Emerging New Information Literacies – A Conceptual Outlook[*]

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Abstract. Instead of making the post-literacy discourse more sophisticated, we approach the changing nature and complexity of information literacy from transforming social practice, elaborating the characteristics of three new "clusters" of information literacies. The main reason to define and discuss newborn literacies, transforming literacies and "hyperpeople literacies" is the emerging world of "Internet of Everything", as a complex symbolic and transactional environment. In planning for this era we have to use "human technology", social innovation and design thinking aspects.

Keywords: New information literacies, post-literacy, metaliteracy, assessability, Internet of Everything, receptive/productive user, newborn literacies, transforming literacies, hyperpeople literacies.

1   Introduction

Our overall goal is to define and discuss three new "clusters" of information literacies: newborn literacies, transforming literacies and 'hyperpeople literacies. Nevertheless, before the introduction of these categories we have to look around at the unstoppably and uncontrollably expanding conceptual universe of information literacy.

Envisioning the future, Ridley [1] defines post-literacy "*as the state in which reading and writing are no longer a dominant means of communication*", while Kress [2] talks about visual objects instead of letters, and screens instead of books. We have also had a colorful transliteracy approach since 2005 (which was originally coined to support the cross-sectional approach of communication platforms and later developed into the "3 T"-paradigm: teaching, technology and transliteracy). As a "*unified construct that supports the acquisition, production, and sharing of knowledge in collaborative online communities*", metaliteracy was born to promote "*critical thinking and collaboration in a digital age, providing a comprehensive framework to effectively participate in social media and online communities*"[1].

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[1] The source of the definition is a dedicated site [3].

It is also very common to identify "*new information literacies*" in various contexts, like writing and Writing Studies [4], critical media literacy/critical thinking [5] library environment [6], digital games [7] or participation [8]. In the last few years it became extremely popular to talk about *"emerging information literacies"*, too. By way of example, Lee Rainie, the director of Pew Internet Project described six new types in a lecture [9]:

- *Graphic literacy* (Thinking visually and mastering the "language of the screen" and visual representation of information)
- *Navigation literacy* (Learning to maneuver through a non-linear, hypertext environment that can be disorganized)
- *Context literacy* (Seeing the connections among pieces of data and information in a hypermedia environment)
- *Focus literacy* (Practicing reflection and deep thinking – and enjoying leisure and daydreaming)
- *Skepticism literacy* (Learning to evaluate information and how to assess its accuracy and sourcing)
- *Personal literacy* (Understanding your digital identity and digital footprints; managing your privacy and self presentation)

The readers of information literacy literature can easily identify the overlapping nature of vocabularies: the authors try to combine the traditional skills-based approaches to information literacy with new technology improvements, challenges and possibilities. For instance, Rainie's graphic literacy and navigation literacy are willingly discussed 'brand-old' forms of information literacy as *graphicacy* and *navigacy*: the context, focus and scepticism literacies are variations of critical thinking and critical media literacy skills, very close to the 'really-new' *assessability* [8]. Personal literacy as a term truly reflects a very important new field of digital existence, but successfully makes a muddle of the conceptual substructure, since "personal literacies" were used in a totally different meaning, as natural counterparts of "professional literacies" so far.

1.1   A Way Ahead: Alterations in the Cultural Forge

However, the common nature of every information activity is invariant: visual representation as information input, processing in the brain, and objectivation (exformation) as information output. Therefore, we do not have to seek the changing nature and complexity of information literacy around a cognitive relief or the technology horizon, but on the field of transforming social practice, embedded into the digitally mediated cultural environment. It simultaneously means that the architectures, services, solutions, tools and gadgets of the universe of future information and communication technology are important aspects, but the crucial moments are the changing patterns and structure of everyday life. Putting it the other way around: new literacies are "*required for successful participation in an increasingly technologically mediated society*" [8]. That's why the term

"transformational literacies" was born: preparing users for life [10], or "*to help (students) see the connections between their hard work as readers and writers and their futures as contributors to stronger communities and a better world* [11].

Andrea Forte proposed a new framework recently. It highlights the "critical dimensions" of information literacy, while simultaneously indicates the main directions of change.

Table 1. Dynamics of information literacy development [8]

	Social	*Literacy skills*	*Technological*
Consumption	Educating people to find and use information well		Designing information systems that help people to find and use information well
	Approach to		*transforming practice* ➔
Production	Educating people to create and contribute information sources	⬇	Designing information systems that help people to create and contribute information sources

1.2   Goals of the Paper

It is almost impossible to compose a full, overall, perfect classification system of every literacy form, because of the dynamic nature of the field. The emerging literacies become new, the new ones become old, while the old ones are continuously augmented with new features and relevancies.

Our aim is to *call in new sets of literacies into the discourse*, speeding and assisting understanding of the very nature of "literacy tectonics": *newborn, transforming, hybrid and hyperpeople literacies*. We hope that this enriched conceptual framework can vivify and quicken not only the literacy debates, but raise the awareness and stimulate the design of new intellectual, educative and work environments and pedagogy/training practices.

2   Literacies, Putting in Motion

There is not enough space to substantially elaborate the characteristics and core features of all the literacy forms to be discussed; our moderate aim is to create a commensurable, initial "map" of them.

2.1   Newborn Literacies

The reason behind the birth of brand new literacy types is not only the cumulative relocation of basic activity and transaction forms into the digital ecosystem, but the

overflow of closed, professional knowledge sets, creating their casual, everyday, trivial versions, generating a kind of "literacy emancipation" wave.

The pioneer field, financial literacy, evolved as the ability to make informed decisions about how to use and – later – how to manage our money and financial transactions online, including *"saving, banking, budgeting, smart shopping tips, understanding types of loans and credit and how to manage debt, investing and financial planning, choosing suitable mobile phone plans, avoiding scams and rip-offs, and explains the basics about insurance and superannuation"* [12]. Legal literacy was born as an ordinary digital literacy of lawyers and students of Law Schools [13], and psycho-literacy was introduced as the general knowledge of basic terms and concepts within the psychological community, especially to students [14]. A few years later, the concept was extended to the legally literate and the psychologically literate[15-16]) citizens, while currently it is more than important for every 'Netizen' to identify, know, and understand the legally sensitive fields of typical online activity forms, and the psychologically sensitive parts of people to people online communication.

The explosion of health information pages for patients and health practitioners, digital health tools and spawning health applications (we had more than 40 thousand mobile health apps in 2012! [17]) led to a change from health awareness to health literacy, stepping up *"from just looking at health information, and moves towards a model that involves behavior changes and digital interaction"* with and between patients [18].

The junior concept of futures literacy was coined directly for enhancing the skill-set of policymakers [19], but the anticipatory systems and models, including the methods of scenario-making can help everybody get to better decisions, and are open for civil organizations, local communities, interest groups and even individuals.

Table 2. Newborn literacies, altogether

Financial literacy
Legal literacy
Psycho-literacy
Health literacy
Futures literacy

2.2   Transforming Literacies

The second cluster of emerging literacies consists of significantly improved versions of earlier literacy forms, following the inherent changes within the given domains, while reflecting the extended playground of activity forms, as a part of the "gradation" from the receptive to a receptive/productive nature.

Data literacy as *"competency in collecting, interrelating, organizing and developing knowledge and insights from raw data"* [20] and its cousin, statistical literacy (as citizen's ability to understand and critically evaluate statistics, coming from the media environment and appreciating its relevance in all aspects of life) has

substantively changed in the last few years, thanks to Open Data, Linked Data, the birth of data journalism and data science, and, oddly, the appearance of Big Data with enormous and diverse sources behind it. *"Ensuring that big data creates big value calls for a re-skilling effort that is at least as much about fostering a data-driven mindset and analytical culture as it is about adopting new technology"* [21]. A new culture of personal data was also taking shape, since *"every facet of life from sleep to mood to pain was becoming trackable"*: the concept of "Quantified Self" was born in 2009 [22].

Similarly, visual literacy (or "visuacy"), as a conceptual approach to graphic problem solving [23] transformed into a more complex form (using comic books, graphic novels, anime, cartoons, and more, to develop comprehension and thinking skills) [24]. Following the revolution of everyday information architecture and infographics, graphicacy [25] is increasingly "infographicacy', as a part of broader design literacy [26].

Game Literacy got into the vocabulary of academics and teachers to take *"seriously the serious play of young people … analysing games and the world of games as text"* [27]. A few years later, serious games became integral parts of learning environments, while gamification (*"use of game thinking and game mechanics in non-game contexts"* by definition [28]) was raised and spread in company and big organization environments.   How to create special game environments; how to combine work with games; how to adjust motivation, attention and time-management – these are the main issues of future gamification literacy, "gamificacy".

The rampant world of social media vivified a new ability in public and semi-public spaces: participatory/participation literacy. Changing their passive "lurking" position, millions became active Netizens in community forums, interests groups, social movements' sites and local democracy experiments (consensus conferences, participative budget planning, etc.). The emphasis shifted sharply from discussions to real-world interventions: as we step from interaction to decision-making competency and responsible execution, the operative part of social actions established a new literacy set: abilities for agenda setting, strategic planning, managing conflicts and sharing tasks: we willingly call it "operacy".

We see the same dislocation ahead in the field of media literacy, as an erudite manner of media consumption the moves to participation. [29]. This shift from understanding and (critically) analyzing translocated to writing on media texts and creating complex contents. This aspect was always hiding behind basic 'writing' skills (such as creative writing or creative literacy, like poetry writing) [30], but the online revolution of authorship [31] reshaped it in a more broad sense, as a part of productive literacies (using the phrase of Kurt D. Squire) or info-creation (referring to Isto Huvila) [32]. In a more general way we talk about the ability to create public content - "content creacy".

A special part of this galaxy of (multimedia) content is production of scientific materials. Scientific literacy itself has been discussed exhaustively for a long while, but in contemporary society it is more than the proper composition of scientific texts (as generations used Mary Schleppegrell's framework with description/definition,

explanation, recount/procedure, argument): sooner or later it becomes a universal literacy form in schools, as Citizen Science (People's Science) moves into public education, providing a special treat and familiarity for future generations to take part in living scientific problem solving, creating horizons for lifelong research [33].

Table 3. Renewing literacy landscape

Current forms		*Next generation variants*
Data literacy		(Big) data literacy
Visuacy		(Info)graphicacy
Game literacy	→	Gamificacy
Participacy		Operacy
Media literacy (mediacy)		Content creacy
Scientific literacy		Lifelong research

Data and game literacies can easily form hybrids with other literacies, since we can find data everywhere, and there are almost no limits to gamification in these environments. The combination of health literacy and numeracy is important *"to understand, evaluate, and use numbers … to make informed health care choices"* [34]. We have lot of good examples of how gamification could influence clinicians' practice [35] and patients' behavior [36].

Scientific data literacy is a separate field, following the recognition, that the „*fast-changing scientific research and education environment was becoming increasingly data intensive, due to the advancement and proliferation of tools and networks"* [37]. Scientific infographics has also become popular, since data visualizations can assist in understanding the conceptual and the practical [38], and communicate scientific results [39]. Furthermore, we also have a long record of combining science learning with games [40] and producing new scientific knowledge using gamification (see for example the legendary Fold It! project [41]).

3   What are the Hyperpeople Literacies?

The next epoch of culture is about a new, holistic quality of the altering digital universe, as it transubstantiates to a UCC (Universal Communication and Collaboration) environment, creating effective PANs (Personal Area Networks), originating the so-called "Industrial Internet", dissolving all these sequels into the paradigm of "Internet of Everything" (IoE), which totally re-draws the close-knitted digital world we used to live with.

When the number of active "agents" (objects) and processes spawn exponentially, the new space of people to machine (p2m), machine to people (m2p) data to data (d2d

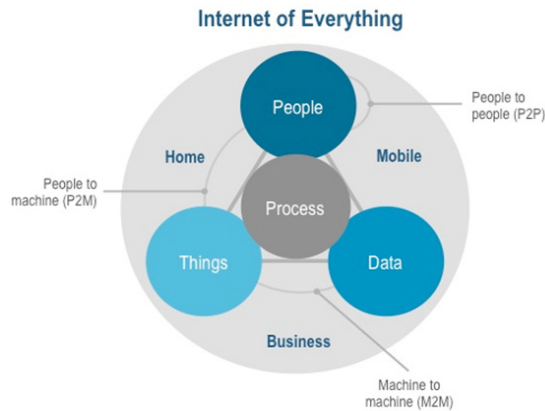or linked data) connections needs new, high level protocols, semantics, meta-languages, design and mission.

Fig. 1. The paradigmatically new world of Internet of Everything [42]

The "Internet of Everything" is a complex symbolic and transactional environment As Mark Pesce envisioned [43]: *"we are at the threshold of an entirely new era, where a new form of communication – beyond any one of us, yet embracing all of us – has transformed us into hyperpeople."* The average online citizen, the "hyperpeople" will be characterized by new interaction patterns (including special semantics on the Human part with new kinds of Personal Digital Assistants), under the shadow of re-designed interfaces, tools and background systems (including hardware, software, "orgware" elements).

Everybody will be digital immigrants again in this emerging, hyperconnected world, but it would be a dead-end to choose an old target: becoming digital natives again. Do not seek the profoundly new element around the revolutionary tools, the capacity or the topology: the real novelty is the *complexity*, which challenges every actor: individuals, communities, enterprises, organizations, nation states. This new transaction environment needs re-evaluation of progressively shrinking resources - our attention and time in an essentially changing identity and collaboration space. This space can be none, but open, since the closed terrains are hindering the flows and transformations.

It is very important to accommodate to the rules of the game of this future, process-focused hyperconnective arena prematurely, with the new forms of information literacy, with self-confident navigation and operacy in a well-designed interface culture, with semantic weapons, and new routines of man-machine communication. From this point of view – as Ellen B. Mandinach propagates it – data needs to be usable, purposeful and meaningful in order for it *to be translated to action*. Hyperpeople data literacy is about utilization.

In a p2p context, emotional literacy's role can be crucial [44], and the planetary nature of IoE needs an acceptance of a lingua franca (transforming English fluency to English as a universal second language) [45]. The new pressures on trust and liability in IoE environment highlight literacy forms, supporting educated decisions and responsible participation: context/sceptisicm literacy, assessability and critical thinking. To be able to control the m2m segments, the role of infographicacy comes to the forefront.

Paraphrasing the famous sentence of Alan Kay, the best way to be ready for the future is to build it. The "agenda of further thinking" [2], the teleology of information literacy has to include the elements of collective design. IoE is unimaginable without a strong social innovation approach, using elements of design thinking, instead of a market-driven, spontaneous, unreflected way of building. It takes *futures literacy* becoming distinctively important in the next decade.

4   Conclusion

We could successfully present a new approach that's not to be sneezed at. In planning for the hyperpeople era we must be aware of its transformative nature, integrating previous literacy forms into a unified, complex platform. And it is also obvious that the key questions do not surround the next generation of information technology innovations, solutions, tools and services. On the contrary: we must use "human technology", social innovation and design thinking aspects, when seeking literacy aspects of the Internet of Everything era.

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