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PRODACT, a tool to analyse digital products created by students, against Digital Educational Poverty

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Abstract

The construct of 'digital educational poverty' was introduced in 2021 by CREMIT and Save the Children, expanding on the concept of the 'digital divide'. The article presents how this framework is the outcome of the hybridisation of two perspectives through which digital competence can be understood: that of 'rights' and that of 'New Literacies'. At the heart of the article is the description of the PRODACT tool (PROmote Digital Analysis and Competences in Transmedia), developed in 2023 by the authors and applied between 2021 and 2024 to products created by 6,598 minors (most of them 12 or 13 years old) within the framework of a project involving 99 secondary schools throughout Italy. PRODACT was designed to support teachers in evaluating the digital artefacts produced by students, emphasising the centrality of practices in a dialectical relationship between theory and application, between consumption and production, and between criticism and creativity. It is structured around five dimensions and eight indicators, which were adapted and refined into seven specific versions tailored to each format type (Wikipedia, online petition, podcast investigation interview, podcast review, visual storytelling, video storytelling, and social marketing). The article analyses 350 products through PRODACT, demonstrating how digital competence must be considered dynamic rather than static (not something obtained 'once and for all') and how, in this perspective, PRODACT enables an integrated and comparative evaluation of the richness and complexity of the aspects that define these products, promoting their use in curricular teaching practices.

KEYWORDS: PRODACT, Digital Educational Poverty, Onlife Citizenship, Digital Competences, Postdigital.

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1. Introduction

The teaching profession today is rooted in a society that is increasingly postdigital and in a parallel evolution of what is meant by 'digital school'. A few years ago, after an initial phase characterised by the technical option of the concept (Pasta, 2021a), scholars theorised (Rivoltella, 2018) that technology, initially seen as a tool for specific tasks, has expanded to become the normal environment for school practices, a process that transfers technology from the extra-ordinary computer labs, or computer classrooms, to something ordinary in everyday classroom life. This 'normalisation', which today goes by the name of 'postdigital' (the end of the extra-ordinariness of the digital; cf. Jandrić, MacKenzie & Knox, 2023), is facilitated by technological devices that have become light and portable, flexible and multifunctional, usable, intuitive and immediate, and always connected.

The postdigital society is also characterised by the continuous hybridisation between the online and offline dimensions of the informational and relational ecosystem, indicated by Luciano Floridi (2014) with the neologism of 'onlife'. In this context, one of the areas with which the 'digital school' was declined, that of 'digital education', evolves into the paradigm of 'Onlife Citizenship', since, in the postdigital era, citizenship education is no longer thought of as a transition to 'life on the screen' (Turkle, 1996), nor should it be understood as 'one' of the citizenships, but as an internal dimension of the single citizenship of which the subjects are bearers, which requires new alphabets (Rivoltella, 2020) and new tasks for schools

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in this regard (Pasta & Rivoltella, 2022a). From the perspective of Onlife Citizenship, it is precisely the focus not only on tools (whether or not to use mobile phones), but on alphabets and culture, that underlies the construct of digital educational poverty.

The article presents the PRODACT tool (PROmote Digital Analysis and Competences in Transmedia), developed in 2023 by Michele Marangi and Stefano Pasta of the Research Center on Media Education, Innovation and Technology Education (CREMIT) of the Catholic University of Milan. This tool was created to support for secondary school teachers to assess the digital artefacts produced by students as part of Save the Children Italy's Digital Connections project. It will be presented here as a tool that, even beyond the project, offers evaluation criteria for teachers in guiding students through digital product creation processes.

This contribution is part of the studies on digital educational poverty; in other forums so far the measurability of the phenomenon has been discussed (Pasta, Marangi & Rivoltella, 2021), its definition (Pasta & Rivoltella, 2022b; Pasta, 2022; 2023), on the data collected through the DEPEND (Digital Educational Poverty in Educational Networking and Development) tool (Pasta & Rivoltella, 2022), with a focus on children in whom digital educational poverty and educational poverty did not coincide (Marangi, Pasta & Rivoltella, 2023), and on the points of overlap between intercultural and digital competences in the children of mixed couples (Marangi & Pasta, 2023; Pasta & Marangi, 2025), on the methodology proposed in the creation of digital artefacts in order to combat digital educational poverty (Pasta & Marangi, 2023; 2024; Marangi & Pasta, 2025).

2. Digital Educational Poverty

2.1 The new construct

The construct of 'digital educational poverty' was introduced in 2021 by CREMIT and Save the Children, expanding on the concept of the 'digital divide'. It is not understood solely as deprivation of devices and access to the Net, nor as denial of participation in distance learning or integrated digital education during the Covid-19 emergence.

It should be remembered that the construct of 'educational poverty' was intended to broaden the measurement of inequality from just economic poverty, although this is very important. The Index of Educational Poverty (IPE) is calculated on the basis of 12 percentage indicators: children between 0 and 2 years old without access to public educational services for early childhood; primary school classes without full-time education; secondary school classes without full-time education; pupils who do not use the canteen service; school drop-outs; minors between 6 and 17 years old who have not gone to the theatre; who have not visited museums or exhibitions; who have not gone to concerts; who have not visited monuments or archaeological sites; who do not play sports on a continuous basis; who have not read books; who do not use the internet (Cerbara & Caruso, 2020).

The Educational Poverty Index is based on the concept of the 'educational opportunities' offered by an area (Mazziotta & Pareto, 2013). Similarly - but not surveyed on a territorial basis - 'digital educational poverty' refers to the lack of acquisition of digital skills, understood as new alphabets (Rivoltella, 2020) necessary to analyse the production and fruition of the various digital contents by 'viewers' (Pasta, 2021b) and, therefore, a sort of 'pedagogical endowment' to access the opportunities offered by the social web. Quoting Save the Children's definition (2021, p. 15),

> *"digital educational poverty thus refers to the deprivation of opportunities to learn, but also to experience, develop and allow skills, talents and aspirations to flourish freely, through the responsible, critical and creative use of digital tools" (translation by the authors).*

It does not, with a utopian and cyber-enthusiastic outlook, equate the Internet only with positive aspects, but associates it, consistently with classical media-educational frameworks, with an 'extension of reality' characterised by risks and opportunities.

This heterogeneity in surveying and measuring digital competences is also reflected in the ambiguity with respect to the 'digital divide', a term which, as a systematic literature review by Scheerder, van Deursen and van Dijk (2017) has shown, is used to define very different concepts, both for the type of digital divide addressed (skills, uses and outcomes), and for the determinants. Since the 1990s, when personal computers and the Internet became widespread, the digital divide has been at the centre of the debate (Eastin, Cicchirillo & Mabry, 2015). At that time, it was defined as inequalities in access to and use of Information and Communication Technologies (ICTs), mostly the Internet (Castells, 2002). Access to the Internet led to a binary distinction between those connected to the Internet and those who were not ('first-level digital divide'). In 2002 Hargittai stated that a distinction should be made between an Internet access divide and a skills divide, the latter indicating differences between groups of people in terms of skills necessary to effectively use the Internet ('second-level digital divide'). This is the first step in overcoming a deterministic approach according to which the mere presence of technology would automatically give access to all the benefits of technology. Consequently, the focus of the digital divide discourse shifted to digital skills, which also encompasses differences in use, referred to as the 'usage gap' (Van Dijk, 2005).

Finally, with the 'third-level digital divide', researchers (Van Deursen & Helsper, 2015; Wei & Hindman, 2011) propose that digital inequalities can be observed in the consequences of Internet use (Fuchs, 2009), where inequality exists when the possession of digital skills and Internet use do not lead to beneficial outcomes. Indeed, in some cases, promoting access and skills without attention to outcomes may perpetuate or exacerbate social inequality (Van Deursen & van Dijk, 2014; Pasta, 2021c). Other more recent studies, such as *Geographies of Digital Exclusion: Data and Inequality* by Graham and Dittus (2022), reflect on how the prominence of data and algorithms still changes the key contours of information inequality, and who, what and where gets left out.

The notion of digital educational poverty is the outcome of the hybridisation of two perspectives with which digital competence can be declined: that of 'rights' and that of 'New Literacies'.

The first paradigm is based on the rights perspective, it is inspired by the *European Digital Competence Framework for Citizens (DigComp) 2.1* (Carretero Gomez, Vuorikari & Punie, 2017) and the additions of *2.2* (Vuorikari, Kluzer & Punie, 2022), also considering documents such as the European Union Strategy on the Rights of the Child (2021) and the General Comment to the United Nations Convention on the Rights of the Child regarding children's rights in relation to the digital environment (2021); this perspective is reflected in the concept of 'digital competence' of Europe's Digital Decade 2030 (2021) and in previous European digital competence surveys such as ICILS (2018) and DESI (2019).

Despite the European framework of heterogeneity referred to, more than half of the educational systems (including Italy) make explicit reference to DigComp in their attempts to define digital competences. The five areas of the DigComp - Information and Data Competences, Communication and Collaboration, Digital Content Creation, Security, Problem Solving - constitute the conceptual framework for the construction of functional operational tools most present in educational systems (Ranieri, 2022), even though they are sometimes formulated differently and sometimes include additional areas. However, some declinations of DigComp show a limitation in the static nature with which they think about digital competences, mistakenly basing assessments on certifications, patents, and checklists (Rivoltella, 2020).

To try to overcome this limitation, the construct of digital educational poverty also refers to a second paradigm, that of New Literacies, which focuses on the dynamism and transdisciplinarity of competences (Buckingham, 2019) and to the concept of Dynamic Literacies (Potter & McDougall, 2017), underlining how a segmented approach betrays the 'citizenship vocation' of digital competence (Pasta, 2021b). Digital competences, in fact, are not static, but dynamic: this means that they unfold on a performance continuum and are co-determined by other subjective and contextual variables. Moreover, they are subject to continuous change over time. This creates a strong risk that a competence appears to be possessed today and is undetectable a few days later. At an international level, this approach can be found in the works of the Stanford History Education Group, such as *Students' Civic Online Reasoning* (2019) and *Evaluating Information: The Cornerstone of Civic Online Reasoning* (2016); at an Italian level, this approach is present in the Digital Civic Education Curriculum, drawn up for Italian schools (from Infancy to Upper Secondary) by the Ministry of Education in 2018.

This dual approach is present in the different tools proposed by CREMIT for Digital Connections, for example in the twelve indicators that make up the Digital Competence Score (PCD) and at the basis of the DEPEND test to detect digital educational poverty. The 12 indicators of the PCD are: technical knowledge of digital formats and environments; knowledge of the rules of publishing and copyright; ability to filter data and contextualise information in digital content; knowing how to recognise and activate digital creativity; possessing and using narrative skills; knowing strategies for protecting one's digital identity; knowledge of netiquette and awareness of cyberstupidity; competence in the logic of how algorithms work; recognition of the collaborative dimension of digital knowledge; using digital from a perspective of conscious and active citizenship; ability to share content; ability to verify and situate information (Marangi & Pasta, 2023).

In the PRODACT tool, which is the focus of this article, the dual perspective is integrated in more classical items - such as respect for copyright - alongside more innovative components, such as assessing the ability to inspire others or groups to produce additional media materials on the theme of the digital artefact produced by the group of young people.

2.2 Classes of 'performers' producing digital artefacts

PRODACT was submitted to 6,598 minors (most of them 12 or 13 years old) from 410 classes in 99 secondary schools throughout Italy during the school years 2021-22, 2022-23, and 2023-24. It should be noted that the sample is not statistically representative but consists of schools whose directors responded to the call issued by Save the Children and the Ministry of Education. These schools are often located in areas with significant levels of educational poverty, as Save the Children prioritized this criterion in selecting candidates, alongside geographical diversity and a mix of urban and rural areas.

In the Digital Connections (2021-24) project, implemented by Save the Children together with

CREMIT and the Edi Onlus cooperative, classes participated in cross-media creation workshops, delivered over a two-year course of 48 school hours as part of civic education classes. The pupils, working in small groups, were asked to create digital artefacts in four newsrooms: Online Writing (creation or integration of a Wikipedia entry and/or drafting an online petition), Podcast (review of a media product or a territory-related enquiry), Digital Storytelling (e.g., memes, visual/ video/data storytelling), and Social Marketing (content dissemination to promote conscious and responsible lifestyles on social or static web platforms).

Priority is given to topics that reflect the pupils' media consumption, focus on the local territories of the schools (but outside the school walls), connect with subjects taught in other disciplines to practice the interdisciplinary nature of civic education, or relate to sustainable development and a culture of rights. The didactic proposal promotes, at the same time, critical thinking in media consumption, from recognizing algorithmic logic to identifying fake news, and responsibility in media production, from respecting copyright to amplifying diverse perspectives. It therefore reflects a conception of digital competence according to a metacognitive and strategic vision of activities related to digital environments, which is based on technical, intellectual, citizenship, and participative-relational skills. This approach develops New Media Literacy by interweaving the dimensions of criticism (semantics, meanings, social and cultural meaning), ethics (values, responsibilities, citizenship), and aesthetics (codes, languages, narratives).

The PRODACT tool was designed to support teachers in evaluating the digital artefacts produced by students in the newsrooms, emphasizing the centrality of practices in a dialectical relationship between theory and practice, between consumption and production, and between criticism and creativity. This tension highlights the dynamic nature of digital competence: practice is not merely a way to illustrate or apply theory but serves as a means to develop and even challenge it.

In the following sections of the article, we will show how this perspective on digital competence underpins PRODACT as a tool for analysing digital products.

3. Methods of analysis: PRODACT, an original tool for analysing digital products

Evaluative research in the field of Media Literacy Education has long shown that digital competences have a high degree of pragmatic specificity (Bonaiuti et al., 2017), meaning their possession can only be assessed when applied to real-world problems in practical contexts (Pasta, Marangi & Rivoltella, 2021; Ranieri, 2022). This poses a clear challenge to abstract certification approaches, which often rely on information gathered in formal and hierarchical settings, such as school classrooms, that fail to reflect or meaningfully represent people's actual lifestyles and consumption habits.

In recent years, scholars have increasingly emphasized that digital competences should be understood dynamically and adaptively rather than statically. These competences exist on a performance continuum and are shaped by subjective variables and their relationship to social and cultural contexts. Moreover, they are constantly evolving, making it likely that a competence evident today may become undetectable in just a few days.

The spread of digital technologies as a connective rather than merely productive medium (Rivoltella, 2017) has also transformed the meaning of media products within an intrinsically postmedial perspective (Eugeni, 2015). Krauss (2005) defines the aesthetic medium as a complex device, integrating conventions, tools, and its materiality. In this light, the creative process transcends the tools and materials involved. This perspective applies especially to today's platform- and data-driven media, where media elements blend seamlessly into a larger ecosystem (Rivoltella, 2024).

In line with this perspective, an assessment tool was developed to analyze media products through various indicators, measuring digital competences in literacy, communication, collaboration, content creation, safety, well-being, problem solving, and 'Onlife Citizenship' competences (Pasta & Rivoltella, 2022a). These competences are applied in contexts designed to be as authentic and relevant to students' lives as possible.

The media products were analyzed based on the aesthetic, critical, and ethical dimensions of digital competence as outlined in New Literacy (Rivoltella, 2022), alongside the guidelines of DigComp 2.2 (Vuorikari et al., 2022) and the four areas of Digital Educational Poverty (Save the Children, 2021).

From this perspective, it appears evident that in contemporary pedagogical research, the development of digital competence requires frameworks that transcend purely technical skills, fostering instead a critical, cultural, and creative engagement with media. Within this perspective, the analysis of digital media formats acquires a central role, as outlined below.

The analysis of digital media formats is rooted in the most current theoretical paradigm of Media Education (Buckingham, 2020), which moves beyond conceiving digital technologies as mere instruments and products as isolated objects or simple "tasks" to be performed. Rather, it seeks to uncover the underlying logics that shape the design, dissemination, and usage of digital artefacts (Jenkins, 2009).

In this context, the structure of PRODACT is founded on a holistic understanding of digital competence, articulated through three interconnected dimensions.

First dimension is interpretative, grounded in systematic strategies of textual analysis and informed

by a model of "extended semiosis," this dimension embraces not only cognitive processes but also the affective, projective, and ritualistic elements embedded in media practices.

The second dimension is cultural, adopting a macro-analytical lens, examining media within their broader social, economic, and ideological frameworks, and exploring the networks of relationships they sustain with institutions, groups, and individuals.

Last dimension is creative, situated within a contextual perspective, it integrates critical-interpretative approaches with the proactive, participatory practices that emerge through the production of artefacts, emphasizing and enhancing the personal and collective experiences of individuals engaged in the creation and use of diverse media formats.

This framework underpins PRODACT (PROmote Digital Analysis and Competences in Transmedia - www.cremit.it/prodact/), the tool developed by Marangi and Pasta in 2023 to evaluate various types of digital products created in classrooms. Table 1 summarizes its key elements, highlighting the convergence of diverse classification methods and criteria (Marangi & Pasta, 2025).

This is a communicative product evaluation form, structured around 5 dimensions and 8 indicators, which has been adapted and refined into 7 specific versions tailored to each format type (Wikipedia, online petition, podcast enquiry interview, podcast review, visual storytelling, video storytelling, and social marketing). The adaptations are based on the characteristics of the product and the indicators of DigComp 2.2, the Digital Competence Score-PCD (encompassing all 12 indicators), and the three dimensions of New Literacy, which include 2 critical, 3 aesthetic, and 3 ethical components.

These three assessment dimensions were combined with the 4 areas of Digital Educational Poverty, each represented by 2 indicators, to develop and validate the Digital Competence assessment and weighting system. Each form includes a final column with basic guidelines, offering concrete considerations tailored to each communication format.

The PRODACT framework is designed to detect the various aspects characterising the creation of a digital communicative artefact, to identify criteria consistent with the existing literature, and to enable an assessment that considers all procedural elements involved in product creation. From this perspective, PRODACT

Table 1 - PROmote Digital Analysis and Competences in Transmedia - PRODACT.

	Evaluation Dimensions and Indicators of communicative products	Area of Digital Educational Poverty (DEP)	Digital Competence Score (PCD)	Dimensions New Literacy	DigComp 2.2
A. Technical and structural issues					
1	Ability to use applications and digital content while respecting copyright	Understanding	Knowledge of rules of publishing and copyright	Critical	Copyright and licences; solving technical problems
B. Thematic issues					
2	Care in the choice of sources	Understanding	Ability to filter data and contextualise information in digital content	Critical	Managing data, information and digital content
3	Ability to identify the essential aspects of the topics covered and to be coherent with the project approach	Being	Possessing and using narrative skills	Aesthetic	Integrating and re-elaborating digital content
C. Stylistic and narrative issues					
4	Ability to use the expressive potential of the format used through an effective narrative and stylistic register	Being	Knowing how to recognise and activate digital creativity	Aesthetic	Developing digital content
5	Ability to engage the reader, listener or viewer	Autonomous and active living	Ability to share content	Aesthetic	Creatively using digital technology
D. Socio-cultural issues					
6	Ability to contribute to a constructive debate, expressing a recognisable point of view	Autonomous and active living	Using digital from a perspective of conscious and active citizenship	Ethical	Interacting through digital technologies; protecting health and well-being
7	Ability to offer a pluralist and open, non-self-referential vision	Living together	Knowledge of netiquette and awareness of cyberstupidity	Ethical	Netiquette; protecting personal data and privacy
E. Generativity					
8	Potential for development to stimulate other people or groups to create further media materials or communicative situations or to stimulate direct or indirect spill-over effects on the territory	Living together	Recognition of the collaborative dimension of digital knowledge	Ethical	Sharing through digital technologies; engaging citizenship through digital technologies

serves as a key tool for determining competence levels, but it should be applied in a nuanced and qualitative manner, rather than mechanically or solely quantitatively.

Every communicative and narrative product involves different levels of analysis and interpretation, which are not solely related to the presumed objectivity of the technological, aesthetic, and thematic elements constituting the product, but also to the observer's subjective interpretation and the social and cultural variables of the production context (Eugeni, 2023).

4. Product analysis

Here, we propose an analysis of the elements identified through the PRODACT tool, conducted on 350 products developed as part of the Digital Connections project. We randomly selected 25 productions per format for each two-year period (second and third grade classes), resulting in a total of 50 productions for each format. The analysis of the digital products was conducted by the authors of this article, in collaboration with a team of three other university researchers specializing in Media Education at CREMIT. Evaluation scores were assigned using a 1-to-10 scale. These scores should not be interpreted as percentages, but rather as values distributed along a progressive linear continuum, as will be further clarified in the following section.

As outlined in the project, scores are assigned based on four levels (Table 2): the initial level (1 to 5.5), the basic level (5.51 to 7), the intermediate level (7.01 to 8.5), and the advanced level (8.51 to 10).

Table 2 - PRODACT scores.

Minimal traces of the observed aspect	1-5,5	Initial
Elements of the observed aspect, but not articulated and deepened	5,51-7	Basic
The observed aspect emerges and recurs, but needs to be articulated and structured further	7,01-8,5	Intermediate
The observed aspect appears constant and well managed, in an original and conscious manner	8,51-10	Advanced

The averages for each newsroom (Figure 1) show higher values for products in the second two-year period compared to the first, likely due to teachers becoming more familiar with the tools and the project. The difference is more pronounced for podcasts and less so for digital storytelling.

With reference to the values achieved in the newsrooms, the best overall result is achieved in digital storytelling (8.57), similar by podcasting (8.53), placing both newsrooms in the advanced level, the highest category. If we consider the Standard Deviation (Figure 2), in the podcast there is a greater variation between the scores in the first biennium (SD 1.13), while in Digital Storytelling the score difference is more marked in the second biennium (SD 0.92). From this further indicator, the difference in the results of the podcasts in the first two years expresses a lesser widespread competence with respect to this format, while the greater difference for Digital Storytelling in the second two years indicates the difference that progressively develops between more standardized products and more original products, which better incorporate the training path developed. The lowest score is recorded in the digital writing newsroom (7.87), while social marketing performs better with 8.22. However, both of these newsrooms fall within the intermediate level, demonstrating that, on average, results across all areas of production align with the two highest levels.

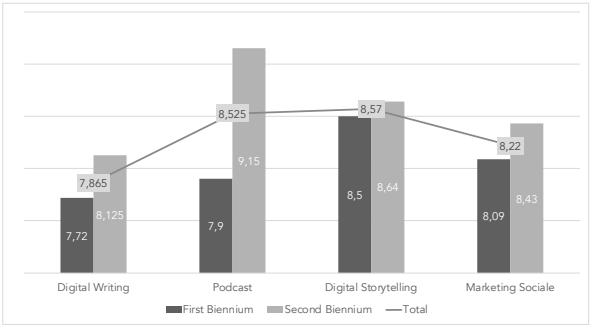


Figure 1 - Average by Newsroom.

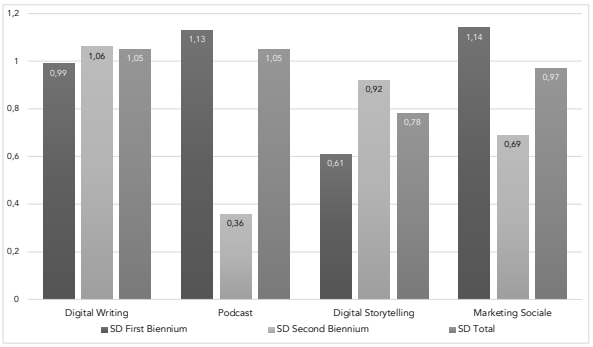


Figure 2 - Standard Deviation by Newsroom.

One possible explanation for these results is that writing is the first activity tackled, making it more challenging to engage with project activities during both two-year periods. Conversely, social marketing, being the final activity, often faced shorter timeframes or, in many cases, saw its products somewhat confused with those of digital storytelling, indicating a limited understanding of the purpose of creating communication campaigns.

Once again, based on the recorded results, digital storytelling stands out as the most popular and highest-quality format - together with podcasting in particular in the second year - reflecting the strong overall competence and familiarity with expressive modes and technical aspects that students often practice outside school.

Conversely, the lower rating of the newsroom related to digital writing could be attributed to two factors: first, the lesser habit of students to write in an articulate and in-depth manner outside the school environment; second, the consideration of age, as mastery of style and writing is not always fully developed at this stage.

In this context, while no objective trends can be definitively established, it is noteworthy that this generation of pre-adolescents demonstrates greater skill and effectiveness in communicating through mixed codes and formats, typical of digital storytelling, rather than through canonical writing codes, which remain the primary medium used in traditional school teaching.

An in-depth analysis of the specific formats within the individual newsrooms (Figure 3) highlights some significant findings. The product with the best overall results is the review, while the petition ranks the lowest.

In addition to the review, visual and video storytelling also fall within the advanced level, with scores exceeding 8.5. The other products are classified within the intermediate level, scoring between 7.01 and 8.5: the wiki entry, the survey, and social marketing all achieve scores above 8, while the petition remains the only product below this threshold.

In the case of digital writing, Wikipedia entries score approximately 0.3 points higher than petitions. Based on the products analyzed, it appears that petitions posed greater challenges, not so much in terms of writing quality, but in aligning the content with a specific cause and structuring the narratives to make them more engaging for readers. Conversely, Wikipedia entries, even when less effective, tend to maintain writing standards more consistent with everyday school activities. In the podcast newsroom, the superior performance of reviews in both two-year periods stands out, with an overall score approximately 0.4 points higher than that of inquiry. This difference allows reviews to fall within the advanced level, while inquiry remain in the intermediate level

Beyond the median value, between the first and second two-year periods, however, there is a significant increase in scores in the inquiry (+1.32), in the review (+1.18) and in the petition (+0.95), while the other formats remain stable, with the only case of decrease for the Wikipedia entry (-0.14).

If the Standard Deviation (Figure 4) is also used for these data, in the second two-year period both the inquiry (0.35) and the review (0.27) have low discrepancy values, indicating an upward leveling compared to the results of the first two-year period, confirming the previous data. The highest variations in the SD, in this case, concern Video Storytelling (1.27) and the Wiki entry (1.21), confirming what previously emerged for the Digital Storytelling newsroom and the discrepancy that characterized the wiki format.

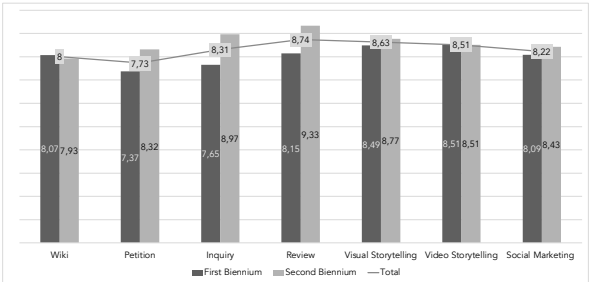


Figure 3 - Average by Format (1-to-10 scale).

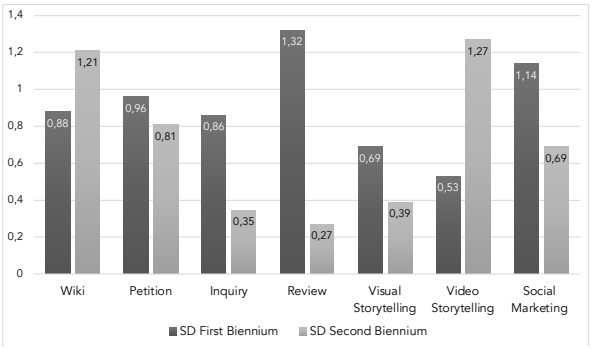


Figure 4 - Standard Deviation by Format.

From the qualitative analysis of the products, it often appeared that the reviews are experienced by students as more personal opportunities to address and recount issues they feel are closer to them, ranging from cultural consumption to social activities, or the perception of the territorial contexts they experience, in a more engaging way. This is not to say that the inquiries are less effective, but in the analyzed products, a more pronounced direction from adults often emerged in shaping the topics to be addressed and the people to be involved. Moreover, the investigation seemed more complex than the not always respected need to construct and conduct interviews, integrating them with a journalistic narrative. From this perspective, the reviews seem to benefit from a style and approach that, in many cases, may appear more colloquial, without losing any of their communicative effectiveness. This dynamic of greater familiarity is confirmed in the digital storytelling newsroom, where both visual and video formats are placed at an advanced level.

The fact that visual formats have excellent performances in both bienniums seems to confirm the students' familiarity with using this type of format, particularly highlighted by the large number of memes produced, which were often very effective and consistent with the project's context. This seems to

further demonstrate that the possibility of incorporating informal skills and everyday consumption into a formal learning and in-depth reflection environment, such as school, enables an unprecedented yet effective convergence between the acquisition of new digital skills and the reinforcement of familiar communication practices.

The performance of video storytelling, which scores identically in both two-year periods, indicates great familiarity with this format on the part of the students. The excellent performance of both formats in the digital storytelling newsroom is significant, considering that they account for 44% of the total products produced over the three years of the project.

When analyzing the individual indicators that make up PRODACT, additional data emerges regarding the performance of digital competence in each communication format (Figure 5).

The highest values for all indicators are consistently found in the review format, while the lowest values appear in the petition format. From a purely mathematical perspective, both constants align with what we observed earlier: the review format achieved by far the best ratings, while the petition format received the lowest. This remarkable consistency, considering a sample of 350 products and three years of work in very heterogeneous schools, confirms some elements we have already seen and seems to attest to the great popularity of the review format and the challenges involved in constructing and structuring a petition.

In our opinion, the key element appreciated in the review format, which allowed for the highest values in each indicator, is the opportunity to express one's own perspective on very diverse topics and aspects, often connected to daily life, consumption, and the preferences that characterize male and female students. Furthermore, the review format seems to encourage an unprecedented sense of agency, allowing students to direct the creation of original and personal artifacts, even within the formalized context of school.

On the contrary, the petition likely involves a particularly complex set of elements that students are not very accustomed to, ranging from preliminary documentation to the ability to identify key components, not only to describe but also to engage people in taking concrete actions to finalize what is proposed. Moreover, it is quite evident that in many petitions, the choice of theme and the proposed objectives cannot be entirely attributed to the agency and preferences of male and female students.

If we consider the Standard Deviation (Figure 6) for the five evaluative dimensions in each production format over both two-year periods, it emerges that the stylistic and narrative dimension records the greatest differences for the Wikipedia entries (1.46), for the Petition (1.26), for the Video Storytelling (1.34) and for the Social Marketing 1.22), while generativity is more diverse in the Inquiry (1.18), the Technical and Structural Issues differs more in the Review (1.48) and the Socio-Cultural Issues are more heterogeneous in the Visual Storytelling (0.98).

If, on the other hand, the greatest homogeneity is maintained between the various dimensions in the formats, the Technical and Structural Issues record lower values in the Inquiry (0.78), in the Wikipedia entries (0.85), in the Petition (0.95), while the Thematic Issues have fewer divergences in the Visual Storytelling (0.4), in the Video Storytelling (0.91), in the Special Marketing (0.95) and in the Review (1.05).

From these data, a greater stylistic and narrative heterogeneity emerges for the digital and visual writing formats, which seem to polarize more between more obvious or very original narrative modes, a fact confirmed by the qualitative analysis of the products of these categories.

Conversely, the thematic dimension records fewer differences in all visual and more social formats, an aspect confirmed by the recurrence of themes typical not only of the age group, but also of the school context, which cause products of this type to emerge on topics such as bullying and cyberbullying, healthy lifestyles, peer relationships and the relationship with school.

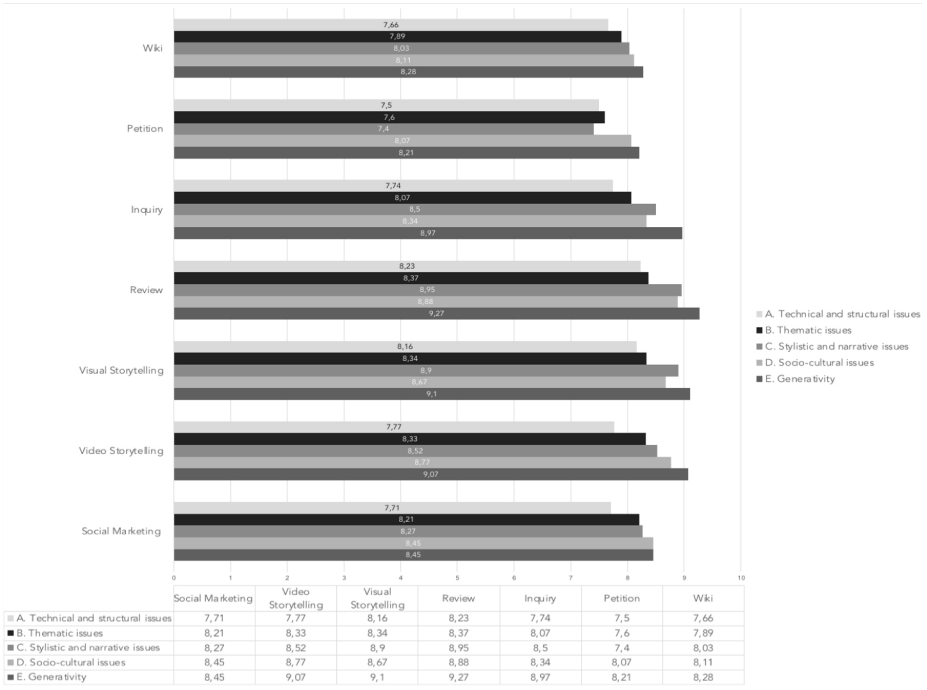
5. Digital productions as experiential didactics, in the logic of 'third spaces'

During the course of the project, 2,700 media productions were created by the classes. With reference to the breakdown by product type (Figure 7), a clear predominance of third-year formats emerges, particularly digital storytelling.

The types of products proposed in the second year are much closer to the modes of consumption and production that boys and girls presumably engage in during their daily lives outside of school.

In the first newsroom dedicated to digital writing, there was a greater production (+3%) of petitions than of Wikipedia entries, reflecting a higher level of involvement and interest on the part of the classes in creating a communicative format seen as more incisive and impactful for proposing changes or engaging people externally regarding a cause or topic deemed important.

In the second newsroom, concerning podcasts, reviews, and investigations with interviews, the number of productions was equally divided, with both formats being well-received by the classes that produced them. It can be assumed that the gradual introduction of a more performative technology, as required by the podcast, piqued students' interest, whether in the creation of an interview for the investigation or in the production of a review.



	Social Marketing	Video Storytelling	Visual Storytelling	Review	Inquiry	Petition	Wiki
A. Technical and structural issues	7,71	7,77	8,16	8,23	7,74	7,5	7,66
B. Thematic issues	8,21	8,33	8,34	8,37	8,07	7,6	7,89
C. Stylistic and narrative issues	8,27	8,52	8,9	8,95	8,5	7,4	8,03
D. Socio-cultural issues	8,45	8,77	8,67	8,88	8,34	8,07	8,11
E. Generativity	8,45	9,07	9,1	9,27	8,97	8,21	8,28

Figure 5 - Scores by Format and Dimensions (1-to-10 scale).

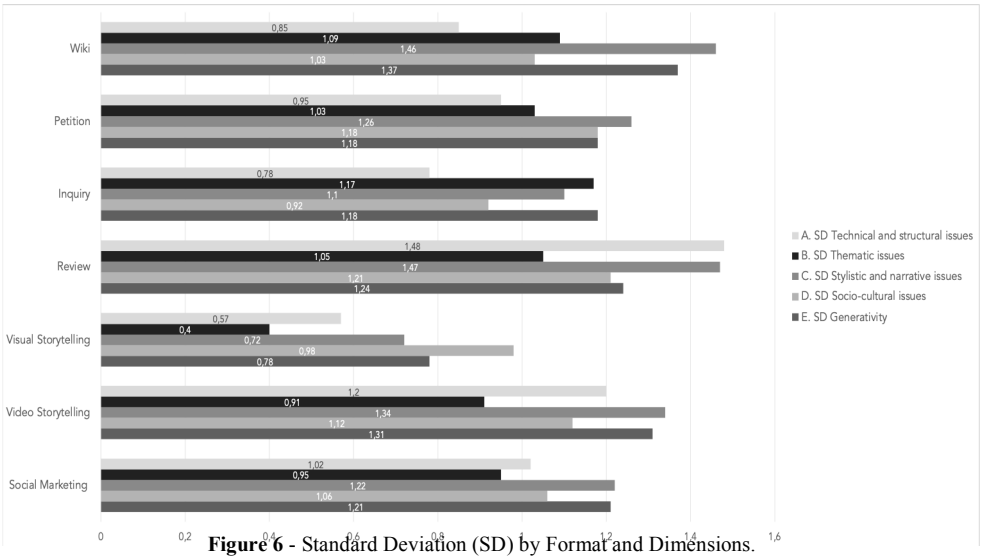


Figure 6 - Standard Deviation (SD) by Format and Dimensions.

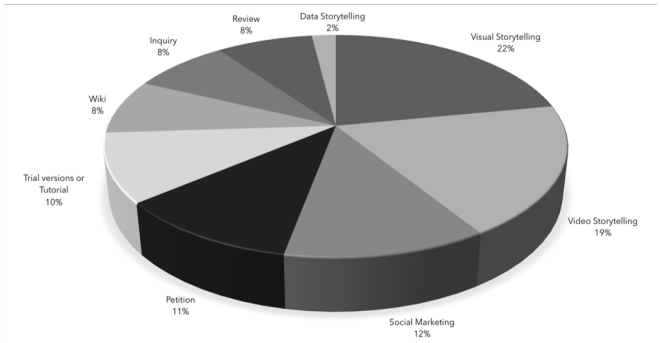


Figure 7 - Product Format.

In the third newsroom, the most productive one, it is not surprising that visual storytelling emerged as the most frequently produced format, although it was closely followed by video storytelling. While one might initially think that visual storytelling requires complex graphic design and structuring, seemingly aimed only at those with some prior experience, the project effectively demonstrated that visual storytelling today can also encompass memes.

It is no coincidence that memes are the most popular format for visual storytelling, although presentations using tools like Canva and PowerPoint, as well as posters, are also common.

This type of format seems perfectly suited to teaching requirements, both in terms of the time needed, which may not be excessively long, and in terms of the opportunity to work in small groups, without devaluing or trivializing the contribution of individual students.

The products analyzed highlight the potential of male and female students in using communication tools to become aware of their abilities, not only in technological and digital skills but also in narrative and stylistic capacities. In this context, they were able to fully utilize the opportunity offered by the project to communicate their own point of view, both individual and collective, in an original way—one capable of conveying a unique perspective and, often, being very mindful of the impact these products can have within the communication circuit.

Regarding the different newsrooms, the Wikipedia entry format and the investigative podcast format seem more coherent and practiced within a school setting. The petition format, on the other hand, is much more aligned with the third socio-cultural space, not only in relation to the quantitative data but also in terms of the topics addressed, which, although approached from a didactic perspective, tackle broader themes and situations more closely related to citizenship, particularly in relation to the local territory. The second-year newsrooms, digital storytelling and social marketing, on the other hand, appear to be more transversal in relation to these perspectives.

The reviews demonstrate a clear quantitative majority related to personal space, focusing on social and cultural media consumption typical of the target age group, such as viewing, listening, and reading. However, it is interesting to note how the school has successfully integrated curriculum-related learning into the review format, for example, through reviews of historical figures, cultural events, or places of historical or cultural significance in the local area.

What emerges is the importance of developing the didactic ability to propose diverse formats during the planning stage, allowing for experimentation with various dimensions of work, ranging from the more institutional and formal to the more personal and informal. This approach recognizes and promotes social and cultural awareness, even prior to digital literacy.

This underscores the need for teachers not to remain confined to rigid categories, as it is not solely the format that determines the outcome of the communicative product. In many cases, the boys and girls demonstrated the ability and potential to combine different perspectives of analysis and development. For instance, reviews are not limited to specific school reports but also address much broader issues, ranging from ongoing wars around the world to gender equality, from the challenges of growing up to the meaning of being a superhero in contemporary times. Similarly, investigations are not confined to interviews with celebrities or reportage on news events; instead, they reveal a strong social and cultural orientation, with recurring themes such as respect for the environment or the significance of engaging in sports in a balanced way, rather than solely focusing on competition.

To foster these dynamics, the analyzed experience effectively demonstrates the potential of didactic work framed by the principles of the ‘third space’ (Potter, McDougall, 2017), understood as a dimension of co-construction and negotiation of meanings. This space can be physical or online, as long as it is characterized by free aggregation dynamics based on individuals’ interests, in line with the principles of non-formal learning (Pasta & Marangi, 2024). Additionally, it can manifest as a processual dynamic, not solely a productive one, situated within a formalized setting such as school, to promote dialogue and the exchange of skills between teachers and students, without creating disruptions in formal roles. Instead, it leverages typical dimensions of digital society, including situated learning (Rivoltella, 2013), Media Education as a participatory practice (Jenkins, 2009), and affinity groups as communities of practice (Gee, 2007) - that is, physical or virtual relational contexts where processes of appropriation among peers are identified, activated, and nurtured, based on firsthand experiences. Here, peers are considered as individuals engaged in shared contexts and interests, rather than reductively as mere clusters of registrants. Three important socio-pedagogical dimensions emerge in the structuring of educational ‘third spaces,’ which are captured in the digital products analyzed here with PRODACT.

Firstly, the collective and situated dimension of learning, where spaces proximal to learners’ living environments are central, allowing people to learn through collective rather than solely individual dynamics.

Secondly, the operational dimension of knowledge practices, which should encompass both the concrete and conscious appropriation of daily media and cultural tools and content, as well as the production of expressive and narrative artifacts that are integral to communicative and relational flows.

Lastly, attention to the dimension of socio-materiality - i.e., the significance of social and cultural consumption, including media consumption, in people's present lives. This must be understood as an essential starting point for articulating an effective process of reflection and learning about the logics that characterize such consumption. It should not be limited to activating critical thinking but should instead foster the development of socio-cultural awareness and widespread competence, enabling the stimulation of further creative capacities and design skills.

6. Development perspectives

From the different analyses conducted with PRODACT on digital communication products, the phenomenon that Bolter refers to as 'digital plenitude' is clearly evident. This refers to the richness and variety of topics, styles, and approaches that decisively break down the concept of high and low culture, uniting seemingly distinct and incoherent fragments into dimensions that offer a broader and more recognizable meaning. In this context, for schoolwork and teaching practice, it seems strategic to use digital storytelling as the format that boys and girls engage with, rework, produce, and distribute daily through their social networks and smartphones. Whether or not they are aware that it is called digital storytelling seems secondary; the high prevalence of production in this area is emblematic of the project's importance in fostering greater critical awareness and creative competence—not only technical skills—in refining and functionalizing the communication formats that are often unconsciously used in everyday life.

Based on this, some possible elements for operational development and future research are proposed below, which could be valuable moving forward.

Digital competence should increasingly be viewed not just as a standalone subject or as a certification confined to a purely technological dimension, but rather as a transversal element within the school curriculum. It should be integrated into the logic of the Civic Education curriculum, which focuses on the development and reinforcement of competencies to prevent and address Digital Educational Poverty. The design and production of digital communicative artifacts provides fertile ground for schools to strengthen and further develop the intersection of formal, informal, and non-formal learning. This approach encourages teaching practices that effectively integrate school language, in line with the National Guidelines for the first cycle curriculum, the Civic Education Guidelines, and the Orientation Guidelines.

The variety of products created, beyond the specific format categories and the newsrooms themselves, demonstrates the considerable expressive and communicative potential present in the students. This potential is often underestimated by both adults and the students themselves, but school practice can help bring it to the surface, discipline it, and guide it. This approach fosters not only the development of technical or narrative skills but also greater awareness and self-esteem regarding students' own modes of thought and expression.

Finally, the complexity and richness of the productions - both thematically, socially, and culturally, as well as in terms of expressiveness, aesthetics, and narrative - underscores the need to avoid reducing this type of activity and project to a static, one-size-fits-all model. Instead, it is essential to promote adaptability to the diverse needs of school contexts, whether territorial, social, or cultural. This approach ensures that each school has the opportunity to bring out and certify digital competencies in a way that is both deeply rooted in students' life practices and aligned with a systemic, rigorous, and coherent perspective in line with national and international guidelines and developments in the concept of digital competence.

The PRODACT tool was designed and developed precisely with this dual approach in mind. Its goal is not only to analyze digital products but also to enable an integrated and comparative evaluation of the richness and complexity of the aspects that define these products, promoting their use in curricular teaching practices.

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