



# Personal Information Management and Organisation Competencies: A Review of Information Literacy Conceptual Frameworks and Standards

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**Abstract.** The aim of this paper is to identify, in information literacy conceptual frameworks and standards, contributions and definitions related to personal information management and organisation competencies. This article reviews the scientific literature pertaining to information literacy and information literacy standards proposed by educational institutions and information professionals' associations. The review consists of an inventory highlighting the need of (1) information literacy frameworks and standards dedicated specifically to these competencies and (2) dedicated research on personal information management and organisation competencies. The conclusion of this paper introduces a framework of personal information organisation competencies which constitutes a first attempt to define these competencies as essential components of personal information management literacy, leading the way for its recognition as a key domain of information literacy.

**Keywords:** Personal information management · Information organisation · Literacy · Literature review · Competency

## 1 Introduction

The development of information and communication technologies pushes individuals to deal with complex and large collections of digital information. To make sense of these collections and to meet their life's objectives and fulfill their roles and responsibilities either in personal or professional situations, they have to put great effort into the management and organisation of personal information [1, 2]. Personal information management and organisation practices call for specific competencies and development of personal information literacy [3–5], an area that remains largely unexplored in the field of personal information management.

The objective of this contribution is to review the academic and professional literature about information literacy to look for contributions related to personal information management and organisation competencies in order to identify constitutive components of a personal information literacy.

The conclusion of this paper introduces a framework of personal information organisation competencies defined on the basis of guided-tour interviews by students of their personal information spaces [6]. It takes the form of a matrix of four core-activities (inclusion, exclusion, apprehension, implementation), three dimensions of information items (technical, informational, social), and three types of relations (efficacy, efficiency, virtuality) between the pursued objectives of individuals when they organise personal information, the opportunities and constraints of the situations, and the mobilisation of their competencies.

## 2 Towards a Personal Information Management Literacy

Personal Information Management (PIM) can be defined as “*the practice and the study of activities a person performs in order to acquire or create, store, organize, maintain, retrieve, use and distribute the information needed to meet life’s many goals (everyday and long-term, work-related and not) and to fulfil life’s many roles and responsibilities (as parent, spouse, friend, employee, member of community, etc.)*” [1]. This field of study dates back to the beginning of the 19<sup>th</sup> century when researchers and practitioners started to explore information use, storing and organising behaviours [7–9]. Since the advent of the personal computer, PIM has become an important area of inquiry with contributions focused either on the development of tools and applications designed to help to manage information (e.g., Rekimoto 1999; Bauer et al. 2005; Rodden and Leggett 2010) [10–12] or on the description of behaviour of individuals when they interact with personal information (e.g., Malone 1983; Boardman and Sasse 2004; Bergman et al. 2010) [13–15].

Despite the richness and diversity of the PIM field of study, little attention has been paid to the competencies involved in the process of managing personal information. Nevertheless, the definition of a PIM literacy is critical for helping users to improve their own PIM practices [5] and more globally, for empowering individuals living in a knowledge society where PIM is a core dimension of people’s interaction with computers [3].

Mioduser, Nachimias and Forkosh-Baruch [3] identified “*the ability to store information items in a way that facilitates its efficient retrieval*” as the primary ability of PIM literacy. They distinguished different components of this ability: (a) giving meaningful names to information items and folders; (b) avoiding creating folders with too little information items or too many of them; (c) avoiding creating folders of ample hierarchical depth; (d) putting shortcuts to information items of high relevancy to the user on the desktop, to shorten their retrieval time and remind the user of their existence and (e) avoiding clustering folders with irrelevant information items [3, pp. 35–36]. They also introduced a “*task management*” skill in PIM literacy, although this ability goes beyond the area of PIM. Majid et al. [4] noted a gap in information literacy models and standards where PIM skills are overlooked. They argued that this lack of PIM skills may result in problems for individuals (e.g., waste of time and effort, information overload) and proposed to integrate skills related to the PIM activities proposed by Jones [1] (finding, keeping and meta-level activities) to information literacy frameworks.

This paper aims at completing these initial attempts to define PIM literacy which only covers a limited portion of the issues raised by the management of personal information. These components are focused on very specific skills where wider competencies should be defined to broaden the scope of the PIM literacy, not only as a list of specific abilities, but also as a complete and integrated framework of competencies needed by individuals to address autonomously and creatively the diversity and complexity of PIM challenges. As a first step, a review of existing framework and standards of information literacy was necessary to search for existing competencies definitions related to PIM.

### 3 Searching for PIM Literacy Components in Information Literacy Frameworks and Standards

On the side of academic literature, the Big6 Skills approach to library and information skills instruction [16] is an early attempt to define the components of information literacy. This model articulates 6 skills: (1) task definition, (2) info seeking strategies, (3) location and access, (4) use of information, (5) synthesis, (6) evaluation. In this framework, PIM is essentially related to skill four “*use of information*”, and one of its subcomponents: “*extract relevant information*”. In a subsequent contribution about information, communication and technology (ICT) skills curriculum [17], even more specific references to PIM can be found: “*record electronic sources of information and gather the URL locations of those sources (...) analyze and filter electronic information in relation to the task, and reject information that is not relevant or credible (...) save and backup gathered data to secure (...)*” [17, p. 24]. At first glance, PIM seems also related to other skills of the Big6 Skills. For example, the skills “*organize information from multiples sources*” could refer to PIM but is more related to the ability to produce and synthesize a presentation of the content of the information rather than the organisation of information objects. PIM may be related, as well, to the capacity to “*engage (e.g., read, hear, view)*” and “*evaluate*”, as understanding the gathered information and evaluating the management processes are abilities involved in PIM. However, this is not clearly mentioned in this model built around a vision of information practice as essentially focused on information seeking and use issues, with only a few references about information management concerns.

Secker and Conan [18] proposed “*a new curriculum for information literacy*”. This model is structured around ten thematic strands, each dedicated to a specific dimension of information literacy. The sixth strand defines key skills under the label “*managing information*”. This strand is divided into five skills: “*note-taking, time management and planning, storing information effectively, bibliographic and reference management and push services/alerting/keeping up to date*” [18, p. 13]. Even if this model put the emphasis on academic information, those skills could all be related to PIM. Specifically, the skills “*storing information effectively*” is specified in two learning outcomes: “*develop and implement a plan for organising your files (including naming and organising folders), decide on an appropriate information management technique suitable for your discipline or the resources you use*” [18, p. 13]. This contribution is one of the most concise found on the issues of management of information with clear mentions of skills related to information storage and organisation.

Kuhlthau [19] proposed a model of curriculum for developing information literacy. One of the central concepts proposed in this curriculum could refer, at least partially, to PIM: “*Information that is organized provides access to facts, ideas, and multiple perspectives*” [19, p. 77]. Nonetheless, the rationale for this concept is rather the ability to distinguish between libraries, as meaningful classifications systems structured by professionals, and the internet, as a complex collection of information structured with hyperlinks by its users. No reference is made to the value of organising found information items in order to structure a meaningful personal collection. This model stresses the importance of evaluating information and sources, albeit no direct reference is made to PIM and the impact of this process on the ability to decide what should be included or excluded from a personal information collection.

Turning to information literacy definitions proposed by nationwide professionals’ associations, the Australia and New Zealand Institute for Information Literacy published in 2004 a second version of its Australian and New Zealand Information Literacy Framework [20]. Among the 6 core standards proposed, one could refer to PIM: “*The information literate person manages information collected or generated*”. This standard is detailed in two learning outcomes: “*records information and its sources*” and “*organise (orders/classifies/stores) information*” [20, p. 18]. However, given examples of those learning outcomes are essentially concerned with citation and bibliographic matters and not directly with PIM.

The Society of College, National and University Libraries (SCONUL), based in the United Kingdom updated its “*Seven Pillars of Information Literacy for Higher Education*” in 2011 [21]. A pillar of this model is “*Gather: can locate and access the information they need*”. This pillar partly refers to PIM when it mentions that individuals have to understand “*the issues involved in collecting new data*” and have to be able to “*use appropriate techniques to collect new data*” [21, p. 8]. Similarly, the definitions of digital capabilities proposed by Joint Information Systems Committee (JISC) briefly refer to PIM under the element “*Information, Data and Media Literacies (Critical Use)*” defined as “*the capacity to find, evaluate, manage, curate, organise and share digital information*” [22, p. 2].

A noticeable allusion to PIM can be found in information literacy skills as defined by the Chartered Institute of Library and Information Professionals (CILIP) in 2012 [23]. This document acknowledges that to be information literate individuals require an understanding of how to manage their findings: “*Know how to store and manage the information you have acquired using the most effective methods available. Reflect critically on the process and achievement as well as on the sources found in order to learn from the experience of finding and using information*” [23, p. 4]. The reference to PIM gets even more direct in the given examples of this understanding: “*Consideration of re-finding resources (either locally or in the original) at a later date. Use of, and relocation in, filing cabinets and/or shelves for physical resources. Use of folders to organise computer-stored data. Organisation of email and email attachments. Use of appropriate software (spreadsheet/database/statistical/reference management etc.). Security and backup copies. Tracking changes in documents. Personal content management*” [23, p. 4]. The framework proposed by the CILIP thus considers issues related to personal information management as constitutive parts of information literacy.

In the United States of America, in 2000, the Association of College and Research Libraries (ACRL) released a definition of “*information literacy competency standards for higher education*” [24]. The second standard of this model (“*the information literate student accesses needed information effectively and efficiently*”) is detailed in a performance indicator: “*the information literate student retrieves information online or in person using a variety of methods*” [24, p. 10]. Mentioned examples of outcomes include: “*selects among various technologies the most appropriate one for the task of extracting the needed*”, “*creates a system for organizing the information*” and “*uses various technologies to manage the information selected and organized*” [24, pp. 10–11]. These standards are the earliest attempts to define skills related to PIM found through this review. The ACRL recently replaced its Information Literacy Competency Standards for Higher Education with its Framework for Information Literacy for Higher Education [25]. This framework is organised into six frames anchored in central concepts of information literacy: authority is constructed and contextual, information creation as a process, information has value, research as inquiry, scholarship as conversation, searching as strategic exploration. This framework briefly refers to PIM in the frame “*research as inquiry*” which emphasises the iterative nature of information search process and the ability to ask questions when searching for information. Two abilities related to information management are recommended: “*monitor gathered information and assess for gaps and weakness*” and “*organize information in meaningful ways*” [25, p. 7].

Recently, the American Association of School Librarians (AASL 2018) released a new version of its “*AASL Standards Framework for Learners*” [26] which considers curation as a key competency. This core concept is globally defined as: “*Make meaning for oneself and others by collecting, organizing, and sharing resources of personal relevance*”. This framework takes the form of a matrix combining the key competencies with four domains: think (cognitive), create (psychomotor), share (affective), and grow (developmental). The curate competency is hence declined in multiple competencies related to the different domains. Those competencies are closely related to different dimensions of PIM practices: information needs (“*determining the need to gather information*”, “*identifying possible sources of information*”, “*making critical choices about information sources to use*”), information gathering (“*seeking a variety of sources*”; “*collecting information representing diverse perspectives*”, “*systematically questioning and assessing the validity and accuracy of information*”, “*organizing information by priority, topic, or other systematic scheme*”), information sharing and group information management (“*accessing and evaluating collaboratively constructed information sites*”, “*contributing to collaboratively constructed information sites by ethically using and reproducing others’ work*”, “*joining with others to compare and contrast information derived from collaboratively constructed information sites*”) and information organization (“*performing ongoing analysis of and reflection on the quality, usefulness, and accuracy of curated resources*”, “*integrating and depicting in a conceptual knowledge network their understanding gained from resources*”, “*openly communicating curation processes for others to use, interpret, and validate*”). By putting great emphasis on curation, the AASL model is particularly concerned with issues of PIM and the multiple competencies proposed in relation to curation offer a detailed and relevant list to lay the ground for a PIM literacy.

Despite the limited scope of this review, which should be enriched with contributions from other researchers and from information professionals' associations based in other countries, this work highlights trends in the existing definitions of information literacy skills related to PIM issues. First, contributions vary significantly in the importance they attach to PIM. While some contributions clearly define skills related to information gathering and organising others overlook PIM issues with a focus on competencies essentially related to information seeking, evaluation and use. Second, the inclusion of PIM in information literacy seems a quite recent and rising tendency. This might be explained by the development of the PIM research field and the increasing complexity of these practices: individuals have to manage, by themselves and more than ever, consequent collection of personal information with multiple devices and across the multiple contexts of their everyday life.

Two limits arise from examining this review of information literacy standards and frameworks. On the one hand, the methodologies applied to produce definitions are often unclear. Standards and frameworks often seem to be formulated on the basis of information experts' knowledge and scientific literature. It is crucial to complete this approach by developing dedicated research studies designed to define competencies and anchored in the information practices as they are experienced by individuals. This is particularly required in the context of PIM practices which take place in the context of everyday life and not only in formal settings. On the other hand, the integration of the components of information literacy often remains unclear, with many definitions taking the form of lists of skills/competencies/knowledge to be mastered in order to be information literate. This approach is limited in its capacity to define information literacy as an integrated set of skills/competencies/knowledge closely related and mutually dependent. A matrix approach, as adopted by the AASL, seems more appropriate to reflect the intertwined nature of the constitutive elements of information literacy. To address these issues and to contribute to the definition of a PIM literacy, the results of a 4-year research project which led to a definition of personal information organisation competencies are briefly described in the next section.

#### **4 A Definition of Personal Information Organisation Competencies**

In order to define personal information organisation competencies, 58 semi-structured interviews were conducted with first-year undergraduate students. Interviews took the form of guided-tour interviews [13] by the informants of their personal space of information, including every device they use (e.g., personal and family computers, smartphones, tablets) and information related to the diverse projects of their life (family life, leisure, education). Students were interviewed twice, before and after their entrance into higher education, to observe how they adapted their PIM practices to face new informational challenges, with the idea that PIM competencies would play a key role in this transition. They were asked to explain how they organised their personal information and to show and comment on the produced organisations of their personal

information collections (e.g., folders, playlists, tags). Interviews also focused on the informants' capacity to reflect on their own practices with questions asking them to evaluate their pros and cons. Each interview was conducted in the everyday context of use of their digital tools, typically at their homes.

Interviews and analysis were inspired by phenomenography [27] with the objective of mapping the variety of the experiences and conceptualisations of PIM practices and competencies as they were experienced and described by informants. The research method was also inspired by sense-making methodology [28] with a focus on the role of PIM practices in the process of sense-making by the informants of their collections of personal information.

The analysis with the NVivo software combined deductive coding articulated around categories of activities proposed in the PIM literature [1, 29] with inductive coding following a grounded theory approach [30, 31]. The analysis of the interviews led to comparison of PIM practices both within subjects, between their different practices and between the two different interviews, and between subjects, for the same activity.

These interviews led to the identification of both successful and unsuccessful PIM practices experienced by the students. By comparing the strategies adopted by the informants and the way they framed and justified their practices, a definition of personal information organisation competencies was formulated [6] (Table 1).

**Table 1.** A matrix definition of personal information organisation competencies [6]

	Efficacy			Efficiency			Virtuality		
	Tech.	Info.	Soc.	Tech.	Info.	Soc.	Tech.	Info.	Soc.
Inclusion									
Exclusion									
Apprehension									
Implementation									
	Meta-Analysis								

This matrix combines 4 activities (inclusion, exclusion, apprehension, implementation) with three dimensions of information objects (technical, informational, social), and three types of relations (efficacy, efficiency, virtuality) used to characterize the mediating role of competencies between the individual's intentions and the opportunities and constraints of the situations where they are mobilized.

The four activities are largely inspired by existing literature on PIM [1] and on information organisation [29]. Inclusion activity concerns the entrance of the collection and consists in evaluating and deciding which information items should be added and saved to the collection. The exclusion activity consists in deciding which are the information items that are no longer useful and meaningful, and deleting them from the collection or archiving them. The apprehension activity consists in perceiving and understanding the characteristics of information items and their relations. Finally, the implementation activity consists in leveraging affordances of the devices and interfaces used to describe the information items and structure them in order to enable and facilitate interactions with the collection.

The three dimensions of information items proposed above are inspired by the work of Fastrez [32] in the field of media literacy and are fruitful to analyse information items from three complementary perspectives, as they are:

- informational, they represent things through the use of different sign systems, attaching a signifier to a signified. They are characterised by formal properties, referential objects and specific modes of signification.
- technical, they are stored, perceived and manipulated through technical devices combining hardware and software.
- social, they are related to the intentions of the individual and institutional agents who produce and diffuse them. They produce effects on their users and are used in a context influenced by cultural models and social representations.

Finally, this matrix combines activities and dimensions with a third level which characterises the relation between the objectives pursued by individuals when organising personal information management, the specific constraints and opportunities of their everyday life situations, and their competencies. The efficacy relation relates to the ability of individuals to mobilise their PIM competencies to achieve their objectives with their collection of personal information such as listening to music, writing a paper, or responding to an email. The efficiency relation relates to the ability of individuals to mobilise their PIM competencies to achieve their goals with minimum effort. The virtuality relation relates to the ability of individuals to mobilise their PIM competencies to maintain their personal information collection over time by anticipating their future needs and the possible evolution of their collection.

Each cell in the matrix represents a particular competency situated at the intersection of an activity, a dimension of information object and a type of relation to the pursued objectives. For example, when organising their musical collection, individuals have to be able to select appropriate music files to be included in their collection, taking into account the technical format of the music file and the efficacy of this file to reach a particular objective such as running or relaxing. Finally, this matrix also proposes a meta-analysis competency to emphasize the importance of the ability for the individuals to take a step back and reflect about their own practices in order to improve their competencies and their PIM practices.

## 5 Conclusion

Despite the development of the PIM field of research, and the increasing complexity of PIM practices, the question of PIM competencies needed by individuals to manage their personal information has been largely overlooked in the scientific literature. Through the review of information literacy standards and frameworks, different references to PIM competencies have been discovered in the scientific and professional literature. This review shows that the recognition of PIM competencies as an essential part of information literacy is a recent trend with many contributions giving little attention to PIM matters. It also shows that definitions are often formulated from the point of view of information experts and academics and need to be completed by dedicated research designed to define competencies on the basis of information

practices as they are experienced by individuals in the context of everyday life. This review also indicates a need for more integrated frameworks of information literacy competencies beyond simple lists which artificially fragment their definitions.

Considering these limitations, a definition of personal information competencies is proposed at the end of this contribution. This framework combines four activities (inclusion, exclusion, apprehension, implementation) with three dimensions of information objects (technical, informational, social), and three types of relations of competencies with the objectives motivating the PIM practices (efficacy, efficiency and virtuality). It is a first attempt to define information organisation competencies as essential components of personal information management literacy, laying the groundwork for its recognition as a key domain of information literacy.

## References

1. Jones, W.: *Keeping Found Things Found: The Study and Practice of Personal Information Management*. Morgan Kaufmann, Burlington (2008)
2. Bergman, O., Whittaker, S.: *The Science of Managing Our Digital Stuff*. MIT Press, Cambridge (2016)
3. Mioduser, D., Nachmias, R., Forkosh-Baruch, A.: New literacies for the knowledge society. In: Voogt, J., Knezek, G. (eds.) *International Handbook of Information Technology in Primary and Secondary Education*. SIHE, vol. 20, pp. 23–42. Springer, Boston (2008). [https://doi.org/10.1007/978-0-387-73315-9\\_2](https://doi.org/10.1007/978-0-387-73315-9_2)
4. Majid, S., Chang, Y.-K., Foo, S., Mokhtar, I.A., Theng, Y.-L., Zhang, X.: Strengthening information literacy competencies through incorporating personal information management skills. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) *ECIL 2013*. CCIS, vol. 397, pp. 331–337. Springer, Cham (2013). [https://doi.org/10.1007/978-3-319-03919-0\\_43](https://doi.org/10.1007/978-3-319-03919-0_43)
5. Kim, J.: Guiding users to improve personal information management. In: *Workshop on Personal Information Management (PIM) 2012 at ACM Conference for Computer Supported Collaborative Work (CSCW)*, Seattle, WA (2012)
6. Jacques, J.: *Définition des compétences propres à l'organisation des collections d'informations personnelles numériques*. Université Catholique de Louvain (UCL) (2016). <http://hdl.handle.net/2078.1/174446>
7. Eliot, C.W.: The division of a library into books in use, and books not in use, with different storage methods for the two classes of books. *Libr. J.* **27**, 51–56 (1902)
8. Otlet, P.: *Traité de documentation - Le livre sur le livre - théorie et pratique*, Bruxelles (1934)
9. Bush, V.: As we may think. *Atl. Mon.* **176**, 101–108 (1945)
10. Rekimoto, J.: Time-machine computing: a time-centric approach for the information environment. In: *Proceedings of the 12th Annual ACM Symposium on User Interface Software and Technology*, pp. 45–54. ACM, Asheville (1999)
11. Bauer, D., Fastrez, P., Hollan, J.: Spatial tools for managing personal information collections. In: *Proceedings of the 38th Annual Hawaii International Conference on HICSS 2005*. IEEE (2005)
12. Rodden, K., Leggett, M.: Best of both worlds: improving Gmail labels with the affordances of folders. In: *CHI 2010 Extended Abstracts on Human Factors in Computing Systems*, pp. 4587–4596. ACM, New York (2010)

13. Malone, T.W.: How do people organize their desks? Implications for the design of office information systems. *ACM Trans. Inf. Syst.* **1**, 99–112 (1983)
14. Boardman, R., Sasse, M.A.: “Stuff goes into the computer and doesn’t come out”: a cross-tool study of personal information management. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 583–590. ACM, New York (2004)
15. Bergman, O., Whittaker, S., Sanderson, M., Nachmias, R., Ramamoorthy, A.: The effect of folder structure on personal file navigation. *J. Am. Soc. Inf. Sci. Technol.* **61**, 2426–2441 (2010)
16. Eisenberg, M.B., Berkowitz, R.E.: *Information Problem Solving: The Big Six Skills Approach to Library & Information Skills Instruction*. Ablex Publishing Corporation, Norwood (1990)
17. Eisenberg, M., Johnson, D., Berkowitz, B.: Information, communications, and technology (ICT) skills curriculum based on the Big6 skills approach to information problem-solving. *Libr. Media Connect.* **28**, 24–27 (2010)
18. Secker, J., Coonan, E.: *A new curriculum for information literacy*. Arcadia Project, Cambridge University Library (2011)
19. Kuhlthau, C.C., Maniotes, L.K., Caspari, A.K.: *Guided Inquiry: Learning in the 21st Century*, 2nd Edition: *Learning in the 21st Century*. Libraries Unlimited, Santa Barbara (2015)
20. Bundy, A.L. (ed.): *Australian and New Zealand Information Literacy Framework: Principles, Standards and Practice*. Australian and New Zealand Institute for Information Literacy, Adelaide (2004)
21. Society of College, National and University Libraries: *The SCONUL Seven Pillars of Information Literacy. Core Model for Higher Education*. SCONUL Working Group on Information Literacy, London (2011)
22. Joint Information Systems Committee (JISC): *Building Digital Capability: The Six Elements Defined*, Bristol, UK (2015)
23. Chartered Institute of Library and Information Professionals (CILIP): *Information Literacy Skills*, London (2012)
24. Association of College and Research Libraries (ACRL): *Information Literacy Competency Standards for Higher Education*. American Library Association (ALA), Chicago (2000)
25. Association of College and Research Libraries (ACRL): *Framework for Information Literacy for Higher Education*. American Library Association (ALA), Chicago (2016)
26. American Association of School Librarians (AASL): *AASL Standards Framework for Learners*. Chicago (2018)
27. Marton, F.: Phenomenography: a research approach to investigating different understandings of reality. *J. Thought* **21**, 28–49 (1986)
28. Dervin, B., Foreman-Wernet, L., Lauterbach, E.: *Sense-Making Methodology Reader: Selected Writings of Brenda Dervin*. Hampton Press, Cresskill (2003)
29. Glushko, R.J.: *The Discipline of Organizing: Professional Edition*. O’Reilly Media, Sebastopol (2015)
30. Charmaz, K.: *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. SAGE Publications, London (2006)
31. Ligurgo, V., Philippette, T., Fastrez, P., Collard, A.-S., Jacques, J.: A method combining deductive and inductive principles to define work-related digital media literacy competences. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) *ECIL 2017. CCIS*, vol. 810, pp. 245–254. Springer, Cham (2018). [https://doi.org/10.1007/978-3-319-74334-9\\_26](https://doi.org/10.1007/978-3-319-74334-9_26)
32. Fastrez, P.: Quelles compétences le concept de littératie médiatique englobe-t-il? Une proposition de définition matricielle. *Rech. en Commun.* **33**, 35–52 (2010)