GUEST EDITORIAL PREFACE

Special Issue on Digital Literacy and Digital Competence:
Facts, Problems, Needs and Trends

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This special issue of the journal collects the proposals of the call for papers focusing on "Digital Literacy and Digital Competence: Facts, Problems, Needs & Trends", an issue solicited by many sides and especially by the members of the editorial board, to draw the panorama emerging from most recent studies on these topics and to define new strategies for the future.

According to the need of a balance for the activity of the journal and to answer to the will of those who think that numbers underline more subtle and complex reasons for the events under observation, it must be noted that this issue of the journal has two special features:

* It comes ten years after a paper presented in 2004, at the yearly conference of the Italian Association for Didactics Research (SIRD), where the need for new educational methods and practices was presented and discussed as a pedagogical emergency, due to the problem of the digital divide in Western countries and its connection with digital literacy and new emerging features for citizenship (Cartelli, 2005),

* Five years ago, started the publication of this journal and in its first issue, among other questions and problems, the concept of digital competence and its connection with digital literacy, computing fluency and informatics skills were analyzed (Cartelli *et al.*, 2010).

Now the reader could question whether or not the focus of this issue is still actual and has relevance for research and everyday life, or it is more useful a balance of the events and results obtained in these years to let people autonomously decide what instruments and practices to adopt in their work. Undoubtedly, the research on *digital literacy and digital competence,* has had great impulse since the first years of new millennium, but people could not expect that today it is getting more and more hot and it is

acquiring an increasingly relevance in all areas of daily life, included education.

There are many reasons for the above declaration, and in what follows they will be discussed in a greater detail, but it is important to note here that the main consequence of the consciousness of the actuality of the research in digital literacy and digital competence implies the re-definition of the journal perspective and the involvement of new actors; the editors of the journal, promoters of the call for papers collecting the contributions published here, are in fact persuaded that this is the main and probably the only way for the IJDLDC to re-affirm itself as the landmark for researchers and professionals dealing with contemporary digital life and education.

In what follows a separation is proposed in the discussion of digital literacy and digital competence, to let the reader have the right perceptions of the differences marking the evolution of the two concepts. Before any other consideration digital literacy is discussed.

As it has been showed by the authors who had their works accepted in the various issues of the journal, and it is emphasized by those who have written the papers in this issue, the deep and continuous transformation of persons and of today contexts, where digital equipments are massively present, urgently require both the definition and stabilization of a theoretical framework and a set of focused operational researches to be carried out. Furthermore, one key outcome toward which seem to converge either the experimental observations and the theoretical considerations, regardless of the approach one may choose, i.e. the *operational* or the *functional* ones (Boechler *et al.*, 2015), is the state of *continuous evolution and transformation* of digital literacy that, unavoidably, tends to follow the technological development and to depend on the penetration level of the technological artifacts (so creating a circuit which looks very similar to a spiral).

It is quite interesting to note how the transformation of digital literacy definition and content, tend with time to lag behind that of Human-Computer Interaction (HCI) and its

paradigms (Giovannella, 2008), because the interaction of human beings with machines involves a literacy which "naturally" evolves with technologies and their associated functions.

But there is nothing new in this phenomenon. Some decades ago the use of computational machines required the ability to use *command lines* (textual interfaces), and an adequate digital literacy level was based on the ability in the use of such way of interaction and, possibly, on the writing of scripts and programs. At that time technologies were exclusively aimed at supporting and optimizing work activities, including problem solving and data access. Only with the spreading of personal computers and the new vision of distributed computing, digital literacy was subjected to a first consistent transformation and redefinition, and the sphere of private activities, and of gaming, contributed in the shifting of the focus on people's personal and cultural features, more than on computing knowledge and skills. At that time burst into the scene also the first networks and it was possible to use net-services like the e-mail in a very simple manner (i.e., the bases for a wider "social" interaction, far beyond the borders of the bulletin boards, were created). By this way the social interaction penetrated into working organization and the beginning of the long season of Computer Supported Collaborative Work and optimization of the business organizations supported by ICT started.

Once again the meaning of digital literacy had to be rethought and redefined, and the age of the organizational digital literacy started up; some authors, while focusing their attention on the school, coined for it the sentence "organizational *e-maturity*" (Durando *et al.*, 2007).

But most radical changes in the meaning of digital literacy come with the "Internet" and especially with the spreading of the Web. In a few years, in fact, the access to the whole body of human knowledge became possible, although by means of new trajectories (hypertext), no longer linear like those of the books, and enriched by a multiplicity of communication channels (hypermedia), while the interaction remained basically *mono-modal*. Now the huge amount

of the information available on the net, which was also responsible of cognitive overload, could no longer be managed by human beings, regardless of the skills developed in net surfing, and new instruments like thematic lists and search engines were needed and, in turn, the acquisition of new additional high level skills and competences were solicited and stimulated.

The same way that in the past decade, the structure and functioning of the instruments (the Internet) become more and more *opaque* to the users, and the virtual social dimension of the new digital environment grew exponentially; as a result, new and more powerful communication protocols led people into the age of *multimodal interaction* and *interaction on the move*, and digital literacy was transformed once again. The main consequence of the described change concerned the progressive loss in the content definition of digital literacy: it now crosses over and through other literacies and it is difficult to find a universally shared and accepted definition for it, it is stronger with respect to the past its dependence from cultural issues, social content and specific peculiarities of the knowledge domain under consideration.

To make more complex the situation, whether possible, it must be noted that not only digital literacy has been invested by the changes described above, but people too have changed while interacting with digital equipments and virtual environments. It is far from the aims of this preface to dwell on the dialectic dispute between digital natives and digital immigrants (Prensky, 2001), and the consequent inter-generational gap emerging from the modifications affecting today society, but we can agree on what follows: living immersed in digital contexts and having an emphatic interaction with it, or being forced to use digital equipments after a life spent in analogical environments is not the same, and the approaches people have with digital media and their use for knowledge construction and communication are different in the two cases.

The hypothesis emerging from the foregoing considerations suggests the adoption of a *glocal* perspective for the definition of a theoretical framework for digital literacy: a set of *global* features independent from the context/domain must be identified, and *local* context/domain peculiarities must integrate them. Further support to this hypothesis comes from the observation that, despite the peculiarities of the specific context, some features of digital literacy tend to be associated with *information retrieval and analysis*, possibly finalized to *problem solving*, which are usually required in everyday activities.

As a result, a separation between the evolution of digital literacy and that of HCI can be detected. The main reason for this difference is to be found in the attention to the centrality of the person, which implies the *design for the experience* and bases itself on the consideration of the multidimensional features of individuals and contexts (Giovannella & Moggio, 2011).

Otherwise stated the theoretical framework for digital literacy is still waiting to be fully developed, to include the skills that are needed to use technologies in the best suited form, supporting all possible levels of contextualized experiences (going beyond work, leisure, learning or social connectivity), either at individual and social levels.

As regards the concept of competence it has to be noted here that there is neither a unique pedagogical perspective for its definition, nor a framework for the identification of methods and practices for its analysis and evaluation. It is especially true for digital competence where a discussion similar to the one reported above for digital literacy can be made.

Notwithstanding the difficulties just mentioned, a great effort has been made in Europe to create a framework for the competences of future citizens and to find the instruments and the procedures, strongly based on the use of digital equipments, aiming at the foundation of a new society. The European Commission (2006), after many funded projects, collected their results and published a recommendation for all the countries in the EU; in this document the key competences for lifelong learning were defined and digital competences were highlighted as the fourth element among them.

On another hand the UNESCO created a framework for teachers' ICT competences (UNESCO, 2011), that has at its highest level the *Knowledge Creation*, it is the level within which individual and collectivity are able "to create the new knowledge required for more harmonious, fulfilling and prosperous societies". In the most advanced HCI and TEL (Technology Enhanced Learning) perspectives the above competences are included in the *design competences*, grounded on the *design literacy* (knowledge and skill), that is the ability to design and re-design on the fly creative and innovative processes (including the learning one) (Giovannella, 2010), not just to use knowledge and skills to critically select information, and to set and solve problems.

Unavoidably, the framework developed by the Unesco, although it is devoted to teachers, has much to do with the *school*. But the school, the educational formal environment, looks today like a system where everyday and almost everywhere in the world, everyone is struggling with someone else, notwithstanding it aims at supporting individual and societal expectations and needs induced by the overwhelming technological evolution occurred in the last few years. In this ecosystem daily decision-making that hardly conform to the undergoing changes of the educational settings have to be faced. Like for drifting continents, different educational agencies are left to collide (e.g. school and family), new continents emerge from the fractures of knowledge's crust (e.g. the Internet) and new gaps and fractures open like earth's faults, by determining increasing distance between all stakeholders: students and families, teachers and the school system, research and daily practice, professional and private use of technologies, policy-makers and the educational system and, finally, among different school settings.

Among the many problems affecting the school the most relevant ones, at least for the present discussion, are the lack of a unique and shared framework and the difficulty in the spreading of the results from the study and research already made by many scholars. As a consequence, the diffusion of the "*do it yourself*" attitude, and of the "*bricoleur*" mentality in the approach to educational problems grew up, also sustained by the autonomy of the teachers in the management of their strategies and by the increasing of the separation between local decisions in the schools and centralized indications by the education ministries. These issues may act sometime as an enzyme, capable of catalyzing positive energies and promoting interesting experiments, but in most cases they only lead to the uncritical adoption of last technological or methodological fashions (podcasts, smart board, webinars, tablet, flipped classroom, coding and robotics makers, printers 3D, etc.) and to the development of educational programs devoted to the dissemination of related knowledge and skills, not framed within a broader vision (i.e., the perspective provided by the UNESCO).

Trends like that of urban areas and educational environments, that are getting increasingly smarter (*smart city learning*) and are fostering the integration between formal and informal learning, or that of learning processes that are becoming increasingly open and self-regulated, not to mention the temporary fad, or the MOOCs, make us realize that in the future nothing will be the same (Giovannella, 2014).

The precondition to satisfy needs and expectations of today society is, of course, the acquisition of an adequate level of literacies and competences, appropriate to the role played by the actors of the learning ecosystem and by the ecosystem itself as organization, and necessarily including also the capability to force technologies to exploit all their hidden potentialities, not just to use them.

The panorama described until now induced many authors to hypothesize that people should acquire a *flipped attitude* toward technology and put themselves the following questions:

- Before benchmarking or learning how to use technology, one should ask which technology is needed to meaningfully improve the quality of the processes that have been designed, and should be put in

place for the improvement of contexts and organizations,

• Which technology is really needed to support and foster the acquisition of the skills and competences that are considered relevant in the XXI century.

Whether the *flipped attitude* is the better answer to the above questions is early to say, but it will probably be the only way to optimize public and private investments and face the following problems:

• The increasing divide between schools that have access to advanced technologies and schools that are "out of the wave",
• The private use of technologies and the use of the same technologies in the educational settings (either by teachers or students),
• The tools, methods and processes offered by the research and their actual application in the schools,
• The demand of everyday instruction and the responses of the policy makers.

The papers in this issue clearly do not give a final and unique answer to the questions discussed above, but they show how there is a huge amount of questions still open, and probably mark the passage from the past of the IJDLDC to its future. Among them it is useful to underline here the following issues which will guide the challenge of the next issues of the journal:

• Given for granted that most part of young people, and nowadays teachers too, are skilled enough in the use of personal devices what strategies could be adequate to foster the transfer of these skills in schools and learning environments? What kind of educational strategies will act on the students by helping them develop new and good competences, and in the meanwhile will let educational processes take advantage of them? One should be fully aware that these competences are useful not only

for the school, they will also increase the level of employability and competitiveness of the students in the labor market;

• Governments and administrations are striving to adopt "digital agendas" to improve the use of ICT by teachers and professors, but how decision makers will effectively take care of the acquisition of adequate technological, methodological and managerial skills by educators? As an example, the Italian programs aiming at the pre-service and in-service qualification of teachers have been and still are, quite unsuccessful. Is this result only dependent on the lack of serious evaluation programs measuring ICT knowledge, skills and competences, or may they depend on the reduced impact of the same programs on the transfer of the same knowledge, competence and skill into the school?
• Since 2006 European Community proposed the "key competences for lifelong learning", needed by citizens in the knowledge society and, later, even more advanced frameworks for key competences have been proposed, but no or little educational strategies have been designed and put in place to support people in the acquisition of those competences; what role should be played by present and future learning ecosystems in the hitting of the target of a real improvement for life quality in the knowledge society?

Coming more specifically to the content of the papers in this issue it has to be noted that Boechler, Dragon and Wasniewski (2015), have made a great effort to describe the state of the art along the way to achieve a shared framework of reference for digital literacy and competence; as well, they have reported the efforts currently made by many scholars to identify the most effective strategies to integrate objective and subjective (self) approaches, with the main aim to develop predictive tools and to design tools able to mitigate and recover problems and gaps. In the same direction, but focused on the functional understanding of technological terms

in digital texts of popular culture, moves the contribution by Karasavvidis and Theodosiou (2015). Furthermore a great attention is dedicated by Seok & DaCosta (2015) to the gap on knowledge on cyber-security and cyber-safety, as clearly shown by the "discouraging" results they have reported.

Still on the side of evaluation and development of new tools, noticeable is the effort done by Sergis, Zervas and Sampson (2015) to define an evaluation framework going beyond individuals, in the attempt of considering them as part of an organization. This paper introduces a perspective by which the schools can, and should, be considered as a corporate organization and a socio-technical organism, highly influenced by ICT knowledge, skills and competences owned by their human capital.

The design of the schools' organization is still an open and very interesting issue. At present, in many countries, schools are still organized accordingly to models developed at the beginning of the XX century (Weber, 1922) and aiming at achieving the transmission of knowledge and skills. In many regions the transition to more organic models (Mayo, 1933) is very slow and the relevance of competences, included the digital ones are still very limited on the overall design of the organization. To this further problem the IJDLDC will dedicate room in the future, and it is in the opinion of the editors that the diffusion of an adequate design literacy could largely contribute to the advancement of the domain.

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