literacy is meant to help individuals gain the skillset and knowledge needed to use and engage with AI systems meaningfully, ethically and in a socially responsible way [1]. Over the past four to five years, numerous AI literacy models have been developed and among them, the four-factor AI literacy model of Ng is a popular framework that evaluates

one's competence in AI in terms of knowing and understanding, using and applying, creating and evaluating, and ethics [2]. Such frameworks have helped structure AI literacy efforts globally across different domains. However, existing research focuses mainly on K–12 and higher education, and areas like STEM, business, and healthcare [3]. Comparatively less attention has been paid to how AI literacy circulates in broader public spaces, or how its communication may shape civic imagination and discourse.

Civic engagement and democratic participation need a well-functioning public sphere. The latter provides a platform for people to gather and discuss shared concerns. People can exchange perspectives and contribute to decisions that carry social weight [4]. Expert-led forums such as TED talks can play a big role in this process. They can not only shape how audiences perceive emerging technologies, but also provide a lens through which such technologies are discussed [5], [6]. Yet, how these talks influence AI literacy remains underexplored. The present study addresses this gap by examining seventeen (N=17) TED talks delivered between 2020 and 2025, related to AI, its applications, and its societal implications. In doing so, it poses the following research questions.

RQ1: How do experts communicate the four core aspects of AI literacy in the public sphere?

RQ2: What additional themes are identifiable from these talks that may enhance our understanding of AI literacy?

2. RELATED WORK

2.1. AI Literacy

To be AI literate does not mean merely knowing the technical aspects. The ability to critically evaluate both AI systems and their output is also a part of AI literacy. AI literacy is meant to provide the competence and skills needed to live and work effectively in an increasingly AI-dominated world [3]. Scholars have conceptualized AI literacy from multiple perspectives. For knowledge, usage, evaluation, and ethics are the four factors needed for AI literacy. Long and Magerko view AI literacy in terms of five themes: knowledge, ability, internal mechanism, usage, and perception [1], [2]. Other frameworks with varying competencies and design aspects are also available. That a basic understanding of AI, combined with awareness of its ethical and social implications, is a minimum requirement for any AI literacy framework is a consensus among most scholars. Some opine that knowing how to create novel AI solutions should also be considered part of AI literacy. Others stress broader interpretive or evaluative skills. Globally, AI literacy is being taken up in educational programs ranging from early schooling to higher education [2], [3].

2.2. Public Sphere and Citizen Participation in Technology

The public sphere is a vital space for people to discuss technology. It can be thought of as a conceptual gathering place where everyday people and experts can come together to talk about important topics, share their ideas, and form opinions that influence democracy. The core of this arena is rational debate. At the same time, Jasanoff reminds us that conversations about science and technology should not be left just to experts and politicians. To have legitimate governance, we need to involve more people [4], [7]. This is especially true for conversations about AI. Such discussions are likely to influence how the public assesses the risks of AI and how they frame ethical questions. The Habermasian notion of the public sphere, along with Jasanoff's advocacy for participatory governance, offers us a clearer picture of the myriad ways in which civic discourse can potentially shape the contours of AI literacy.

3. METHODOLOGY

This study is qualitative in nature. Seventeen (N=17) TED talks on AI and AI literacy, delivered between 2020 and 2025 were selected for thematic analysis were shortlisted using keywords such as "AI," "AI literacy," "AI and society," and "ethics of AI" were used to shortlist the videos. Inclusion criteria required that the videos.

- Focus on general AI themes rather than sector-specific applications
- Be delivered in a talk format, and

- Have a minimum of 1,000 views.

The final dataset included 17 expert-led talks from 2020 to 2025 addressing various conceptual, ethical, and futuristic trends related aspects of AI Figure 1.

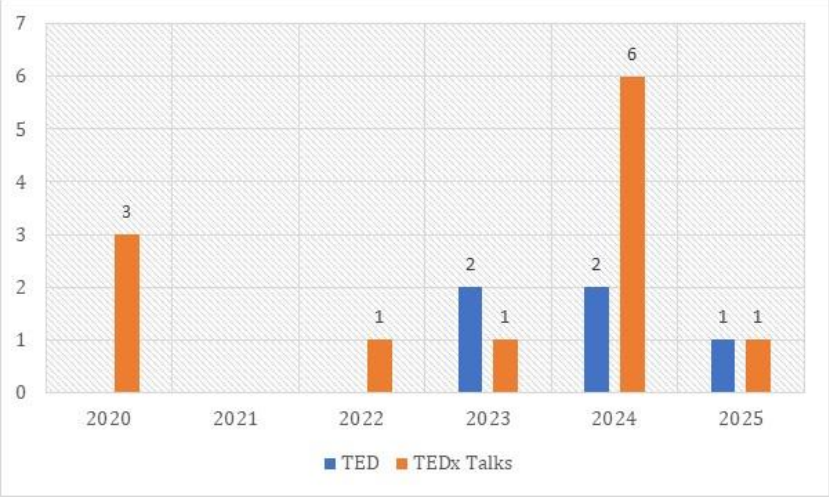

Figure 1. Year-Wise Distribution of TED and TEDx Talks on AI literacy (2020–2025)

Transcripts were auto-generated from YouTube and manually corrected. Thematic analysis was conducted in line with Braun and Clarke [8]. Repeated reading was undertaken to achieve familiarity with the data, and codes were generated. Codes were then collated into potential themes, which were reviewed, refined, and defined. An iterative coding process was used: open coding to identify recurring ideas, followed by axial coding to group codes into subthemes. The process was a mix of deductive or theory-informed and inductive steps which happened in parallel.

Wherever applicable, codes were simultaneously grouped into subthemes, and these subthemes were then organized under the relevant themes or factors of four-factor AI literacy framework (know and understand, use and apply, create and evaluate, and ethics). This constituted the deductive, top-down element of the analysis. Codes that could not be immediately mapped to any of the four factors were set aside for later review. Once the mapping to framework was complete, these unmapped codes were revisited. Where possible, they were subsequently assigned to appropriate subthemes and themes. If they did not fit, they were organized into new subthemes and aggregated into higher-level themes. This formed the inductive, bottom-up phase of the analysis, allowing for the themes not part of the original theoretical framework.

4. RESULTS AND DISCUSSION

AI literacy issues, as conveyed by the speakers, were analyzed using the four-factor framework of [2]. The findings are presented by mapping each aspect of the framework to the corresponding subthemes identified in the data. Illustrative quotes from speakers are provided to support each theme. A summary of the results is given in Table 1.

4.1. Know and Understand AI

This aspect of focuses on developing a basic understanding of the functions of AI. This includes core concepts, skills, and attitudes that require no prior knowledge. As highlighted by the speakers, to understand AI, one must first clearly define what AI is and, more importantly be able to know what it is not. The experts also discussed the need to recognize AI's limitations. Other subthemes covered were the ubiquity of AI, and the broader social and cultural considerations.

A recurrent theme was about the conceptual understanding of AI, premised on the idea that that AI literacy begins only when one has a basic understanding of what AI is and is not. Without this ability one

will not be in a position to confidently interact with AI systems. People must be able to distinguish between AI's actual capabilities and the exaggerated portrayals often found in the media. Although deep technical or mathematical expertise is not necessary, a broad, intuitive grasp of how AI works could be helpful. Recognizing AI as a human-created system and rejecting the idea that AI could one day become an autonomous entity were other critical insights. Speakers especially emphasized the man-made nature of AI and specifically machine learning, a technique which enables AI to learn from vast amounts of data and infer patterns. AI's output is heavily dependent on the quality of its input. If the training data is biased or incorrect, the output will be prejudiced or inaccurate too, based on the idea of "garbage in, garbage out" [9], [10], [11], [12], [13].

Speakers also highlighted how knowing AI's limitations was an important aspect of being AI literate. AI systems can make mistakes and produce erroneous output. This is because AI systems rely on statistical associations and do not understand things in the way in which humans do. AI-generated output must therefore be accepted after proper evaluation. Another concern, was about the "black-box" nature of AI, which pertains to the idea that the underlying complexity of AI can make it difficult for even developers to fully understand how specific outputs are generated [14], [15], [16]. Speakers noted that AI is deeply embedded in our lives. Often this is invisible and influences decisions such as loan approvals, mortgages, or medical diagnoses, and identifying AI in daily life was a crucial skillset. Many people interact with AI-driven decisions without realizing it. Knowing when one is dealing with AI is therefore an essential aspect of AI literacy [14], [17]. Beyond its functional uses, AI was presented as a sociotechnical infrastructure similar to roads or the internet and data and energy as the new "currency" powering this infrastructure [18]. Another idea was that AI is simply a reflection of the data it is trained on [19], which includes everything humans have ever uploaded to the internet. In this sense, AI is nothing but a mirror of humanity, amplifying both our virtues and vices.

4.2. Use and Apply AI

Describe the "use and apply" aspect as the ability to use AI in everyday situations. The analysis revealed a number of subthemes like AI for positive impact, communicating effectively with AI systems, prompt engineering, strategic application of AI tools, and collaborating with AI in meaningful ways.

One of the major ideas that the speakers touched upon was using AI for positive impact and social change. Experts highlighted the need to build skills that would allow individuals to harness the power of AI for positive and productive outcomes, while also equipping people to manage the weaknesses of LLMs and, more broadly, GAIs [9], [11]. The importance of knowing the "language" of AI systems, and the know-how of prompting and communicating with AI was emphasized as well. This involves familiarity with basic concepts such as APIs and model inference, good knowledge of how to use prompts effectively to work alongside "digital co-workers," and an appreciation of how machines convey confidence or adapt to user preferences, which together shape their underlying "culture" [18], [20]. The concept of strategic application, or knowing when and how to use AI tools, was also emphasized. AI literacy teaches one how to use Generative AI tools to aid learning rather than simply bypassing the learning process. This subtheme also emphasizes the need to discern when to use an AI tool versus a traditional search engine [10]. Another idea pertained to collaboration and management, and learning how to work alongside AI systems in new professional roles [21]. Speakers also emphasized the need to learn how to manage AI according to one's needs, by recognizing its capabilities, and knowing when its use would be inappropriate [10].

4.3. Evaluate and Create AI

This aspect of emphasizes higher-order thinking skills such as evaluating, appraising, predicting, and designing with AI applications. Key subthemes include AI hallucinations, bias, the detection of AI-generated content, and principles of responsible AI use.

Speakers stressed the need for people to think about and critically analyze AI and its outputs [21]. A key skill is recognizing hallucinations and biases. The former is when an AI generates incorrect or nonsensical information [10], [11]. One should also develop the ability to identify and address biases embedded in AI models. Recognizing AI-generated content is a key element of AI literacy. When

encountering such content, speakers advised users to ask pointed questions such as, "Where did this information come from?" They also noted that providing feedback by "flagging" problematic or misleading AI output is needed to help these systems mature responsibly [22]. Equally important is responsible AI development. For developers, this means designing systems with caution by ensuring rigorous testing and continuous monitoring, so that biases do not creeping into the tools that we create. They must ensure their personal assumptions are not imparted into the systems they design. Mitigating AI's environmental footprint, and understanding how biases may arise within models, were some other topics that were touched upon [21], [23], [24].

4.4. Ethics and Society

This aspect deals with issues like fairness, accountability, transparency, ethics, and safety. Without understanding them, one cannot become socially responsible and ethical users of AI. That AI literacy was equally important as traditional literacy was highlighted by a number of speakers. And this entails that we move past media-driven dystopian portrayals of machines ruling the world, the well-known AI "apocalyptic nightmare" image [9]. Subthemes discussed include deepfakes, misinformation, bias, discrimination, privacy, copyright, environmental impact, and policy.

Speakers identified several immediate ethical challenges caused by deepfakes and misinformation especially when amplified by AI. Among them, the rise of deepfakes was specifically flagged as a major concern. Another issue was the widespread use of digital avatars that blur reality. The experts also warned about the harm wreaked by misinformation on account of AI stating fiction as fact, and users uncritically accepting such statements as being trustworthy and not verifying them [9], [22]. Speakers also touched upon the creation of addictive AI-based products that target user vulnerabilities [23]. The speakers also delved in detail on the issue of bias and discrimination inherent in AI systems. Examples were provided on how this manifested in critical areas like criminal justice and medical diagnoses [14], [17], [24]. Historically this has resulted in discriminatory outcomes in many areas such as credit card approvals, medical diagnoses, and facial recognition [14].

The issues of privacy and copyright infringement were also discussed in the context of data collection and use [10], [23] . Speakers also drew attention to the rising problem of copyright infringement, where AI models are trained on creative works without consent [11], [24]. AI models consume vast amounts of energy, and cause major greenhouse gas emissions. Considerable environmental costs are incurred when these models are run. Another central topic was the discussion about AI's impact on jobs, particularly whether it leads to job losses or new employment opportunities [14], [21], [24]. Speakers advocated strong policies and governance of AI. That clear boundaries need to be set on what is and is not acceptable, along with clear mechanisms to ensure accountability, was also touched upon. An intriguing question asked was whether integrating applied philosophy into every phase of AI development and adopting a "puzzle-solving" mindset could perhaps help resolve different ethical dilemmas [14], [17], [23]. A call for global coordination on AI risks was also made. Experts drew parallels of AI regulation with historical treaties on nuclear testing or genome editing [25].

Table 1. Themes and Subthemes: Deductive Theory-Informed Analysis

Theme	Subtheme
Know and Understand AI	Conceptual Understanding of AI
	Recognizing AI as a Human-Created System
	Awareness of AI's Limitations
	The "Black Box" Nature of AI
	Identifying AI in Daily Life
	AI as a Sociotechnical Infrastructure
	AI as a Mirror of Humanity
Use and Apply AI	Using AI for Positive Impact
	Prompting and Communicating with AI
	Strategic Application

	Collaboration and Management
Evaluate and Create AI	Recognizing Hallucinations and Biases
	Recognizing AI-generated Content
	Responsible AI Development
Ethics	Deepfakes and Misinformation
	Bias and Discrimination
	Privacy and Copyright Infringement
	Environmental Impact
	Impact on Jobs
	Policy and Governance

4.5. Additional Themes

In addition to the four core aspects, two additional themes were identified from the expert discourse on AI literacy: Reflect and Critique AI and Advocacy and Lifelong Learning Table 2.

4.5.1 Reflect and Critique AI

This theme addresses deeper questions related to the ontology and epistemology of AI, including the nature of AI itself, whether AI outputs constitute "knowledge," and whether AI genuinely understands or merely identifies statistical correlations. This sub-theme explores the nature of AI-generated output and asks whether such output can be considered genuine knowledge. Large language models, though capable of many tasks, are pre-trained on massive datasets where learning is often incidental rather than intentional, resulting in issues such as hallucinations and a lack of true common sense [9], [10], [13]. The issue of statistical versus genuine understanding was flagged by some speakers. They discussed how AI systems rely on statistical correlations between data, which is quite different from how human beings understand concepts. This was linked to the recurring theme of AI's lack of common sense described as the "dark matter" of language and the unspoken rules of how the world works: can an AI, lacking common sense and basic human values, ever be truly safe? Another subtheme touched upon was that of "digital species." The term does not imply a biological entity, but rather a system with capabilities far exceeding those of a mere tool. The fact that AI can not only communicate and process information, but also engage in rudimentary planning might suggest that AI is perhaps not just another invention, but an "infinite inventor" and in this sense a reflection of all human creation [13], [15], [19].

4.5.2 Advocacy and Lifelong Learning

Advocacy and lifelong learning come up as recurring themes when the experts talked about AI literacy. The idea is not only to make sure everyone has some baseline understanding of how these systems work, but also to keep AI education open and equitable, so that access to knowledge remains restricted for a privileged few. There's also a clear message that learning about AI cannot be a one-time effort given the rapid pace of technological change and introduction of myriad AI tools on a regular basis.

AI literacy is framed in terms of "AI for All" as an urgent imperative for everyone [10]. With conversational systems now embedded in workplaces and classrooms, the public at large has to catch up. Some went further, suggesting that individuals might take on a kind of informal advocacy role helping acquaintances or colleagues untangle AI myths and misunderstandings [9]. The feasibility of the general public becoming community educators is yet to be seen; however, in spirit the suggestion reflects a push towards shared responsibility where ordinary AI-literate citizens take up, as a personal mission, initiatives to help demystify AI for others and help them overcome misconceptions.

Another issue highligted was of equitable education and speakers called for AI literacy to be embedded from the earliest stages starting from K-12 levels [10]. Without deliberate efforts, digital divide will likely widen, leaving certain groups permanently behind, and increasing digital inequality. Removing barriers, whether financial, or infrastructural, was described as crucial to ensure that everyone, from schoolchildren to university faculty, has some grounding in AI's uses and risks. Acquiring AI knowledge was likened to a fitness regimen requiring a consistent "minimum effective dose" of effort, similar to a

fitness regimen. Steady and ongoing effort was likely to be more valuable and sustainable than sporadic training or learning efforts. The message of lifelong learning was less about mastery and more about adaptability: being willing to update one's skills and perspectives as the technology evolves [16], [18].

Table 2. Additional Themes and Subtheme: Inductive Analysis

Theme	Subtheme
Reflect and Critique AI	Nature of AI-generated Output
	Statistical vs. Genuine Understanding
	Digital Species
Advocacy and Lifelong Learning	AI for All
	Equitable Education
	Lifelong Learning

4.6. Analysis

Public interest in AI has risen sharply in recent years, largely because generative tools like GPTs have become an integral part of classrooms, offices, and even living rooms [26], [27], [28]. The way prominent figures, such as TED speakers, frame AI in the public sphere matters more than it might first appear. If citizens desire to exchange views and ask questions about technologies, the public sphere remains one of the few viable options available to them. Conversations about AI cannot be limited to boardrooms or confined within policy documents. When that happens, the rest of society risks being treated as a passive audience watching changes unfold without any say in the script. As history has demonstrated time and again, whenever major technological shift happen, whether the printing press or the internet, this shared civic space becomes home to intense debates. AI is no exception. Here, too, competing values and narratives jostle for attention. When the public sphere is genuinely participatory, it does not just produce noise; it shapes expectations, nudges policymakers, and holds developers to account. At its best, it pushes innovation toward responsibility rather than spectacle.

This study organizes its findings around four-factor AI literacy framework, with two additional themes layered in for nuance Figure 2 what comes through is a reframing of AI as a social phenomenon, not merely a technical marvel. That shift may sound subtle, but it changes the terms of debate: instead of obsessing over futuristic "apocalyptic nightmare" tropes borrowed from Hollywood, the emphasis falls on real, empirical concerns such as bias in datasets, social inequities embedded in algorithms, environmental costs, and ethical blind spots. To be clear, such concerns are not new; scholarship has dealt with them at length [29], [30], [31], [32]. But the speakers suggest we avoid treating them as abstract moral puzzles. These concerns must be contextualized with the trajectory of an emergent technology: it is part of the natural turbulence that accompanies any fast-moving, widely adopted technology. One might think of them less as serious concerns and defects and more as growing pains, perhaps serious at this point in time, but not unprecedented.

Although built on advanced computation, AI is deeply social in its content. It mirrors the behaviors, values, and assumptions embedded in the human-generated data on which it is trained. From a social perspective, AI is a reflection of humanity. To be truly AI literate means going beyond simply understanding how AI works. It is to recognize AI's real threat: the ability to centralize power, reinforce inequality, and widen the digital divide. There are also some fundamental questions about the very nature of AI systems that need to be addressed. Researchers need to ask probing questions: Is it correct to consider AI-generated output as "knowledge?" Discussions on human agency and boundaries of machine autonomy should become more common. Awareness of emerging research, such as symbolic knowledge distillation and moral norm repositories, which have the potential to make AI reasoning more interpretable and ethically aligned, is also important. AI literacy is, therefore, to be understood not just as a functional skill but as a civic necessity. It becomes part of what is called a "collective immune system" a means by which society can resist fatalistic narratives and instead make conscious, democratic choices about the kind of future it wants to create with AI [25].

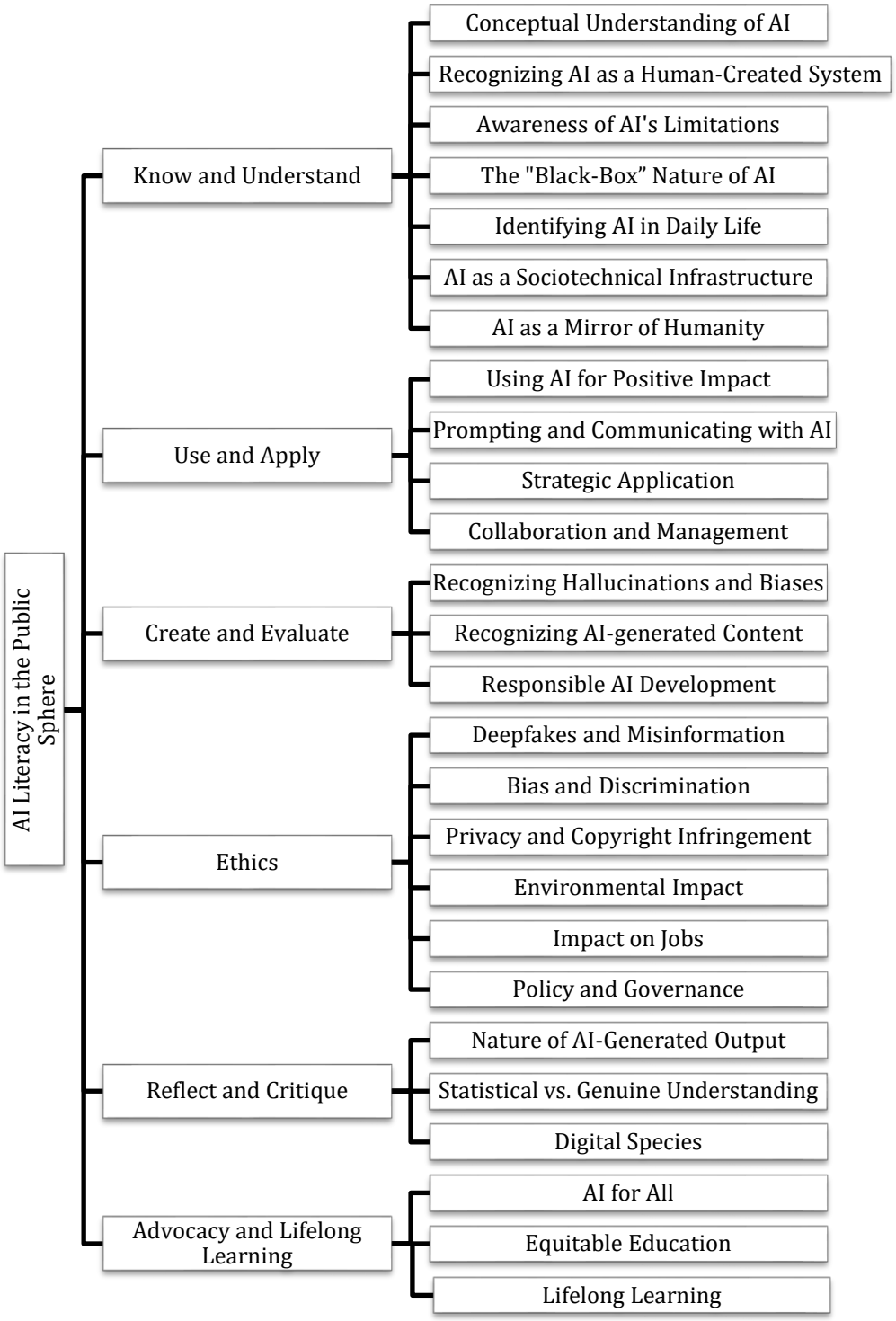

Figure 2. Complete Thematic Hierarchy of AI literacy in the Public Sphere: Four Dimensions from Ng with two Further Identified Themes

5. CONCLUSION

This study has some limitations. Its focus was only on TED and TED-affiliated talks, and other types of videos were not considered. Neither were interactive formats like Q&A or panel discussions analyzed, nor were audience reception or engagement metrics studied. Future research could address these gaps. There is a need to look at a wider spectrum of videos as well as to study audience sentiments obtained either through comments or surveys. Another possible direction for future research could be to look at

potential linkages, if any, between expert narratives on AI literacy and policy outcomes. The results of the study may also be used as an initial roadmap for developing an empirically grounded typology on AI literacy in the public sphere.

As this study demonstrates, public-facing discourse on AI literacy is centered on core ideas such as conceptual understanding, awareness of AI's limitations, recognition of AI's ubiquity, and appreciation of its infrastructural and sociopolitical dimensions. AI literacy initiatives become a push to reassert agency over our technological future. The rise of public discourse on AI signals a collective effort to understand a technology that increasingly shapes daily life. Guided by the four-factor model of Ng along with two other identified themes, the study shows how experts conceptualize AI as a shared societal issue.

AI is not an abstract elite technology and AI literacy must be understood as a mechanism to reclaim public discourse. It enables citizens to go beyond understanding how AI works. It helps answer deeper questions like what AI means, what it should do, and who it should serve. It encourages society to question the outputs of AI systems. AI literacy is therefore a critical intervention against technological determinism and transforms AI from a "black-box" into a publicly contestable phenomenon.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Subhodeep Mukhopadhyay	✓	✓			✓	✓		✓	✓	✓				

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

No conflict of interest.

Informed Consent

Not Applicable.

Ethical Approval

Not Applicable.

Data Availability

This study draws on publicly available TED Talks hosted on YouTube. No new datasets were created.

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