

Pnrr And School: New Research Paths To Support Digitisation Processes In Public Administration

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Abstract: The complexity of the school and its organisational and educational management has become increasingly evident in recent years. The variables that continually come into play, thanks to sudden normative demands for transformation, as well as didactic and educational fashions, condition choices, decisions and states of mind. At the same time, the Onlife phenomenon (Floridi, 2021), which increasingly recognises that our lives are entangled with technology, invites us to frame schools according to innovative visions and missions, aware that the digital world cannot and must not replace the real one, but rather support it, avoiding denying the unique and emotionally expressed value that physicality offers it. This framework in the field of education not only reflects and opens up new trajectories of study and research, but also comes at the same time as PNRR funding. In the face of this financial tsunami, we wonder how well known and utilised are the innovative approaches, starting with Embodied Cognition, necessary for such a transformation, how much the PNRR projects are grafted onto the constructs that underlie them, how and why these initiatives promoted by schools (specifically solicited by MIM) will impact, how much will be capitalised - as a heritage of competences - and if, and how, these will be implemented.

Keywords: PNRR; Educational Research; Embodied Cognition



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1. Introduction

The complexity of schools and their organisational and educational management has become increasingly evident in recent years (Arduini, 2012; Carwood, 2007). The variables that continually come into play, thanks to sudden normative demands for transformation (Colombo, 2011), as well as didactic and educational fashions that swarm based on baseless media followers and opinion leaders, contaminate and permeate the minds of school actors, conditioning choices, decisions and states of mind. This phenomenon risks creating unnecessary confusion, misreadings of data and approaches, demotivation and anxiety on the part of teaching and educational staff. All of this in a cultural and institutional scenario where the red

thread of educational research and pedagogical constructs that, in recent decades, have always represented the guiding star towards which to orient one's professionalism, evaporate without grip or even disappear altogether. At the same time, the Onlife phenomenon (Floridi, 2016), which increasingly recognises that our lives are entangled with technology, where the on line and the off line mingle and mutually condition each other, invites us to frame schools according to innovative visions and missions, aware that the digital world cannot and must not replace the real one, but rather support it, facilitate it (Ranieri et al., 2020), avoiding denying the unique and emotionally expressed value that physicality offers (Damiani P., 2020). It is a matter of having the awareness that the conversion from a traditional, transmissive, frontal school to a participatory, innovative, proactive and professionally autonomous school (Panciroli et al., 2018) cannot be determined by a material factor alone, much less only by purchases of technological aids or subscriptions to interactive apps. This is a delicate, profound, articulated and challenging transition. All actors will be involved and must be engaged in a transformation, first of all of a *forma mentis* (Calvani et al., 2010). This is why training is necessary, in order to reshape the thinking, action and function of those who work daily in the school context. This framework in education not only reflects and opens up new trajectories of study and research, but also comes at the same time as an avalanche of PNRR funding. If it is true, therefore, that the intentions of the MIM are valid and respond to the need to implement this now indispensable transformation - also with the functional aid of ICT - it is also true that these actions need diluted and serene times, in which the paths and training modules are not labels to be applied on the teachers' knowledge register but experiences of putting into play that allow deep reflections, honest comparisons and constructive exchanges, in which the overcoming of the Cartesian dichotomy (Damasio, Macaluso, 2004), the awareness that the learning experience needs a learning body, the educational significance of the suspension of judgement and the valorisation of the pedagogy of possibilities and errors (Benes et al., 2017). In the face of this financial tsunami, we wonder how well known and utilised are the innovative approaches, starting with Embodied Cognition (Caruana, Borghi, 2013), necessary for such a transformation, how much the PNRR projects are grafted onto the constructs underlying them, how and why these initiatives promoted by schools (purposefully solicited by MIM) will impact, how much will be capitalised - as a heritage of competences - and if, and how, these will be implemented. The survey project wants to try to answer these interesting research questions and, therefore, to conduct a qualitative-quantitative research at a national level that aims at understanding and studying the evolution of the school system in the next two years, before and after the implementations foreseen by the PNRR. Before proceeding to the research proposal, we will quickly go on to illustrate the new passages and landscapes that are emerging, referring to the communicative, social and scholastic aspects in the light of the profound interconnection that has been created with digital environments.

2. New passages and landscapes

2.1 *New passages (and landscapes) of communication*

The new digital technologies have contributed to the construction of polysemic and polystructural platforms: polysemic, insofar as they contribute to the construction of ever-changing meanings, polystructural insofar as the same media simultaneously offer several tools for the construction of such meanings, passing, in essence, from multimedia to *intermediality* (Rivoltella, 2016). *Portability*, (i.e. the material possibility of carrying devices), *connectivity*, and *authoritativeness*, (i.e. the possibility of publishing content without resorting to the mediation of devices) characterise, according to Rivoltella, this phenomenon. The communicative landscape through which these media operate, therefore, is constantly being modified by these very media and the use we can make of them. All this transforms the media into a connective tissue (Siemens, 2005). Thanks to this widespread diffusion of devices, the protagonists of cross-media are increasingly the users, who become the focus of any new online proposal, in the sense that they are increasingly called upon to contribute (Jenkins et al., 2010). We are facing a fundamental passage: the birth of the *prosumer*. A passage to be strongly emphasised, therefore, because it marks, anthropologically, the passage from an idea of man as a passive consumer of cultural products constructed by others to a state of *active audience*, which can in turn produce content to be submitted and shared with other audiences that in turn, and widely now, assume this dual connotation (Volli, 2018). In such a scenario, the evolution of digital possibilities is grafted into the configuration of a true artificial intelligence (McCarthy, 2020) capable of responding in real time to the solicitations of the audience based on an almost infinite repertoire of data to be analysed, compared, selected and returned in real time.

2.2 *New social transitions (and landscapes)*

This reconfigures the anthropic landscape of communication in the first place and, secondly, has obvious repercussions in the very fabric of society, establishing an inescapable link between virtuality and reality that cannot be ignored. From a relational and social point of view, therefore, the network amplifies the possibility of extending the range of interactions and that of being active users, in the sense that the *Internet is a text both read and written by its users* (Hine, 2008). Although not completely transparent, the new media seem in any case to guarantee inclusiveness and universality to citizens, fostering horizontal communication and a freedom of expression for individuals, groups and institutions that is unprecedented in history, and even political debate, thanks to the disintermediation of information brought by the new media, is potentially open to all. Stopping at the obvious, however, is not a good way to approach the net as a source of information that allows one to construct an opinion that is politically and socially expendable. Are young people able to disentangle themselves in this new landscape? Sonia Livingstone (Livingstone, 2013), starting from the immense amount of data made available since the *EU Kids Online* research (Livingstone, 2011), focuses on the risks and opportunities inherent in young people's digital experiences. She notes that being young does not automati-

cally give one greater familiarity with new technologies: using the Internet is not easy. It requires practice, experience, special knowledge that cannot be taken for granted. Entrusting minors with expertise merely because they are digital natives means delegitimising their right to have public policies that accompany them in the acquisition of fundamental skills in the use of the new media (Livingstone, 2013).

2.3 New school transitions (and landscapes)

The response of the educational world to such new perspectives lies in the realisation that it is no longer enough to train critical thinking. It is necessary to educate the new prosumers to a principle of responsibility (Rivoltella, 2016). A need perceived and relaunched by MIM's initiatives for school innovation, which seems to be struggling with the advancement of the times and new technologies. According to the scholar, we can no longer disregard considering these new elements as constitutive of the youth culture in which the school promotes its work of shaping the person and educating on reality. It will therefore be necessary to make a decisive paradigm shift in the same didactic perspective that has hitherto been seen in the explication of school educational dynamics. One can no longer simply prohibit the use of digital devices in the classroom, institutionalising more passable and structured didactic forms. It is no longer enough to set up environments and implement devices within educational institutions. We must take responsibility for research, in an effort to fully understand the new dynamics we are going through, otherwise we would end up falling into a dialectic without mediation. Picking up on Wolf's thought (2009): teachers and students should not be put in the position of having to choose between books or monitors, between real and virtual. Pier Giuseppe Rossi (2016) takes a decisive step in the direction of a reasoning based on neuroscience research (Gallese, 2005b; Gamelli, 2012) on the relationship between action and perception, contextualising it in the didactic mediation that takes place in the use of digital artefacts. For Rossi, the digital has introduced new types of mediation, the salient elements of which are the co-presence of various media and the interaction between different languages, making it possible to activate simulation paths that replace the logic of prediction with that of forecasting. The new digital artefacts, in fact, constantly interact according to predictive logic with response mechanisms that remain autonomous although induced by the behaviour of their user. The advent of artificial intelligences such as Chat GPT confronts us with the need to rethink not only Media Literacy (Rivoltella, 2023). The enormous amount of data processed by algorithms, the ability to pattern, visualise and predict (Manovich, 2020) connections that escape the human eye achieving not only representational but heuristic value (Rivoltella, 2023) leads us to the need to recognise new competences concerning the very cooperation between man and machine. The profile of these new landscapes reshapes the skyline of a school that becomes both a container and a place of choice for those anthropological, psychological and social instances that pose complex problems and therefore require complex solutions.

3. PNRR and digital implementation

Quickly reviewing the path of digital implementation, in 2015 with the activation of the National Digital School Plan, the curricula as envisaged by the 2012 Guidelines and National Indications were integrated with respect to digital skills. The European Commission's 2013 publication on digital competences, DigComp1, made it possible to orient educational action with respect to five reference areas such as: Literacy and Data, Communication and Collaboration, Digital Content Creation, Security, Problem Solving. In subsequent reworkings (DigComp 2.1) reference is made to the possibility of integrating the use of digital skills for teaching purposes. It will be with DigComp 2.2 (Vuorikari et al, 2022) that the digital competences to be implemented in the school system will be more structured, defining concrete examples but not yet totally practicable in the Italian reality as there is a need for in-depth training processes addressed to teachers in order to allow a process of redefinition of the teaching methods and approaches that can really integrate digital competences. The areas of articulation concern: Professional Involvement and Enhancement, Digital Resources, Teaching and Learning Practices, Assessment of Learning, Enhancement of Student Potential, Fostering the Development of Digital Competencies for Students. It is therefore necessary that, before teaching using technology and the digital world, the issue of educating in media and the digital world should be addressed (Laneve, 2020) and this is the objective of DigCompEdu (Redecker, 2017). Virtual reality, augmented reality, digital storytelling, coding, can allow for a substantial expansion of the student's experience, but teachers must be the first to experience it. Realising a permanent and shared e-learning, along accessible and inclusive lines, (Guglielman, 2011) is still a challenge. The School 4.0 Plan seeks to involve the entire school community, promoting the transformation of traditional classrooms into innovative learning environments; it also decisively stimulates the activation of training workshops for teaching staff. In the *Next Generation Labs action*, the possibility of building innovative environments for digital professions is sought, while with the *Next Generation Classrooms action*, thanks to the remodelling of the physical environment into a new integrated digital environment, the need to provide skills useful for collaboration, design and inclusion is pursued. With six reforms and eleven investment lines envisaged by the PNRR Italia Domani, the MIM connects, through the Futura platform, the different actions on a national and European basis useful for building an innovative, sustainable, safe and inclusive school with a total allocation of 17.59 billion. The reforms involve technical and professional institutes, the ITS system, orientation, recruitment of teaching staff, the Scuola di Alta Formazione Continua, and the Reorganisation of the School System, while the investment plans mainly concern two areas: infrastructure and skills. With respect to infrastructures, interventions are to be made both on school buildings and on the construction of innovative environments including tools for digital education, with 4.6 billion lire earmarked for kindergartens and the integrated 0-6 system, 400 million lire for the upgrading of canteen facilities, 300 million lire for the upgrading of school sports infrastructures, 3.9 billion lire for the safety and upgrading of schools, 800 million lire for the construction of new schools, and 2.1 billion lire for Schools 4.0. With regard to skills aimed at digital awareness, equal opportunities,

reducing territorial gaps, technical and vocational education, 1.5 billion was allocated to strengthen basic skills for students in the first and second cycles and to combat school drop-out, 1.5 billion for the reform of ITS, 800 million for integrated digital education and training on the digital transition of school staff, 11 billion to implement new skills and new languages to guarantee equal opportunities, strengthen the study of STEM, increase multilingual knowledge, 560 million for the extension of school time in order to increase the educational offer and combat school drop-out, implement training paths and projects in extracurricular hours.

4. Research Project

In the face of the PNRR's imposing allocations to allow, on the one hand, the digital transition for public administrations such as schools, and on the other a radical paradigm shift to be interpreted as a true cultural transition towards new teaching methods involving the use of digital technologies, it is legitimate to wonder how we are preparing for these delicate transitions and how to assess the actual impacts that these complex dynamics aim to generate. The research team is therefore endeavouring to set up a methodological device that will enable a nationwide sampling-based survey to answer a number of fundamental questions.

Firstly, an attempt will be made to understand, for each participating subject, the state of the art *ex ante* implementation of the actions envisaged by the NRP. Secondly, an attempt will be made to collect qualitative-quantitative data regarding adherence to the various actions envisaged by the schools participating in the study. It will be essential to bring to light not only the explicit dynamics, but also the implicit ones, especially as regards adhesion to pedagogical models and constructs that can serve as a guide in the preparation of the projects to be implemented on the one hand, and on the other to understand to what extent there is a real and not merely formal adhesion to these perspectives, especially as regards the area of training. Lastly, the effectiveness and impact of the actions implemented will be assessed by means of an *ex post* survey, when the interventions will actually be completed, in an attempt to systematise the emerging elements and the real connections with the educational, methodological and pedagogical practices that animate everyday school life. The lines of research will therefore transversally intervene on different levels: for one aspect, the investigation will concern the retrieval of quantitative data with respect to the project adherence, the actions implemented, and the number of human resources involved in the processes; for the other, the qualitative investigation on the training processes put in place and on the actual repercussions on teaching in terms of effectiveness and improvement.

From the point of view of research methodology especially in the educational field, (Calvani, Marzano, 2020) note the need to capitalise on empirical evidence-based knowledge with the support of network technologies and new methodological research perspectives. Indeed, fundamental factors can be detected to open up the research landscape to increasingly integrated and interconnected approaches to practice. These factors can be traced back to the development of the network and search engines that allow access to resources available worldwide: the development of an EBE (Evidence Based Education) culture that allows the effectiveness of methods

to be compared on a large scale (Davies, 1999; Whitehurst, 2002); the possibility of interpolating information with evidence from Instructional Design and from studies on effective teaching (Merril, 2002, 2006a; Bell, 2020); the focus on an improvement-oriented culture of quality. In this sense, it is useful and desirable to adhere to a research model that can be in line both with the perspectives opened up by Action Research (Lewin, 1946) and with a methodological practice that can be used in complex contexts such as schools, for example Design-Based-Research, which allow the practice of education itself to be improved by exploring learning and teaching environments, developing contextualised theories that refer to particular contents and educational objectives (Pellerey, 2005).

A useful methodological contribution can be found in Evidence-Based Improvement Design, EBID (Calvani, Marzano, 2020), which attempts to integrate research and practice, within an improvement paradigm (Bryk, 2015; Lewis, 2015). With regard to the aspect of investigating educational processes, the Research-Training perspective (Asquini, 2018) assumes relevance, in the need to delineate approaches to empirical research such that they can be carried out with teachers and for teachers, from an active and participatory perspective (Vannini, 2018) in an attempt to bridge the gap between the world of research and the world of education, as it is clear that the knowledge of researchers does not coincide with the knowledge disseminated among teachers (Damiani E., 2006; Magnoler, 2012).

5. Conclusions

In the final analysis, the research project, in addition to setting up a useful device to retrieve that information of a quantitative nature to reconstruct the framework of the interventions following the activation of the actions foreseen by the PNRR, wants to try to specifically define the trajectories and the pedagogical and didactic directions underlying the choices made by the schools with respect to the possibilities and themes foreseen in the various funding articulations. The educational institutions are called upon to implement the digitisation plan envisaged by the Digital Compass 2030 (Eggers, 2016), guaranteeing full accessibility to the services offered through the implementation of connectivity, moving towards a rationalisation of the data centres distributed throughout the country, with a view to the construction of a National Data Platform. Structural interventions are needed to reduce the school dropout rate, estimated by MIM (MIUR, 2019) at 3.8% for secondary schools. This data is supplemented by the survey carried out to quantify the percentage of graduates (62.2% of 25-64 year olds are graduates in Italy, compared to 78.7% in the European Union (Istat, 2019) and with the observation that in the EU the percentage of graduates is 44% compared to 28% in Italy (MIUR, 2019). The improvement of the quality of learning, where the main problem is detected in curricula and training methodologies (OECD, 2018), is another nodal point of the School's reform and transformation action. What is lacking, especially with regard to this last point, is a methodological contextualisation more marked by laboriality and experimentation. Didactically active methodologies that involve students by allowing them to work not only on content but on soft skills play a key role in the paradigm shift that Europe is asking of Italian schools. The actions of the PNRR will inter-

vene on the recruitment of teachers by activating the resources to be able to build a system of continuous teacher training; they will intervene on training considered functional to career progression; they will intervene on digital skills, insofar as the use of digital media will be promoted in the very structure of lessons, which will have to be based on a learning by doing approach; they will intervene, lastly, on the very nature of the programmes, emphasising STEM disciplines and multilingualism (Ferri, 2021). Once it has been determined which outcomes this impressive implementation system will be able to produce, it will be necessary to constantly reflect on the state of the processes: will they have been metabolised and integrated into the new and hoped-for everyday school life, or will there be formal adherence without a profound understanding of the values and constructs underlying the action? How can it be possible to intervene operationally with support actions focused on real needs and contextualised with respect to the peculiarities of the territories and the various communities of practice? In this sense, an intervention that can take root in a practice that favours rethinking the training processes of school professionals, and of education in general, through the enhancement of the deep personal dimensions that underlie the relationship with others and with the world, may be of fundamental importance. Specifically, it is a matter of making all the theoretical transformations advocated so far expendable in terms of everyday life and, above all, corporeity. A support anchored to an Embodied Cognition approach (Damiani et al, 2021), a composite scientific paradigm, interdisciplinary, constantly evolving in different fields (from philosophy to neuroscience), converging around the recognition of the role of corporeity, intersubjectivity, embodied simulation and implicit dimensions in development and learning, could be diriment. It will not be possible to take for granted the complex and profound personal and professional mental, adult and generative skills that should be guaranteed in all teachers and educators. Thanks to a complex and flexible approach that focuses on the need for integral, intentional and systematic training, which can promote the construction of training devices and the monitoring and evaluation of outcomes and process.

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