

Media education in the Postdigital era: how to incorporate data literacy, media literacy, AI Literacy and/or multi-literacies into theoretical frameworks?

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Abstract: This contribution builds on boyd and Crawford's (2012) example of the need to integrate data literacy into media literacy. Taking the media literacy movement as a point of reference, an investigation is proposed into the possibilities of analyzing media productions generated by intelligent agents in the postdigital era through the adaptation of media literacy approaches, integrated with a data literacy framework. The aim is to examine whether it is appropriate to take into account dimensions that data literacy-oriented frameworks do not seem to focus on, such as critical use and responsible media production. The study considers the analysis of media production and communication, no longer generated only by humans, but also by AI applications for automated media production. The paper proposes operational solutions for fostering critical and informed digital citizenship in an age increasingly shaped by algorithms and AI.

Keywords: data literacy, media education, multi-literacies, Personal Data Literacy Framework, postdigital era.



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1. Introduction

The media education movement was born and outlined its foundations and main approaches in the last century, when the new media and digital media were decidedly highly visible and identifiable as specific media in society. Now, instead, one of the great challenges of the current era in science, education and various disciplines is the postdigital challenge (Jandrić et al., 2018), which leads to the digital no longer being regarded as 'other' than human life (Knox, 2019; Jandrić et al., 2018). In the post-digital vision, therefore, the digital domain is not separated from other everyday spaces, because the two spaces are inextricably linked (Bayne & Jandrić, 2017). In such a perspective, the distinction between 'old' and 'new' media loses meaning because in some ways the postdigital brings together the 'old' and the 'new' (Andersen, Cox, & Papadopoulos, 2014).

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It is in this perspective that we can place the development of Artificial Intelligence, which is significantly expanding the range of applications that will use deeply analyzed data to produce communications generated by AI algorithms (Eugeni, 2021; Kaplan, 2018).

While there is an increasing urgency to promote forms of data literacy with the intention of making citizens aware of the use of their data by entities and organizations that are less and less transparent to participants, it is easy to see the need not to totally abandon other forms of education concerning the conscious use of new technologies such as media education and media literacy. In literature, there does not seem to be a frame of reference that uniquely includes the study of all the above-mentioned aspects; on the other hand, we are witnessing the emergence and development of specific frameworks that can in turn be integrated in order to obtain a definitive framework that allows for both study and educational intervention, according to a functional logic that allows us to overcome the risk of relying exclusively and reductively on a single framework. Within this logic lies the contribution of the authors Boyd and Crawford (2012) who emphasize the importance of integrating Data Literacy within the new literacies.

In today's society, in fact, we are constantly exposed to a vast amount of data and messages (data-driven society): this makes it necessary for the user not only to be able to handle them, but also to be able to understand and interpret them. In order to have a more knowledgeable citizenry, Spiranec, Kos and George (2019) push for the need to develop Critical Data Literacy. Alternatively, a data literacy framework can be integrated with others that address media literacy.

On the other hand, we cannot forget that media education does not only deal with media literacy, but is articulated in a multitude of literacies, which is why multiple literacies are referred to in this paper with the aim of covering the needs of the media education context.

The complexity deriving from the unavoidability of referring to specific literacies makes it necessary to work very complexly (Raffaghelli, 2019) to link them in order to develop educational actions that are coherent and responsive to the needs of contemporary society and, above all, in the search for a reference system for the development of the issues concerning digital citizenship (Carmi et al., 2020). The definition of specific frameworks in the field of digital literacy (Digcomp above all) and the affirmation of Information Literacy linked to the practices of basic use of the Net, place above all Media Education (predominantly in the various articulations of Media Literacy frameworks) in the conditions to exercise the greater flexibility and dynamics that it has historically demonstrated in the course of the evolution of the various approaches. The aim is, metaphorically, to fill the gaps left by other literacies just as a fluid fills the holes left by other solids resting in a plane. On the other hand, considering the frameworks of the different literacies as autonomous frames of reference is a risk that leads to probable educational failure (Cope & Kalantzis, 1999), whereas the opportunity to apply, expand and extend the existing media literacy approaches with a view to responding to new demands and needs has been emphasized several times (Buckingham, 2007). Reasoning absurdly, if frameworks were to be used as autonomous and unrelated frames of reference, it would be very difficult to achieve effective educational action in a holistic sense, as on the one hand this would entail asking both the community of media educators, teachers, and the citizenry to make an effort to identify deficiencies and subsequently generate the desired integration. It would

also result in uneven integrative interventions with low levels of coherence between them as a response to the need to critically analyze media content and productions generated and influenced by AI algorithms. On the other hand, the need to work synergistically with other frameworks in a holistic manner is also expressed in Digcomp release 2.2 (Vuorikari et al., 2022), the aim of which is not to exhaust the e-skills framework in DigComp itself.

Starting with these considerations, the aim of this paper is to identify operational solutions that complement the frameworks currently available in literature for the development of critical and informed digital citizenship.

2. Materials and Methods

- The study is conducted using analysis and synthesis as main research methods. The theoretical basis of the study is the existing literature analysis on the topic as well as publications in thematic journals and on websites.
- Specifically, the most relevant existing approaches to media education were identified, and for each of them, a further educational action was applied regarding the dimension of communication awareness in a process in which AI can be integrated or fully applied.
- When the approach to media education involves a specific media literacy framework, this was referenced.

The analysis took into account the role of media evolution, using the post-digital framework to emphasize the differences in media production and consumption.

In this paper, particular reference is made to the way Pangrazio and Selwyn (2019) envisaged their Personal Data Literacy Framework (PDL) to be used and applied: it was selected for this research because it was intentionally constructed with the intention of being integrated with other frameworks and applied in both formal and informal contexts.

The aim is to educate the user to identify data, reflect on it to understand the implications of its management and control. It is based on 5 dimensional axes that produce specific interventions:

1. identification of personal data and the types of data considered by various systems;
2. understanding data: identifying how and where personal data are generated and processed as well as interpreting the forms of graphic visualization of the same;
3. reflecting on data: understanding the implications that personal data, their processing and use can generate on one's own and others' lives;
4. how one can manage and use one's personal data;
5. tactics and strategies: applying resistance tactics and reusing data for personal or social purposes.

With this kind of integrative logic, the PDL framework is specifically concerned with providing its own contribution to education in the identification and transparency of data, to reflect on them and to understand the implications of their management, while the other integrated framework(s) perform the specific functions for which they were designed.

3. Integrating data literacy with traditional media education approaches

Media Education in its decades-long journey has gone through various moments in its development, each characterized by its own specific approach (Rivoltella, 2001). The approaches we are going to describe originated before the spread of the post-digital concept.

We will try to retrace approaches by bringing out, for each paradigm, both a possible interpretation of communication generated by AI algorithms and an educational hypothesis. The idea is to propose a way to analyze media productions generated by intelligent agents by adapting media-educational approaches still used today to carry out educational interventions on traditional, new, and social media, seeking to explain how to bridge the gap left in the connection with other frames of reference.

For each approach the framework of all key elements of actions suggested by the PDL dimensions is kept implicitly fixed, although voluntarily for reasons of space it is not repeated. The reading logic should not be interpreted according to the repositioning of mutually exclusive visions, but in terms of an exploration of the main approaches and frameworks that have inspired and still inspire educational interventions in the field. Unfortunately, even today we witness the univocal adoption of approaches that do not open up to the complexity of the dimensions proposed in the others, for example those that refer to the inoculatory approach that support the defense of the child by censoring and making inaccessible IA resources considered harmful.

4. Media education in postdigital-era. Framework and new proposal

In the last twenty years, proposals have been made to overcome the traditional media education approaches in order to arrive at a more holistic interpretation of educational action and reduce the risk of conceiving media education only in the unproductive dichotomous risk/opportunity relationship. Some of these embrace several foundational elements of postdigital. We will go through them briefly, bearing in mind that the approaches presented so far are from an operational point of view still adopted, at least partially, in the various contexts and socio-educational contexts.

4.1. *Systematic approach to media education*

Buckingham (2019) in his *The Media Education Manifesto* emphasizes the importance of moving beyond traditional approaches in favor of a focus that is driven towards critical understanding, the only one capable of challenging taken-for-granted assumptions and considering alternative ways of looking at media issues.

The author retraces the four key concepts (language, representation, production, audience) traditionally belonging to the media education curriculum in the UK, which have enabled fundamental questions about media power to be addressed, while also ensuring a systematic view of situations as interdependent concepts. In addition to the four key concepts, there are three dimensions that are part of the pedagogical practice of media education:

- Textual analysis: reading media accurately, educating the user to a critical gaze capable of thinking about how media convey meanings.
- Creative production: production can take different formats and must always have a specific target group to refer to.

- Contextual analysis: traditionally refers to the more sociological dimensions related to media audiences.

According to this proposal, AI appears mostly as an integration of the previous three approaches taking a more holistic view. If one thinks of textual analysis, one finds traces of the semiotic approach, so in this case it may become relevant, with respect to a resource, to understand by whom it was generated and whether it is the work of an intelligent agent.

Creative production is usually realized in school contexts through laboratory teaching, where the functioning and responses provided by generative AI systems are critically analyzed. Finally, with regard to contextual analysis, it becomes important to analyze and understand audience data, the field of interest of data literacy and the closest point of contact with PDL.

4.2. New Literacies and Post-Media Education

The recent analysis of the evolution of the theoretical framework of media education has led Rivoltella (2020) to introduce a new framework with the intention of resolving its applicability to the new complex postdigital context; on the other hand, Pangrazio (2016) herself, even before proposing the PDL Framework, argued the need to abandon the old frameworks as inadequate for current digital contexts. The proposal, which Rivoltella (2020) calls New Literacies, is interesting because it moves with the intention of making three innovations with respect to previous frameworks:

- it stands outside the formal-educational scheme by embracing the logic of the third space (Potter & McDougall, 2017);
- promote a holistic and lifelong logic of Media Education where all ages and their respective needs are considered at a systemic level;
- it overcomes the primacy of the focus on critical thinking, to which the promotion of responsibility and the development of ethical awareness, fundamental principles in a media context characterized by the widespread practice of authorship, must be integrated.

New Literacy is characterized by its dynamism, which makes it possible not to fix its dimensions to a single cultural operation, but to extend them to three others. In this way, both consumption and production/design activities must consider all dimensions: the critical dimension according to the logic of understanding and access, the ethical dimension, which is expressed in responsibility and resistance, and the aesthetic dimension, which concerns the recovery of the sense of beauty.

Rivoltella, in developing the proposal, refers to an interpretation of postdigital proposed by Eugeni (2020), post-mediality, which takes up the main elements of postdigital by placing greater emphasis on digital convergence and the fact that communication is now predominantly algorithmic. From this point of view, the abandonment of mass communication is realized in the shift toward algorithmic communication that results in passive personalization (Esposito, 2022). Reflection also brings out the possibility of developing a new Post-Media Education approach, the first foundational elements of which are a new kind of text analysis carried out with algorithms that make it possible to visually highlight occurrences and similarities that could not be realized before, and a new form of critical thinking that is no longer developed on the basis of text analysis, but on the awareness of digital conversation

Considering the evolution of AI, this theoretical approach lends itself to the integration desired by the PDL authors themselves: if one wants to apply these dimensions to both consumption and production, it is necessary to consider AI as a characteristic part of the current context (formal, informal and third spaces) and make it the object of both consumption analysis and design and production. For all processes, it would be necessary to promote the analysis and identification of personal data and their use considering the specificities of the age of the subjects involved, the level of ethical responsibility, as well as taking care of the identification (consumption) and generation (production) of beauty.

5. First proposal for critical AI literacy

Up to this point, the analysis was carried out by considering the integration of data literacy and new/media literacy frameworks. In recent years, literacy frameworks have also been realized that deal specifically with the competent use of Artificial Intelligence. These literacies therefore do not concern the consumption and production of media messages but are of interest to us in order to complete the investigation and achieve a systemic look at the problem posed initially. The authors considered here have included AI in the list of new literacies needed to live and cope with the challenges of the data-driven society.

Long and Magerko (2020) have developed a framework based on basic AI literacy skills, which can be summarized in the verbs: recognize, understand, apply and evaluate AI. On the other hand, the framework developed by Ng et al. (2021), taken up by Cuomo, Biagini and Ranieri (2022), who reinterpreted it by extending the critical and ethical dimensions in particular, consists of four dimensions:

- the cognitive dimension, which emphasises the importance of knowing and understanding the fundamental concepts of AI by focusing on basic knowledge and constructs;
- the operational dimension, which is expressed in knowing how to use and apply AI in a variety of contexts;
- the critical dimension, which concerns knowing how to communicate and collaborate consciously and effectively with AI technologies and critically evaluate their social impact;
- the ethical dimension, which focuses on understanding and awareness of the ethical issues raised by the development and use of AI in terms of transparency and explainability, fairness, accountability, privacy and security.

In the proposals of Ng et al. (2021) and Ranieri, Cuomo and Biagini (2023), data literacy is present in a re-edited form as the highest level of expression of the operational and ethical dimension, but not in sufficient depth with respect to complete data literacy. Compared to the PDL, there is no complete identification of how and where personal data is generated and processed.

What is evident is the applicability of AI Literacy only to events where the use of AI is certain. This underlining produces the real gap between the previously analyzed integrations and the latter, as the immediate and direct use of the data literacy and AI literacy integration concerns a world completely based on complication and interaction generated at least partially by machines through algorithms.

This integration thus implies a shift in critical, ethical and aesthetic dimensions towards an understanding of the levels of human responsibility that are realized in the

generation of increasingly competent and sophisticated prompts and in an ability to analyze and select the product of artificial intelligence that allows humans to maintain their role as final decision-makers.

Finally, the "AI Competency Framework for Students," a framework of twelve competencies on the use of AI developed by UNESCO (2024) with the aim of guiding students to become responsible and critical citizens, is structured around three dimensions: the operational dimension, the critical dimension, the ethical dimension. In this framework, the key elements of the PDL are developed in the last two dimensions.

6. Conclusions

The contribution stems from the need to identify operational solutions to complement the frameworks involved in the development of a critical and aware digital citizenship (Panciroli & Rivoltella, 2023). The objective focus of data literacy frameworks on the issue of data transparency and the need to update and adapt media literacy to the complex postdigital scenario that algorithms are helping to transform, suggests as a possible operational way a reinterpretation and revisiting of Media Education approaches with a view to building the bridge that currently does not exist between Information, Data and Media Literacy frameworks.

In Figure 1 (extensions of Media Education approaches of postdigital), a summary of the in-depth analyses is proposed as a link between the current situation and the hypothesis of an integration between Media literacies and/or new literacies and Data Literacy, for instance by combining the PDL Framework with one or more of the considered approaches. The same could be done for other frameworks, such as Big Data Literacy (D'Ignazio & Bhargava, 2015).

Among other studies that have emerged in recent years, there does not seem to be any interest in significantly recovering media education frameworks. Most recently, Baskara's work (2025) mentions media education, but only in a limited way to introduce AI-Enhanced Media Literacy. Should we perhaps consider a sort of "translation" or "transition" from media literacy to multiliteracies, asking ourselves whether key elements of media education are being lost in this transition and whether, in seeking to arrive at a new framework, we are no longer giving importance to achieving full digital citizenship in a post-media society such as the current one.

Figure 1. Summary of the extensions of Media Education approaches (postdigital era).

Approach / framework	Vision of AI	Educational proposal
Systematic Approach to Media Education	AI as a form of expression of media communication and thus also subject to critical reading	Understanding by whom a resource was generated; critically analyzing the operation and responses provided by generative AI systems; analyzing and understanding audience data.
Framework: New Literacy and Post-Media Education	AI as a characteristic element of the current context, to be considered both for consumption processes and for the design/generation practices of formal, informal and third-space experiences This literacy does not concern the consumption and production of media messages. Data literacy is present in a re-edited form as the highest level of expression of the operational and ethical dimension, but not in sufficient depth with respect to complete data literacy.	Ensure that the manifestations of AI are the subject of both consumption analysis and design and production. For both phases, give ample space to and promote the analysis and identification of personal data and their use considering the specificities of the age of those involved, the level of ethical responsibility, as well as promoting the identification and generation of beauty. Applicability of AI Literacy only to events where the use of AI is certain.
Framework: AI Literacy		Understanding of the levels of human responsibility that are realized in the generation of increasingly competent and sophisticated prompts and in an ability to analyze and select the product of artificial intelligence that allows humans to maintain their role as final decision-makers.

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