MEDIA EDUCATION:
STUDI, RICERCHE, BUONE PRATICHE

Collana a cura del MED – Associazione Italiana
per l'Educazione ai Media e alla Comunicazione

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La collana a cura del MED (Associazione Italiana per l'Educazione e ai Media e alla Comunicazione) prosegue il suo percorso di formazione e di ricerca nel campo scientifico della Media Education. Al pari della rivista « Media Education: Studi, Esperienze, Buone pratiche », attiva dal marzo del 2010, è stata fortemente voluta dal fondatore della nostra Associazione, Roberto Giannatelli, uno dei primi studiosi ad aver portato la *media education* all'interno dei confini delle nostre università e delle nostre scuole che ci ha lasciati nell'ottobre del 2012. I primi dieci volumi pubblicati dal MED hanno aperto un orizzonte in Italia ancora inesplorato, una prima collezione di riflessioni e lavori scientifici mai apparsa prima nel nostro paese.

La collana ora riparte con nuovo editore e si propone di stimolare la realizzazione di ricerche e la pubblicazione delle opere più interessanti in relazione all'educazione ai media e all'uso dei media nella scuola (e nel territorio) allo scopo di migliorare l'apprendimento dei nostri alunni e di sviluppare competenze mediali e digitali utili per affrontare la complessità del mondo odierno e per costruire una professionalità futura, anche in riferimento alle Indicazioni nazionali per il Curricolo scolastico.

Opera pubblicata con il contributo del Dipartimento di Scienze della Formazione e Psicologia dell'Università degli Studi di Firenze.

Teacher Education & Training on ICT between Europe and Latin America

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ISBN 978-88-255-2102-3

I[st] edition: December 2018

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ISBN 978-88-255-2102-3
DOI 10.4399/97888255210231
pag. 9–10 (december 2018)

Introduction

Maria Ranieri, Laura Menichetti, Martha Kaschny Borges*

In many countries around the globe, the mission and the organisation of schools are changing and, therefore, also the role of teachers and what is expected from them (OECD, 2017). Teachers are increasingly asked to face new challenges including teaching in multicultural classrooms; integrating students with special and different learning needs; developing digital, media and information literacies for preparing their students; using information and communication technologies (ITC) effectively for teaching, and so on.

In this context, new challenges are also emerging for Teacher Education and Training. On one hand, the higher education system is required to rethink its educational offer in order to innovate both contents and methods of academic teaching. From this point of view, it is well known the call for the renewal of academic pedagogies by the side of international bodies such as the OECD (Hénard & Roseveare, 2012) or the High–Level Group on the Modernisation of Higher Education (McAleese *et al.*, 2013), which are recommending public institutions to support the improvement of quality teaching and learning at the university level.

On the other hand, the challenge of in–service teacher professional development is still in place with a myriad of heterogeneous and ephemeral initiatives, a plethora of methodological models for teacher professional development and a consistent amount of uncertain results about the effectiveness of interventions (see, for example, the case of innovation of teaching practices in OCDE, 2015).

With all this in mind, this book collects a series of contributions which were presented and discussed during the international work-

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shop Teacher Education & Training and ICT between Europe and Latin America, organised by the editors of this book at the University of Florence on November 19th, 2018. The aim of the workshop was to compare at national and international level different perspectives on emerging needs and approaches to Teacher Education and Training, with special attention to Europe and Latin America and a focus on intercultural and digital training.

More can be done and said on these issues, of course, especially considering that two main contexts were taken into consideration, that is Italy and Brazil. However, the workshop as well as the book can be considered as a first step towards a reflection which promises to go beyond the seminar and the book to develop further theoretical and practical work in the near future.

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Part I

INTERNATIONAL PERSPECTIVES

Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210232
pag. 13–26 (december 2018)

Teacher training and ubiquitous education Challenges for research in Brazil

Martha Kaschny Borges*

1. Introduction

The contemporary moment is permeated by deep changes in the way the human being lives, interprets the world and events.

Interpersonal relationships and objects are also being transformed. Digital technologies play a prominent role in these movements, since they are present in society in a ubiquitous[1], pervasive[2] and mobile[3] way.

In education, these movements also occur. In this sense, teachers also need to appropriate digital devices, to incorporate them into their teaching practices so that, together with their students, they take on the role of protagonists in the construction of digital culture. Thus, projects aimed at the initial and continuous training of teachers to incorporate digital technologies into their teaching practices are fundamental, since subjects present new ways of learning articulated to the new cognitive skills developed. In this sense, digital technologies can be associated with the complexity of society, of knowledge, that need to be considered for the re–signification of teaching and learning practices. This dimension becomes a notable topic in research, discussions and recent productions of the educational field.

Among these, Lucia Santaella (2004), in her book *Navigating in Cyberspace: The Cognitive Profile of the Immersive Reader*, presents an investigation that typifies the cognitive profiles of readers from the

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1. Ubiquity is the coordination of mobile devices by the environment that allows the user to communicate at any time and any place via electronic devices.

2. Invisible distribution of the computational means by environments and objects.

3. Possibility of physical movement while maintaining connection to the internet.

different types of appropriation of the technologies of text reading in many historical times.

Through the classification[4] and comparative method, the author identified three types of readers: contemplative/meditative reader; moving/fragmented reader and the immersive/virtual reader. The classification criteria defined were "the types of sensory, perceptual and cognitive skills that are involved in the processes and the act of reading" (2004, p. 19).

The configuration of the cognitive profiles of each type of reader is intertwined with the possible forms of reading offered in each context and time. The first cognitive model refers to the contemplative/meditative reader. Born in the Renaissance, this reader deals with images and fixed texts ruled by a pre–prescribed syntactic–textual order. His/her main means of reading is the printed book and the ideal space to read is reserved and private, for example, the library.

From the sixteenth century, books started being read privately, quietly and increasingly emancipated from religious and family celebrations, which allowed a more intimate relationship between the reader and the book. Due to their durability, books, paintings, maps and scores can be repeatedly revisited, placing the reading as a process of contemplation and (re)signification.

The hegemony of the contemplative/meditative reader lasted until the nineteenth century, replaced by the appearance of the moving/fragmented reader in the period of the Industrial Revolution. The urban transformations that occurred in the middle of the last century brought consequences for people's way of life. In this period, we observed the expansion of the circulation of people in cities, the concentration of capital in urban centers, the development of the logic of serial production, progressive and rationalized in factories, and the consolidation of capitalism and the technological advance.

Faced with the imperative of constant adaptation to novelties, the past was deprived of its value and repeated consumption caused the impression of change, when in fact things remained the same. In order to feed the illusion and the need for innovations, the publicity and the consequent proliferation of ephemeral images — fetish of the image — and visual messages inducing the consumption of merchandise — fetish of the commodity appeared (Lipovetsky, 1993).

4. "[...] point of view that seeks to group the singular differences of the phenomena in the common traits presented by them" (Santaella, 2004, p. 18).

Relating the reading process to the action of navigating in cyberspace[5], Santaella (2004) investigated how the use of technologies and hypermedia[6] alter the cognitive profile of readers. The second type of reader, the mover, prepared the human perceptual sensitivity for the emergence of the immersive reader, navigator of virtual spaces.

Immersive reading is characterized by being multilinear and labyrinthine, driven by perceptual leaps ordered by associative processes established during reading. The freedom of the immersive/virtual reader is expanded, since he can choose the varied paths available in the liquid architectures of cyberspace and can organize his reading from the senses that he himself identifies in the text, establishing a process of subjective significance of the act of reading. Faced with countless words, images, documents, videos, etc., the immersive reader constructs custom and non–transferable cognitive maps through the association of fragments.

The three types of readers presented coexist in today's society and the same reader develops differentiated reading practices, according to context, reading support, and motivation to read.

More recently, with the possibility of hypermobility and hyperconnectivity, the researcher proposed the emergence of a fourth type of reader: the ubiquitous reader (Santaella, 2013). Mobilized by ubiquitous computing, this reader acquires ubiquitous reader status, living in an environment that constantly encourages reading and cognition processes from hypermedia media supports. Faced with the excess of stimuli, the ubiquitous reader unites the attention and the multitasking cognition or distributed cognition to move in the complexity that the informational environment offers to the user. Multitasking can be defined as the ability to maintain a mental picture of complex sets of relationships and to quickly adjust them to perceptual changes (Jenkins *et al.*, 2006).

These four types of readers and their particularities bring great challenges to the area of teacher training, since the use of networks in

5. "Cyberspace is the 'Matrix', an invisible abstract region that allows the circulation of information in the form of images, sounds, texts, etc. This virtual space is in the process of planetary globalization and already constitutes a social space of symbolic exchanges among people from the most diverse places on the planet" (Silva & Tacman, 1999, p. 57).

6. According to Santaella (2013, p. 231), hypermedia is the "joining of hypertext with multimedia, that is, it is precisely the language with which we deal when we navigate the information in the networks".

the teaching and learning processes is situated in the establishment of conditions for the integration of contemplative, moving, immersive and ubiquitous readers in qualified and coherent learning processes.

1.1. *Immersive and ubiquitous reader: a new way of reading*

The cognitive–sociological approach defines reading as "a process of extensive comprehension, the dynamics of which involve sensory, intellectual, physiological, neurological, cultural, economic, and political components" (Martins, 1984 in Franz, 2002, p. 31). Moreover, it also includes the "reading of the world", an expression coined by Paulo Freire. For him, educating only makes sense if this reading promotes in the subject an emancipatory process of ethical, aesthetic, social and cultural transformation that allows his conscious, emancipated and citizen insertion into a democratic society. Thus, "The fundamental task I face is to experience with intensity the dialectic between the 'reading the world' and the 'reading of the word'" (Freire, 1996, p. 84). Therefore, the act of reading is not restricted to written language, but includes reading of sounds, gestures, images and events, signs, symbols and the context of the present, with all its possibilities and difficulties.

Characterized by the state of readiness and interactivity[7], the ubiquitous reader overcomes the status of the receiver and participates in the message in a participatory manner, which means that the broadcast can be manipulated, flexible, and at all times. Communication becomes multi–faceted as individuals become transceivers, producer–consumers, reader–authors.

The composition of the ubiquitous reader profile involves "sensorial, perceptual and cognitive transformations that also have consequences for the formation of a new type of body, physical and mental sensitivity" (Santaella, 2013, p. 34). These transformations are based on: 1) specific perceptual actions and controls that decode semiotic signals and routes with agility; 2) types of cognitive behaviors based on inferential operations, search methods and problem solving; 3) development of perceptual readiness — a semiotic competence that allows to operate motor reactions in conjunction with

7. Interactivity as "bidirectionality between emitters and receivers, expressing free and creative exchange and conversation between the poles of the communicational process" (Silva, 2000, p. 81).

dynamic visual changes, control objects represented on the screen by moving the mouse and construct sensory–motor automatisms — and the poly–sensoriality that consists of the association of different modalities of sensory attention in search for information.

Therefore, the contemporary subject transits constantly and without ruptures between the physical world and the virtual world. He interacts, communicates and "reads" at the same time the context of two worlds: the icons, signs and symbols of the environment around him and the cybernetic environment. And this, without abrupt breaks, continuously. With a simple touch on his smartphone, from any place and at any time, the subject interacts with the virtual environment, talks with other subjects that may be inches or kilometers away from him and, at the same time, interact personally with subjects in the same place and moment as him. Now this constant and continuous movement from the physical to the virtual environment requires specific cognitive skills, a fragmented, constantly distributed attention and a particular motor control.

Certainly, the mind is capable of modifying its structure and function as a response to the influences and demands of the environment that surrounds the subject. This capacity is called neuroplasticity (Lent, 2016). It allows the ubiquitous reader to process, in a parallel and joint way, different information, giving them the same importance or attention, as well as his surrounding information, and those that arise through the movements carried out by his fingers. These are "read" extremely fast, almost intuitive or "guessing", which requires a visual acuity and very intense and fast mental action.

The immersive/ubiquitous reader builds knowledge from different focuses of attention and distinct viewing angles of a fact, an image, a story, and so on. Sometimes, this enlarged look can become superficial and fragmented, since there is an inexhaustible amount of information and entertainment in front of the senses, just as the access to this information is fragmented and unsystematic.

Hypermobility and hyperconnection allow access to and seizure of a wide range of information on the most varied types of knowledge. The open learning made possible by digital technologies, promotes the development of self–training processes. This type of learning, termed ubiquitous learning, is spontaneous, contingent, chaotic, fragmented, unsystematic, gets closer to the informal and non–formal education, but not to formal education.

Thus, it's possible to imagine that this formal, regular and

systematic education tends to disappear, since each subject can be formed from their interests and through devices that enable self–formation. Surely, in cyberspace, information is available, but in a chaotic, non–systematized, in a constantly changing and dispersed way. Moreover, "the balance between the indiscriminate diffusion of information in cyberspace and the individualized construction of knowledge" is very unstable (Santaella, 2013, p. 27). That is, learning requires more than spontaneous, unsystematic and chaotic processes of search and access to information. Learning demands the development of dynamic and active processes that produce lasting cognitive and behavioral modifications. Therefore, only access to information is not synonymous with learning.

Before the historical conditions that promote the appearance of the reader and learning ubiquitous, with particular cognitive processes, it should be noted that this new reader does not extinguish the previous ones. Each type of reader has particular cognitive functions. Each one contributes in a different way for the development of an individual provided with increasingly hybrid and rich cognitive skills. Therefore, it is necessary to recover the previous readers' competences, as a more focused and lasting attention, the causal thinking by the readings of linear texts, with beginning, middle and end, reflective and relational thinking, among others.

The increasingly prominent presence of immersive and ubiquitous readers in educational institutions today has been pressing changes in educational, didactic, curricular, methodological processes, in teacher and student training, and even in educational policies. However, it is necessary to go beyond actions to incorporate digital technologies into pedagogical practices, as well as punctual and individualized actions, as it is today. And in this sense, the training of teachers plays a fundamental role for the challenges that present themselves in the contemporary world.

If learning today is modified, it is necessary that the teaching processes also change. Reflecting on the educational processes currently carried out in educational institutions with the use of digital technologies, considering that teachers and students interact, mediated by technologies, in a different way, that have different cognitive profiles, is an important object of research that brings subsidies to the construction of meaningful teaching and learning processes. What's more, they support processes of initial and continuing teacher training.

The need for research that investigates ubiquitous teaching and learning processes, the different cognitive profiles, the different cognitive competences of the subjects, both at the theoretical level and in the pedagogical practices, presents itself as a challenge imposed by the complexity of society and knowledge.

In this sense, the research group Education and Cyberculture[8] of the State University of Santa Catarina, has been developing since 2005, research that investigates the issue related to the insertion of digital technologies in educational spaces, the relations/tensions/translations that the different actors effect in the teaching and learning processes, aiming to provide subsidies for the qualification of the teacher training in the present time.

The following is a brief summary of two research projects conducted in the group, one that analyzed the navigation routes of children that start the formal literacy process and another that mapped the navigation routes in the cyberspace of primary school teachers.

2. Two research projects, multiple results to subsidize teacher training

The ways of appropriation of reading and consequently of the cognitive profiles developed by children and adults are distinct and the distance widens when we debate about children who enter digital navigation long before they enter school and begin school literacy processes (Borges & Ávila, 2015).

This research was developed in 2014, of a qualitative nature and featured as a case study. It was carried out with twenty–five children aged 6 to 7 years, who attended the first year of a municipal school in Florianópolis/SC. The instruments of data collection consisted of: participant observation script; observation of pedagogical interventions; identification of reader types, according to Santaella (2004, 2013) and a field diary. The main goal was to identify the navigation routes in cyberspace that the children developed in the computerized room of the school.

8. http://dgp.cnpq.br/dgp/espelhogrupo/0500088587763773 (12.12.2018).

2.1. *Navigation routes for first year children*

When navigating in cyberspace the children demonstrated that their routes are realized through the symbols and images that compose it. That is, they perform a reading, but not a reading based on the word itself, not an alphabetic–syllabic reading, but reading the image, the identification of the symbols. The main symbols in cyberspace guide their routes.

Navigation based on knowledge derived from his reading of the world and his previous knowledge. Due to this characteristic, children at the same time as they are in the beginning of the process of formal literacy in the school also developed a digital literacy process, as they acquired knowledge about the use of hypermedia along with the discovery of letters and words.

The interaction they presented with the computer was almost "natural", intuitive, fast, and mostly collective. They quickly discovered the commands they had to perform to navigate the hypermedia ahead, either through trial and error, or to 'learn' the routes made by colleagues. Even when navigation occurred randomly, they defined the choices to be made.

Another relevant result concerns the fact that children developed the cognitive profile of an immersive and ubiquitous reader (reader who interacts with hypermedia and its multiple languages, who wants to be constantly connected) very quickly.

Initially, of the twenty–five children observed, four presented ubiquitous readers' traits, due to their intimacy with the network; sixteen, characteristics of immersive readers, because they knew how to enter the network, memorized specific routes and usually repeated and recognized the signs of cyberspace; five of them did not show intimacy with the network and everything was new, they needed help and had a high incidence of errors to enter the network. However, it was noticed that all of them presented traces of the immersive reader, with more or less intensity.

In this way, unlike Santaella's studies, the classification of the four types of readers for children is extremely temporary. Instead of a classification, a characterization in reader types, in small children the process of appropriating the tools of cyberspace is extremely fast, they have modified their navigation strategies from one encounter to another. Rather than identifying the types of readers, the research identified processes or stages of appropriation that intertwined, much

in the way of the literacy process itself.

In this way the results indicate that the cognitive changes presented by the children and especially the speed with which they move in cyberspace need to promote a new reflection on the practices practiced in the school. It is critical to know how children use digital technologies and develop their learning process so that training of future teachers considers the importance of developing coherent and challenging curriculum for immersive and ubiquitous reading children.

The changes that permeate the construction of childhood of the present times also require an understanding of the cognitive profile of teachers who share with them teaching and learning processes. This was the purpose of the research that follows.

2.2. *Teaching mapping in cyberspace*

The research, conducted in 2015, mapped the virtual navigation routes elaborated by primary school teachers that involved the use of digital technologies. The objective was to map the actions that the teachers elaborate in the situation of planning of a pedagogical intervention. Their journeys in cyberspace were described and analyzed through texts, images and the "traces" of their actions.

The study was characterized as an exploratory case study of a qualitative nature. It was divided into two main and complementary stages. The first consisted of sending (by e–mail) a questionnaire to fifty Elementary School teachers of a public elementary school in the city of Florianópolis (Brazil). This first stage had the objective to identify the profiles of readers according to the classification presented by Santaella (2004, 2013) and to define the participants of the second stage of the research.

After receiving twenty–five questionnaires answered, six teachers with differentiated readers' profiles were defined. The second stage consisted in the elaboration of a pedagogical intervention that contemplated the use of digital technologies. The navigation routes elaborated by each one were recorded through the Camtasia Studio computer screen capture and recording program.

Each teacher conducted differentiated navigation routes, with rhythms and ways to go through the various cyberspace. Next, the cartographies of each teacher (Figs. 1, 2, 3).

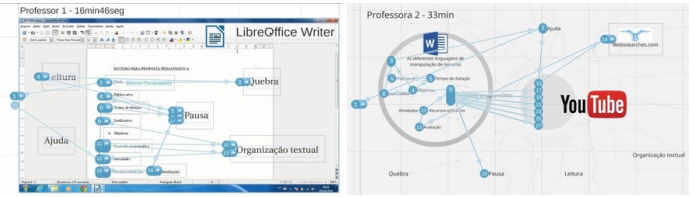

Figure 1. Cartographies teachers 1 and 2. SOURCE: Nau & Borges, 2017.

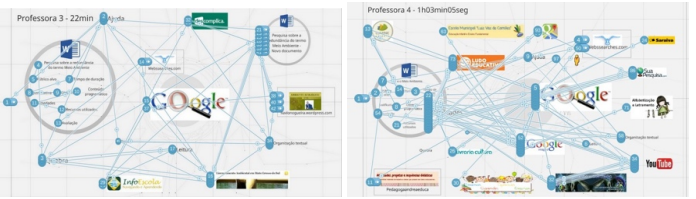

Figure 2. Cartographies teachers 3 and 4. SOURCE: Nau & Borges, 2017.

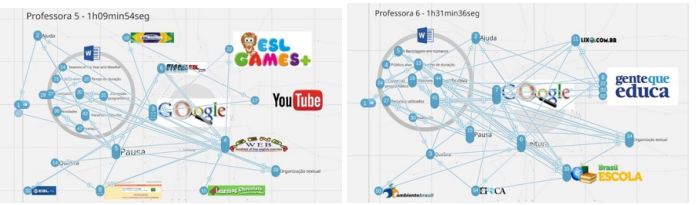

Figure 3. Cartographies teachers 5 and 6. SOURCE: Nau & Borges, 2017.

The main results show that, despite several possibilities for searching and navigating in cyberspace, Google company tools were present in five navigation routes. They were absent only on the navigation route of the teacher who did not access the internet, and who used only text editing tools. Google set itself up as a mediator, in the sense attributed by Latour (2012), of the navigations of teachers, as they obtained space as a cultural authority for advertising, indication and certification of the sites before them. Through Google, the most varied searches were carried out, including content and methodologies of teaching and learning (Nau & Borges, 2017).

Another aspect observed is that the first results indicated in Internet searches were the most used by teachers, which means that the websites layout in the results tends to influence the content that teachers use to compose their pedagogical practice. It is worth noting that typically the first links that come up on Google search are sites run by companies that have invested financially to keep their ads at the top of the search. The same phenomenon needs to be considered in teacher training courses regarding use of the YouTube channel, which was accessed as a content source by three teachers.

Sites of educational content were recurrent in navigation routes, such as Gentequeeduca, Descomplica, Brasilescola, etc. They are tools that help the teacher in the elaboration of practical activities. In addition to this type of site, there was a tendency of pedagogical appropriation of sites that are not intentionally educational, that is, "didacticism" movements were identified. According to Bezerra (2008), didacticism occurs through the transformation of a certain topic from an area of knowledge into object of teaching to be learned in the classroom. For this, the knowledge is reformulated/translated by the school, in the figure of the teacher, considering the level of education, the public involved, the school time and space and evaluation criteria.

However, an absence of governmental educational websites that deal with the pedagogical use of technologies such as TV School, Teacher's Portal, Leap for the Future, BIOE, Public Domain Portal and Technology Guide has been identified.

The didacticism of cyberspace content and the deviation of official sites indicate that the contents available through public policies are not satisfactory for teachers or they are little known and, on the other hand, diverse contents spread over the internet become sources for educational research for teachers. These indications need to be considered in the (re)planning of public policies and programs.

Regarding the activities with the use of technologies foreseen in the proposals elaborated by the teachers, it was observed that, in most situations, the student is seen as mere receiver of information. In addition, in general, activities in which the student produces content or issues opinions through the use of technologies were not expected.

And finally, the disparity between the use of technologies by teachers for personal purposes and pedagogical uses was highlighted. According to the questionnaire data, the teachers of the surveyed

school presented few difficulties in accessing and browsing the internet. When analyzing the navigation routes, it was possible to verify that they have few difficulties in this issue. However, the pedagogical use of digital technologies goes beyond the ability to access and browse the internet.

3. Final considerations

Contemporary society is in transformation, in fact it always has been. Several changes in our way of life occur daily at an increasingly frenetic pace. A new form of social and economic organization has been established, bringing different ways of relating to others and to the world around us. In the field of education, it is no different. These changes also bring uncertainties, insecurities and contradictions. Thus, educational research, particularly research that analyzes the epistemological intersections between the fields of education and digital technologies, can bring significant subsidies for teacher training.

Knowing and recognizing that subjects modify their cognitive profiles and, consequently, their ways of learning over time, due to the intellectual technologies of each time, results in the need to develop new ways of educating and teaching.

In this sense, the training of teachers presents itself as an important dimension for the improvement of the education quality of the contemporary subjects.

Digital technologies bring new challenges for teachers. With so much information and possibilities of reading and navigation in cyberspace, how to develop in students critical, reflective and conscious reading skills? How to help students not to 'drown' in this sea? How can we develop cognitive skills beyond those that networks and digital culture already develop? How to help them become more authors and producers of knowledge than consumers and information reproducers?

As Balestrini states:

> It is likely that, from the educational point of view, mediating, in the era of digital technologies, implies facing the challenge of moving with ingenuity between word and image, between books and digital devices, between emotion and reflection, between the rational and the intuitive. Perhaps the

> path is one of critical integration, of balance in the search for innovative, fun, motivating and effective proposals (Balestrini, 2010, p. 35).

Although some subjects are able to learn without the help of the teacher, the full development of the subject presupposes the learning of skills that go beyond knowledge, like affective, behavioral, cognitive, and social. For this, teacher mediation is a preponderant factor. Thus, valuing and training committed and active teachers in the contemporary context, impregnated by digital technologies is fundamental.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210233
pag. 27–37 (december 2018)

Intercultural teaching for International teachers

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1. What does Internationalisation in Teacher education mean?

P. J. Wells, chief of the Higher education section at UNESCO, recently declared that, on the one hand, there is an increasing demand for education all around the world, due to the growth of population that needs educational paths in different ways. On the other, we can observe a growing shortage of teachers well prepared to face the international and global challenges at all instructional levels.

Which is the first challenge to be dealt with? "In the context of increasing interconnectedness, migration, and multicultural societies, the question arises of how to find pedagogical approaches to address the growing sociocultural complexity in the field of education" (Townsend & Bates, 2007, p. 7)

Sociocultural complexity is clearly impacting on educational contexts — from pre–primary to higher education — creating more and more composite and multifaceted learning environments. New teachers must be able to manage meaningful instructional activities in settings where several factors and needs are concentrated, arising from different histories and cultures.

In what way can future teachers face such challenges? Looking at the new situations through the eyes of internationalization. Internationalisation means that teachers are able to look at intercultural environments in a dynamic way. Their eyes should be able to understand the plural histories of their pupils/students to create, at the same time, diversified educational paths and parallel future perspectives.

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For these reasons, the term "internationalisation", in teacher education contexts, means offering to pre–service teachers the opportunities to experience several school organisations, different teaching ideas and various learning viewpoints.

This grand purpose can be pursued and reached, reimagining teacher education programmes in both the internal and external sides. The internal boundaries are represented by an increasing flexibility in arranging university activities — lectures, workshops, seminars, training — allowing pre–service teachers to make plural their ideas about schools and schooling, teaching and learning.

Instead, the external frontiers are represented by the enlargement of the contexts that pre–service teachers can touch, experience, experiment in their own country or abroad.

The current internationalisation processes are transforming teacher education, because the concept and the view of teacher education is changing.

Kehm & Teichler (2007, p. 264) have identified seven main themes in the research on internationalisation in higher education over the last ten years:

— mobility of students and academic staff;
— mutual influences of higher education systems on one another;
— internationalisation of the substance of teaching, learning, and research;
— institutional strategies of internationalisation;
— knowledge transfer;
— cooperation and competition, and
— national and supranational policies regarding the international dimension of higher education.

The definition of internationalisation at the national/sector/ institutional levels that Knight (2004, p. 11) suggested, underlines the main aspects and aims that teacher education programmes should support: "The process of integrating an international, intercultural or global dimension into the purpose, functions or delivery of post–secondary education".

The intercultural dimension seems to occupy a prominent position in the field of teacher education. "Within the recent academic literature on internationalisation of teacher education, many scholars

examine questions around the intercultural competences of teachers, their global understanding, and their ability to transfer such approaches into work with their students" (Sieber & Mantel, 2012, p. 6).

Ultimately, the internationalisation of teaching education programmes is strictly related to a multiple idea of teaching and learning. A cross–cultural approach can help new teachers to face multiple classrooms.

2. Differences between Teacher Education programmes

In 2017, the *First European Conference on Internationalisation of Teacher Education: Challenges and Options towards a better Recognition and Comparability of Qualifications* was organised at the Goethe University in Frankfurt.

During this event, the speakers and the attendees agreed about a crucial point: it is not necessary to create a unique teacher education programme, valid in all European countries. The historical and cultural perspectives of each country, regarding the teaching profession, are too different. Furthermore, the organisation of teacher education programmes is based on dissimilar structures: some programmes last three years, whilst others last five years. In some teacher education programmes, the training period is intensive, so the student–teachers stay at school from 4 to 8 weeks in a continuous way. In other countries, the training period is arranged in a weekly way. In this case, student–teachers spend one day a week at school. In some cases, the teacher educators are the same university professors, in other cases, a certain number of experienced teachers spend a number of working hours at the university, in order to manage meetings with the student–teachers and supervise their professional growth.

For these reasons, it is quite impossible to standardise the structure of the different European teacher education programmes. On the contrary, it is better to focus our resources on the equivalence of the different educational paths in order to have more opportunities to establish easy rules to recognise the title acquired in one country in another country.

So, the leading sentence should be: equivalence in lieu of uniformity. To reach this important aim, it is necessary to place our attention on the development of teaching intercultural competences.

Each teacher education programme, in whatever way or time, should allow new teachers to improve and enhance an intercultural view of their instructional actions inside or outside the classroom. In particular, new teachers should be able to face complex environments, manage several situations and experience different educational contexts. In this way, they can grow various and differentiated teaching domains.

3. Teaching competences/domains

Over recent decades, many documents have been written about teaching competences. As an example, we can indicate the following list:

- flexibility and adaptability;
- autonomy and creativity;
- in–depth subject knowledge;
- practicing a broad repertoire of teaching strategies;
- practicing student–centred and collaborative learning methods;
- reflecting on their own practice (Beech, 2006; Bourgonje & Tromp, 2011).

The works published by OECD from 2011 and 2014 about the reviews of evaluation and assessment in education, involved many countries of the five continents: Mexico, Chile, the Netherlands, Sweden, New Zealand, Australia, etc.

In those documents, it is possible to find different views and domains considered as important features for future teachers. In the Netherlands, each university must support pre–service teachers to foster seven main competencies: interpersonal competencies; pedagogical competencies; subject–specific and didactical competencies; organisational competencies; competencies to cooperate with colleagues; competencies to cooperate with the environment; self–reflective and developmental competencies (Nusche *et al.*, 2014, p. 101; source: website of the Education Cooperation, www.onderwijscooperatie.nl).

In New Zealand, there are nine main domains: professional knowledge; professional development; teaching techniques; student

management; motivation of students; *Te reo me ona Tikanga* (continuing to develop understandings and skills in the appropriate usage and accurate pronunciation of *te reo Māori* and demonstrating an understanding of basic Māori protocols when opportunities arise); effective communication; support for and co–operation with colleagues; contribution to wider school activities.

The last example comes from Chile: preparation for teaching; creation of an environment favouring the learning process; teaching that allows the learning process of all students; professional responsibilities. Of course, each of these domains is specified in detailed sub–competencies.

Comparing these examples, we can find similarities and differences. From an intercultural teaching point of view, new teachers should be curious and wonder: in which domain can I consider myself as an expert? And, in which domain, should I improve myself as a professional? The answer is included in the idea of global competence.

4. Towards Global competence

"Global competence starts with the capacity to investigate and connect to the world: that is, to be aware of and interested in the world and its workings" (Loveland, 2010, p. 12).

The development of global competence requires some fundamental attitudes: the ability to recognise and weigh perspectives, in particular, students show global competence when they are able to recognise how their own worldviews as well as those of others are shaped by cultural, religious, economic or historical forces.

Already in 1993, Watkins underlined the importance of "educating more human beings to be aware of different systems of beliefs". And he adds that schools and universities should include an international perspective to their curricula, educate their professors in global issues, and provide exchange programmes and internships for their students (Watkins, 1993, p. 13).

More recently, International organisations have accentuated the importance of "global competency or global competence (OECD, 2016a, 2016b) and global citizenship (UNESCO, 2014) and emphasised that education systems needed to deal with global challenges" (Sälzer & Roczen, 2018, p. 6).

From the priorities listed in the Education & Training 2020 — EC Strategic Framework and through the launch of a new test in the PISA Framework in 2018, it is clear that Global Competency is at the forefront of the European and international agenda in enabling us to 'live harmoniously in multi–cultural communities' (OECD, 2018).

Ultimately, in what way can global competence be defined? This concept can be considered as a relatively young construct. Although, it has been used in common language for many decades, in the scientific context it is not clearly defined or rather

> a unanimous definition of global competence cannot yet be identified. There is, however, a general consensus on the assumption that global competence comprises the three dimensions of knowledge, skills and attitudes and can be described accordingly (OECD, 2016a; Reimers, 2009). Different theoretical approaches vary in the selection of these subdimensions and what names they are given, but there is considerable overlap. For example, Reimers' (2009) approach focuses on a positive attitude towards cultural differences, on foreign–language skills and knowledge about globalisation. In its most recent publication on global competence, the OECD (2016a) defines a set of skills and attitudes as components of the construct, that is: analytical and critical thinking, knowledge about and understanding of intercultural and global topics, as well as openness and respect for cultural diversity (Sälzer & Roczen, 2018, p. 7).

The definition that the OECD (2018, p. 7) proposes is as follows: "Global competence is the capacity to examine local, global and intercultural issues, to understand and appreciate the perspectives and world views of others, to engage in open, appropriate and effective interactions with people from different cultures, and to act for collective well–being and sustainable development".

5. Intercultural teaching for International teachers

Given this idea of the concept of global competence, which are the main challenges for teacher education programmes? We can identify three central issues: mobility, intercultural learning and intercultural teaching.

The first topic is clearly stated in the *Common European Principles for Teacher Competences and Qualifications*, where the authors indicate the teaching profession as a mobile profession: "mobility should be a central component of initial and continuing teacher education pro-

grammes. Teachers should be encouraged to participate in European projects and spend time working or studying in other European countries for professional development purposes" (EU, 2005, p. 3).

The mobility for both in–service and pre–service teachers becomes a key moment for their professional growth and development. Teacher education institutions should arrange and economically support several opportunities to mobilise teachers in order to reinforce a broader idea of teaching and learning environments.

Within teacher education, short–term mobility programmes are being seen as a possible way of developing a new generation of teachers as interculturally capable of working with increasing student diversity in their classrooms (Hepple *et al.*, 2017; Santoro, 2014). In addition, a student mobility programme offers preservice teachers the opportunity to step outside such taken–for–granted beliefs about themselves and "others", and can lead to intercultural learning (Allard & Santoro, 2006).

The second topic has just been defined "intercultural learning" because new teachers need to see different kinds of learning in several varieties of educational contexts.

Intercultural learning can be considered as a plural learning process developed within a context where students and teachers should be enabled to communicate successfully with people from diverse linguistic and cultural backgrounds, and so–called intercultural competence should be fostered in all educational settings according to the White Paper on Intercultural Dialogue (Busse & Krause, 2016; Council of Europe, 2008).

The Intercultural Learning T–kit specified the definition of intercultural learning:

> it is about learning how we perceive others who are especially different from us. It is about us. It is about our friends and how we work together to build a just community. It is about how communities can inter–link to promote equality, solidarity and opportunity for all. It is about fostering respect and promoting dignity among cultures, especially where some are in the minority, while others are in the majority (Gillert *et al.*, 2000, p. 97).

Within the framework named Developmental Model of Intercultural Sensitivity (DMIS), intercultural learning

> is seen as a development of more sophisticated worldviews, a development of more complex categories for the perception of the world. In this sense,

> intercultural learning implies an increasing awareness of cultural differences and similarities and a growing sensitivity of the cultural imprints of one's own perceptions. Intercultural learning has to be seen, therefore, as a long–term, multifaceted and challenging process (Leutwyler *et al.*, 2014, p. 287).

For these reasons, teachers need to be better prepared to teach in culturally diverse classrooms (Hachfeld *et al.*, 2015; Hollins & Guzman, 2005; Vedder *et al.*, 2006) and we can pass to the third essential topic: intercultural teaching.

Intercultural teaching represents the competence of teachers who are able to create a world in a classroom. The question is not whether to have foreign pupils or not in the classroom but, rather, to create the conditions that allow pupils to develop plural multifaceted learning considering multiple points of view.

Each classroom is an intercultural classroom because all pupils are different and their needs are unique. Even in the absence of a "formal" intercultural need, that is, with only pupils born and grown up in the same country, the classroom would be intercultural.

Of course, in contemporary society, intercultural teaching competencies are more evident since we can meet several cultures and ethnical groups in the same classroom. So, we can state that intercultural teaching competencies include teachers' attitudes, cultural responsiveness, curriculum and instruction, intercultural communication, and critical orientations (MacPherson, 2010).

The decisive step is to connect a broad idea of intercultural learning with a wide concept of intercultural teaching.

The internationalisation process of teacher education curricula is directed towards the professional growth of intercultural teachers. Consequently, trainee–teacher mobility is not motivated by a simple enlargement of teachers' horizons, just like a nice trip to an exotic and fascinating country. On the contrary, new student–teachers need to experience and taste different kinds of school organisations and learning environments; exchange/sharing ideas about teaching methods and assessing strategies; develop multicultural/intercultural ideas of teaching; develop themselves as professionals; create international networks of teachers; avoid a provincial/parochial educational mentality; avoid believing that there is only one way to arrange a learning environment.

All these points can be developed in several ways: spending a

studying period abroad, including a meaningful period of teaching practice; through virtual exchanges among different institutions (https://europa.eu/youth/erasmusvirtual); also, staying at their own institution but, in this case, teacher educators should schedule activities that can improve and foster a broad idea of teaching and learning environment.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210234
pag. 39–48 (december 2018)

Teachers' professional learning and competence in the digital era

The DigCompEdu framework

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1. Teachers' professional learning

With teaching professions facing rapidly changing demands, today's educators require an increasingly broad set of competences. In particular, the ubiquity of digital communication and the endeavour to help students become digitally competent requires educators to develop their own digital competence. Results from international studies such as OECD PISA and TALIS have also emphasised that teachers' digital competence is a key variable for integrating digital resources into the teaching–learning process, and hence for promoting innovative pedagogies and learning settings. Highly qualified and competent teachers are essential to transform educational systems by means of mastering the technological and pedagogical knowledge and skills needed to effectively integrate digital technologies into day–to–day educational practice (e.g. Schleicher, 2015). The goal for teachers is not to learn how to run technological devices in the classroom, but to design and implement suitable pedagogies that use technology to better meet student needs (e.g. Almerich *et al.*, 2016; Guerriero, 2017).

Teachers can be seen as designers of learning, i.e. experts in the art and science of teaching effectively by employing and combining pedagogies to achieve desired learning goals. In this light, innovation in teaching practice becomes a cornerstone of teachers' ongoing efforts to address the challenges that emerge on a daily basis in a

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context undergoing constant change (Paniagua & Istance, 2018, p. 18).

Hence, fostering teachers' (digital) competence is recognised as a key element in improving the quality and efficiency of schools and remains a high priority on the European education agenda. As pointed out in the European Commission's Communication of December 2016 "Digital skills and competences need to be included in both pre– and in–service training of teachers and actively supported by school leaders" (European Commission, 2016).

In Italy, the Government's recent policy initiative on reforming the education system (National Plan for Digital Education –PNSD) embodies an awareness of teacher competence issues by aiming to (i) develop teacher training actions, (ii) support educational innovation, and (iii) promote digital culture for teaching (Law 107/2015, paragraph 58, letters "d" and "e").

Concerning teacher training for digital competence, the PNSD is linked to the Italy's three–year teacher training plan (IT: *Piano Nazionale di Formazione Triennale*). This centres on key strategies for overcoming the recognised weaknesses of the Italian school system and seeks to bring the system into alignment with international gold standards. These strategies are: (i) harmonising the training actions that individual teachers engage in within the school community; (ii) promoting and supporting collaboration at school level, local level, national level, and international level; (iii) ensuring the quality of training; (iv) framing teacher training as a key priority. With this plan, teacher training becomes fundamental throughout the professional life of educators in primary, secondary and IVET levels, and this could be a crucial factor for improvement and innovation in the Italian educational system.

In the field of the digital competence, the teacher training plan aims to ensure full and effective correlation between educational and organisational innovation and digital technologies. Furthermore, it promotes the use of digital technologies for teaching and learning, and furthers understanding of the relationships between digital technologies and (i) different learning environments (whether physical or digital, at school or at home), (ii) newly constructed school buildings, (iii) evolution in contents, including online production and distribution , (iv) evolution in digital competence (related to three dimensions identified in the PNSD: transversal, computational and as an active agent of social change).

The picture for educators in the higher education sector across Europe is quite different.

Firstly, their professional development does not seem to be a priority within the educational policies of European Member States; training hardly ever occupies a systemic role in such policies. In the few instances where it has been institutionally formalised, it is not organically linked to European policies.

At international level, there is a stark difference between countries like Norway, the United Kingdom and Spain, where training provision is present and plays a highly–integrated role within the university organisation, and other countries, where training initiatives are only partially present or totally absent. Italy is among the latter group, with no strategic plan for training educators in higher education; hence there is no guidance or support for technological innovation in teaching practice in universities.

Several authors have highlighted the need to consider the competences of educators in higher education. In the "Tuning Educational Structures in Europe" project, Gonzáles & Wagenaar (2003) classified competence into two levels: general (instrumental, interpersonal, systemic) and specific (know, know–how and know how to be, know how to transcend). Referring to this work, Epasto (2015) extends and adapts these competences to the Italian context, referring to (i) organisational and planning competence; (ii) disciplinary and teaching competence; (iii) communication, interpersonal and psycho–pedagogical competence; and (iv) digital competence. Specifically, the digital competences of educators in higher education include (i) how to manage ICT during educational activities; (ii) how to create, manage and use social networks and tools in a learning context; (iii) how to create and distribute asynchronous presentations and training sessions; (iv) how to provide useful information to students on tools for managing their organisational activities and for learning; (v) how to manage online assessment tools; (vi) how to use digital technologies to cooperate and collaborate online, e.g. by sharing files or documents; (vii) how to organise and manage courses on LMS platforms. These competences can form the basis for creating a multiform and flexible professional profile via which educators develop the ability to change and innovate in the different situations that the institutional university context inevitably involves.

Although concepts of professionalism are often highly individualistic and assumed to reside in the knowledge and capabilities of

individual teachers, Paniagua & Istance (2018) bring the discussion forward and refer to teachers as "connected professionals", highlighting how teachers' professional competence is not reducible to a set of individual traits but strongly depends also on collaborative learning and design, and on active networking. Teachers in school networks are continuously in contact with a large community of practice and other resources that provide essential support for their professional development.

2. Defining teachers' digital competence: examples from around Europe

At national and international level, a number of frameworks and self–assessment tools have been developed over recent years. These describe the different facets of digital competence for educators and help them assess their competence, identify their training needs and offer targeted training opportunities. If planned and developed appropriately, comprehensive frameworks that define and describe the digital competences teachers are expected to deploy can bring numerous benefits to education systems: they can highlight the professionalism/knowledge/skills that are unique to teachers; encourage teacher self–reflection; and provide a shared and sound basis for the planning and provision of appropriate, coherent, career–long opportunities through which every teacher can acquire and develop the competences s/he needs.

Initiatives at national level include the *"Common Digital Competence Framework for Teachers"* (INTEF, 2017). This has been developed and supported by the Spanish Ministry of Education, Culture and Sport, and coordinated by the National Institute of Educational Technologies and Teacher Training (INTEF). The framework is based on "The European Digital Competence Framework for Citizens" (Vourikari *et al.*, 2016) and includes five areas and descriptors developed for the 21 competences listed. The Framework for Teachers defines three overall competence progression levels (A, B and C), each of which is further subdivided in two sublevels (A1 and A2; B1 and B2; C1 and C2).

With a view to acknowledging and certifying teachers' levels of digital competence, an *online portfolio of digital competence of teachers* has also been implemented that is associated to the framework. The

portfolio (in Spanish) consists of 3 main sections:

— *Biography*, including the self–assessment tool, which is the essential part of the service. In addition, a timeline shows the experience of teaching in the field of pedagogy and digital learning;
— *Teachers dossier of digital competence*, where teachers collect real and verifiable evidence of the level reached in the self–evaluation;
— *Digital Competence Passport* (the result from the previous two sections), a printable, upgradeable and shareable document that teachers could submit to any educational administration or entity for validation.

Similarly, *The Professional Digital Competence Framework for Teachers* produced by the Norwegian Centre for ICT in Education (Kelentric *et al.*, 2017) depicts the essential elements of the professional digital competence of teachers. Although it is based on national strategies and guidelines, this framework provides an overall approach, in which extensive and complex teacher competence is viewed from a digital perspective.

The framework consists of seven competence areas:

— *Subjects and basic skills*, focusing on how digital developments are changing and expanding the content of subjects;
— *School in society*, analysing different perspectives on digital developments and the importance and function of digital media in today's society;
— *Ethics*, for understanding schools' core values in relation to digitalisation in society;
— *Pedagogy and subject didactics* concerning the acquisition of pedagogical knowledge, as well as knowledge of subject didactics relevant to the practice of teaching in a digital environment;
— *Leadership of the learning process*, looking at the capacity to effectively guide learning work in a digital environment;
— *Interaction and communication*, covering the use of digital technologies for information, collaboration, and knowledge sharing with various stakeholders in a way that builds trust and contributes to participation and interaction;

— *Change and development*, focusing on awareness that the development of digital competence is a lifelong, dynamic, situational and flexible process.

Developed at international level in the context of a policy pilot (Erasmus Plus initiative), the MENTEP framework (and related self–assessment tool TET–SAT)[1] depicts four dimensions of digital pedagogical competence: *digital pedagogy*, *digital content use and production*, *digital communication and collaboration*, *digital citizenship*. These are divided into 15 sub–areas and 30 competencies.

In MENTEP, each competence is illustrated by five statements describing relevant practical pedagogical situations at five competency levels. Users read the five statements, reflect on their actual teaching practice, and select the one that most closely matches their own pedagogical behaviour. In order to provide a competency score, each of the five statements represents one competency level (from starter to expert). After answering the self–assessment questionnaire, teachers receive feedback on their competency level and links to national and European platforms of online training resources. Beyond triggering self–reflection, the intention behind MENTEP is to increase teachers' awareness and foster a change in their attitudes towards technology as a support of learning and teaching.

Overall, these models highlight pedagogy as the backbone of teachers' professional digital competence, entailing an understanding of the nature of students' learning process and teaching practices. Moreover, they are broad based, meaning that they can be applied to all teachers in the education system, from primary to higher education.

3. The European Digital Competence framework for Educators (DigCompEdu)

In order to reinforce regional and national initiatives and to provide a common understanding of educators' digital competence, a European–level digital competence framework for educators is clearly needed. To this end, the European Commission's Joint Research Centre has developed the Digital Competence framework for Educa-

1. http://mentep.eun.org/home.

tors (DigCompEdu), a conceptual tool that systematically maps out educators' digital competencies (Redecker, 2017; Bocconi et al., 2018).

The framework embraces twenty–two different educator–specific digital competences falling within six different spheres. The emphasis is not on technical skills. Rather, the framework focuses on the various ways educators leverage digital technologies to enhance and innovate teaching practices, learning processes and educational outcomes. Hence, DigCompEdu domains encompass a number of the crucial aspects of teachers' professional digital competence discussed in the previous sections, including:

- *Teaching and learning* — planning for and implementing the use of digital devices and resources in teaching; enhancing effectiveness and appropriately managing and orchestrating digital teaching interventions;
- *Digital resources* — finding, creating and sharing resources that are tailored to the learning context and individual learners' needs;
- *Empowering learners* —supporting classroom differentiation and personalised education, boosting the active involvement of learners;
- *Assessment* — innovatively leveraging the potential of digital tools for enhancing assessment and feedback;
- *Facilitating students' digital competence* — preparing learners for life in the digital age;
- *Professional engagement* — enhancing and opening up communication and collaboration strategies, both within and beyond the organisation.

The DigCompEdu framework is based on the analysis, mapping and clustering of constituent elements comprising educators' digital competence, as detailed in existing national and international frameworks, self–assessment tools and certification schemes. The reference model thus generated was then subjected to extensive stakeholder review and further complemented by the incorporation of six different proficiency levels.

The DigCompEdu framework provides a common language and approach that can help foster dialogue and exchange of best practices across Member States.

4. Developing self–reflection and self–assessment tools devoted to teachers' digital competence

In order to help educators in primary, secondary, initial VET and Higher Education reflect on and assess their individual level of digital competence, a self–assessment tool named DigCompEduSAT is to be developed based on the conceptual model described above. This is to be an online questionnaire which, when completed, generates an instant diagnostic report identifying the respondent's digital competence profile. As well as detailing the educator's current strengths, DigCompEduSAT will highlight areas in which personal progress can be made and outline possible steps forward in competence development. Beyond serving individual respondents, the tool is also intended to be of use to other education stakeholders, including teacher educators and trainers.

Localised versions of the DigCompEduSAT prototype tool will be tested during Spring 2019 in five Member States (Italy, Spain, Portugal, Estonia and Finland), involving a total of around 900 teachers at different levels. Further validation will emerge from case studies (interviews and focus groups), which will generate qualitative data and recommendations for fine tuning the final release version of the tool.

In Italy, the pilot initiative is being organised and conducted by the National Research Council, Institute for Educational Technology (CNR–ITD)[2]. This builds on CNR–ITD's successful experience in running pilot testing activities for SELFIE, a tool designed for schools' self–assessment of their digital capability[3]. The DigCompEduSAT piloting in Italy will involve different actor and stakeholder groups. To ensure solid local support for educators during the pilot implementation, a network of local coordinators will be established, principally involving two regional–level education authorities (USR Umbria and USR Calabria), two Institutes of Educational Research (INDIRE and IPRASE), two higher education institutions (SCIFOPSI at University of Florence and DISFOR at the University of Genova) and an educational foundation run by the Intesa San Paolo Bank (*La Fondazione per la Scuola, Compagnia di San Paolo* within the context of the Reconnections project). Working jointly with CNR–ITD, the

2. http://digcompedu.cnr.it.

3. http://selfieitalia.it.

local coordinators will (i) activate their local networks of schools and departments, informing educators about the DigCompEduSAT pilot in Italy, and (ii) support educators' engagement in the self–assessment process during the implementation phase.

Finally, to introduce educators to the key concepts of the DigCompEdu framework and help them (self)reflect on their current practice, the European Commission's Joint Research centre has also developed a complementary tool named DigCompEdu Check–in. This online questionnaire for self–reflection, also based on DigCompEdu, mainly focuses on teachers' self–perception of their competence and provides them with suggestions and feedback on how to further enhance their digital competence.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210235
pag. 49–61 (december 2018)

Digital competences in teachers' training

A glance on critical issues and a focus on Brazil

Giovanna Del Gobbo, Laura Viera Pizzi*

1. Digital revolution and impact on teachers' training: a global perspective

If the digital revolution has penetrated many aspects of society and the economy, profoundly transforming our lives, the impact of digitisation is yet to have a truly transformational effect on education. The digital revolution has necessarily influenced the scholastic world for more than two decades, with implications that have been considered in the plans for teacher training, at national and international level (Bocconi, 2006; MAIR, 2018; Midoro, 2005; UNESCO, 2003; Wilson, 2014), but, as pointed out also in a recent Position Paper of the Lifelong Learning Platform, despite an increase in use of digital technologies and related methodologies, the ways in which they are applied in education does not show a real renewal and effectiveness (LLLP, 2017). The revolution has involved the school mainly through the informal, and often overestimated and inappropriate, skills of students developed in daily life, but not yet substantially through the skills of professionals.

Some studies indicate that teacher training on these new educational resources has not proved entirely adequate to the challenges (Balanskat, Blamire & Kefala, 2006; Galanouli, Murphy & Gardner, 2004; Llorente, 2008; Ranieri & Bruni, 2018a; Ranieri, Bruni & Orban de Xivry, 2017; Waite, 2004), often because it has focused more on the mastery of technological devices, rather than on their use within a clear pedagogical approach, thus losing the significance itself of the devices. The integration of these resources into educational practices

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is not achieving the expected results despite their potentialities, as an OECD study of 2015 confirm:

> no appreciable improvements in students' achievement in reading, mathematics or science in the countries that had invested heavily in ICT for education. And perhaps the most disappointment finding of the report is that technology is of little help in bridging the skill divide between advantaged and disadvantaged students [. . .] students who spend more than six hours online per weekday outside of school are particularly at risk of reporting that they feel lonely at school [the impact of technology on education delivery remains sub–optimal, because we may overestimate the digital skills of both teachers and students, because of naïve policy design and implementation strategies, because of a poor understanding of pedagogy [. . .] we need [. . .] to provide educators with learning environments that support 21st century pedagogies and provide children with 21st century skills they need to succeed in tomorrow's world. Technology is the only way to dramatically expand access to knowledge (OECD, 2015, pp. 3 – 4).

Teachers are the key to successful ICT in education: investing in the technology alone is not enough and teachers need the skills to use the tools.

Teachers are aware of this. Two surveys of the OECD *Talis Survey*, in 2008 and 2013[1], underlined that lack of knowledge or skills is a barrier to integrate ICT into educational practices. This means that teachers do not perceive to master ICT and they still require training to integrate these new educational resources. Probably the perception of "incompetence" increases with the development of ICT, which is much faster and more widespread, compared to skill development times. So ICT area was at the first place of teachers' training needs in 2013 OECD *Talis Survey*, overcoming special educational needs training, which was in first place in the same survey in 2008.

Therefore, detecting barriers and defining of characteristics of teachers' training needs appears essential to implement programmes of initial training and continuous training in ICT, so that these devices can be effective and effectively incorporated into teaching practices.

The main aspects to consider seem to be: a) lack of training on pedagogical approach for effective attention to technology; b) poor adaptation of training programmes to the real knowledge and

1. The results of the 2018 OECD survey have not yet been published, but it is possible to assume that, in the face of policies to strengthen ICT in schools and the informal skills of students, the perception of training needs on ICT have increased.

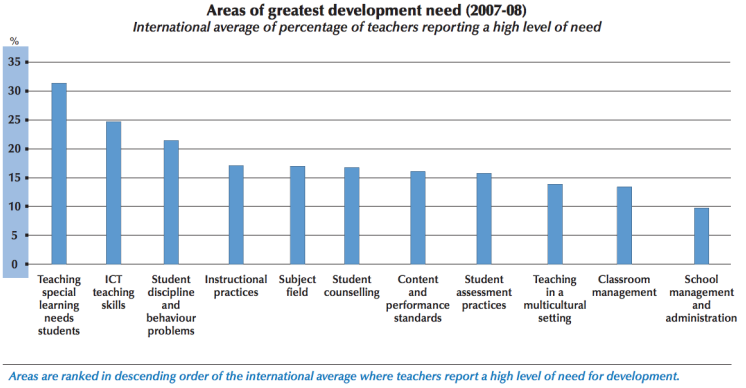

Figure 1. Teachers' training needs 2008. Source: OECD 2009, *Talis* 2008 Table 3.4.

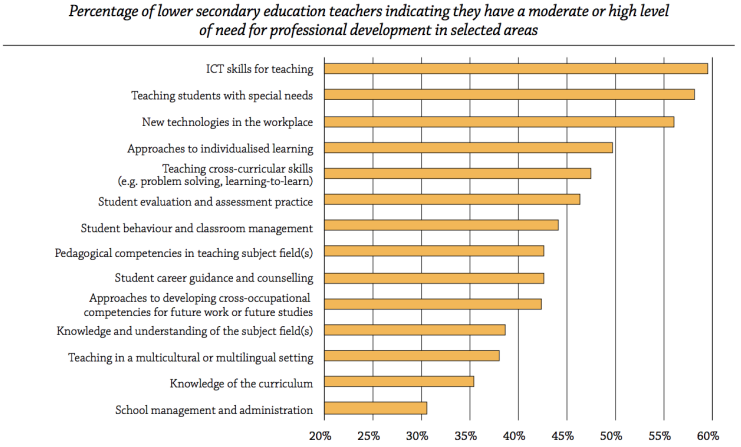

Figure 2. Teachers' training needs 2013. Source: OECD 2014, *Talis* 2013 Table 4.12 Web.

skills of teachers, including informal, with regard to their use of technologies; c) the perception of a burden of work and the identification of the lack of time as a motivation to carry out innovations using ICT, and a consequent inadequate follow–up of their use in the classroom; d) contextual factors related to structural and infrastructural problems (space, connections, tools, ...) related to accessibility, technical support; e) leadership support or lower level

of commitment by school principals about their teachers' lack of ICT knowledge and skills; f) personal experiences and teacher thinking variables as constructivism teaching beliefs, teacher self–efficacy, computer self–efficacy and computer attitudes; g) teacher workload, institutional characteristics, professional development (Aslan & Zhu, 2016; Bingimlas, 2009; Buabeng–Andoh, 2012; Pelgrum, 2001; Trucano, 2005, 2016). Finally, it is possible to synthesise the factors (barriers) that discourage the use of ICT by teachers classifying into teacher–level, school–level and system–level barriers.

In recent years there have been many research projects that have investigated at international level the training needs of teachers for the integration of ICT in teaching (Alazam, Bakar, Hamzah & Asmiran, 2012; Foley, 2016; Naufal & Yosuff, 2014; Ramadan, Chen & Hudson, 2018; Ranieri & Bruni, 2018b; Trucano, 2016; Trucano & Dykes, 2016[2]; Wilson, 2014) and at the same time international and national policies encourage the strengthening of teacher training to produce and raise the number of knowledgeable and skilled students (Enochsson & Rizza, 2009). International organisms are monitoring the ICT use in education through international surveys, exploring possibility to harmonise approaches to data collection and proposing sets of common 'indicators', acknowledging that ICT can offer possibilities for accelerated learning and improved management and accountability of education systems (EduTech Group, 2010; Freeman & Hawkins, 2017; WB, 2011). ICT investments in education have been considered, for years now, as cross–cutting issues that may help accelerate learning[3], although much better monitoring and evaluation is needed to assess their impact and cost effectiveness (EduTech Group, 2010). In OECD countries[4], research consensus holds that the most effective uses of ICT need teachers as central to the learning process. Teacher training and continued, on–going relevant professional development, are essential. The existence of ICTs does not transform teacher practices in and of itself. Teachers' pedagogical practices and

2. World Bank surveys and publications on ICT/education, starting from 2001, has issued a global knowledge base on the use of ICTs in education in developing countries. Publications are available in http://www.worldbank.org/en/topic/edutech/brief/education\T1\textendashand\T1\textendashtechnology\T1\textendashpublications.

3. ICT use in education is a part of the multisectoral approach of Education Strategy 2020 of World Bank Group.

4. OECD surveys often include other countries, including Brazil, to provide benchmarking opportunities and measurements on their performance.

reasoning influence their uses of ICT, and the nature of teacher ICT use impacts student achievement (Trucano, 2016).

Therefore, the professional development of teachers (TPD) appears crucial. To be effective and successful, the professional development of teachers must be not only of quality, but relevant to the needs of teachers and consistent with context. No amount of ICT can compensate for TPD and training programmes that do not take into account contextual difficulties, may not determine the expected results. The effectiveness of TPD begins with an understanding of the needs of teachers and their work environments, schools and classrooms. The role of universities is relevant: not only for teacher training (initial and continuing), but also to investigate and to monitor processes and to detect enabling and hindering factors at the three levels mentioned above: teacher–level, school–level and system–level.

In this framework, in the following paragraphs we present an example of research on the barriers for the use of ICT in the school, through the first results of a research, still in progress, by the University of Alagoas in Brazil.

2. ICT in the Brazilian educational system and in the curriculum

Since the end of the 20th century in Brazil, the educational system has been witnessing the implementation of public policies to encourage the use of Information and Communication Technologies (ICT) in public education at all levels. These policies involve from implantation of computer labs in schools, teacher training and the establishment of Distance Education (DE) modality. The inclusion of ICT was made possible through the Education Law of 1996.

The Ministry of Education Programme called PROINFO (National Educational Technology Programme) is a government initiative aimed at promoting the pedagogical use of information technology in the public basic schools, both in urban and rural areas. The idea has been to create computer labs in schools, equipping them with desktop computers, digital resources, wired and wireless networks and educational contents in schools. This initiative had the intention of encouraging teachers to use the computer as didactic support in their classes.

However, it was from the beginning of the 21st century that these

public policies gained momentum, especially in Universities, where they began to gain volume, through teacher education programmes, mainly with the use of ICT in digital platforms such as Moodle, as well as other technological resources. In this sense, the possibility of offering semi–presence disciplines in regular university courses was included.

In 2006, the Open University of Brazil (UAB) was created to develop the Distance Education modality throughout the Brazilian federal university system, "in order to expand and internalise the offer of courses and programmes of higher education", more specifically, in public higher education institutions, developing distance education poles in strategic locations that had low Human Development Index (HDI) and low Basic Education Development Index (IDEB), or those far away or isolated, as a way of creating permanent EAD educational centres. In this sense, the mains objective of UAB System would be to contribute to the initial education of Basic Education teachers, who have the legal requirement of a higher education certificate to teach.

Another goal of the UAB System, besides promoting distance education for teachers in higher education, would be to support innovative research and methodologies with the use of ICT, aimed at teaching practice. Currently, UAB System has 109 Public Institutions of Higher Education offering 800 courses in 771 poles distributed throughout the national territory. The government, until 2015, was providing financial support, in integration to the infrastructure, through scholarships for teachers in activity in classes of public basic education supporting the senses of academic activities of the courses. Today, all disciplines of Higher Education regular courses can have up to 20% of the time of teaching, developed in a non–presence way, mainly through a Moodle platform. With this massive growth of distance courses and the possibility of semi–presence disciplines and distance courses, several courses of post–graduation courses began to appear.

Also, several courses of Pedagogy in the country included ICT disciplines in their curriculum, with the intention of training teachers with these new technologies. As in Master and Doctoral courses, when they do not offer programmes totally focused on ICT research in education, as is the case of the Post–Graduation Programme in Informatics in Education of the Federal University of Rio Grande do Sul (UFRGS), some universities have created ICT lines and groups

of research in the Programmes, such as the Post–Graduation Programme in Education of the Federal University of Alagoas (UFAL). These are just a few examples of so many other programmes across Brazil that are directing their efforts to democratise ICT in teaching and improve its use in classrooms. The role of universities and research groups has been crucial for the training of teachers, orienting toward a qualitative use of ICT with their students. Non–presence teaching activities have been, in fact, one of the most important forms that the Brazilian educational system has found to offer digital inclusion in a broader way.

In addition to Distance Education through ICT, already expanding in Higher Education, the National Curriculum Guidelines for Basic Education (2013) create rules for Distance Education in the curriculum of High Schools and Youth and Adult Education. In fact, young people are the ones who have better appropriated ECT, both as a way of expressing themselves personally and as a way of exercising their citizenship. And technology resources, such as personal computers, tablets and smartphones, have spread very rapidly in this population. Today, smartphones accessing Wi–Fi networks have favoured access to Blogs, Facebook, Twitter, WhatsApp, Instagram, Google, e–mails, YouTube and many others, allowing the use of the most varied forms of language, learning and interactions. Lucena (2016, p. 284) cites the work of Serres, who calls these youngsters "little thumbs", for their intense use of thumbs in cell phones and tablets, mostly.

To a large extent, the High School and Higher Education could be considered the natural places for the insertion of ICT in the pedagogical process, promoting the digital technologies inclusion among Youth and young adults. According to Lucena (2016), using data of Cetic.br (ICT households) in 2014 in Brazil, 84% of population had a cellular device, but only youngsters between 16 and 24 years old (93%) use it to share photos, videos, download applications, access e–mails and do research on Google.

2.1. *Falling into the "real reality" of schools*

Despite all this progress and huge investments in ICT in Brazil since the end of the 20th century, some problems still do not seem to be solved at all. So there are still huge challenges to be faced. Among them we highlight some of them that we consider priority today.

Despite the effort to create computer labs in elementary edu-

cation throughout the national territory, some schools face serious problems of infrastructure to receive the equipment, such as electrical structure, adequate air conditioning and internet access, and not always hold the whole class, because they are very small or the classes are too big. Santos (2017) carried out some research with teachers of Youth and Adult education and found that for a large number of teachers, computers are considered to be very precious and can be damaged by being handled. For this reason, there are a lot of security concerns with the lab and the equipment, which are in locked rooms, making it difficult to access and to the possibility of demystifying its use and creating a closer relationship with computers for teachers and students as well. There is probably fear of having to pay with one's own, and already scarce, salary, any damage that may occur during use. There is also fear of theft, very common in periphery public schools.

There is also the generational cultural barrier, as we have already pointed out. Teachers do not use ICT in their daily lives as the younger generations. There are many difficulties in realising all the potential that can be used pedagogically in classroom, which demands a great deal of effort, which does not always reflect positively on students' learning (Santos, 2017). For these reasons, teachers may end up seeing ICT as an additional task to be undertaken without adequate help, which leads to the intensification of their work. Some devices, if not well regulated with some usage rules, can make the teacher 24 hours online and totally available to their students, such as WhatsApp Groups which are very spread in all areas in Brazil, affecting the quality of their private life.

Another difficulty in the use of ICT is that although they are already included in teacher education courses as formal and often–compulsory subjects in curricula, they are still being taught in a very traditional way, disconnected from other disciplines and distant from the educational, social and cultural reality, as well as being uncritical. What should be different and innovative, ends up becoming the same (Lucena, 2016). In fact, instead of stimulating the autonomy necessary to develop pedagogical activities in digital media, they tend to stimulate more the isolation of students. This isolation creates difficulties that discourage their use and may lead to dropping out of the course, especially in Distance Education courses.

3. Conclusion

Although the use of ICT in education is considered an irreversible process, there are, for all these reasons, many doubts about the improvement of educational quality after its introduction in Brazil. In the case of Distance Education courses, this concern is aggravated, since the intention to take the courses away from the urban centres, where there is no culture of ICT use, its benefits fall short of in–presence and regular courses, in addition it may end up reinforcing further social isolation, already increasing in contemporary urban societies.

Finally, the financial investment in equipment, computers and labs seems to have favoured more companies that negotiated with government, than the schools that received them, generating a certain discredit among school community members. It is already clear that it is not enough just to make the labs and equipment available in schools. There are pedagogical and cultural factors that still need to receive more attention so that the full potential of ICT can be qualitatively improved and used in classrooms in Brazil.

The reflections about the experience of the University of Alagoas confirm that the introduction of ICTs to aid education is part of a larger change or reform process and will need an integrated, holistic approach, capable of simultaneously considering the three levels and acting on the enabling factors:

a) evaluating the needs of the contexts and of the system as a whole, for planning and programming professional development activities of teachers;
b) monitoring the impact and defining the feedback circuits, to understand if professional development is effective and functional for the needs of innovation and use of ICT in the school system
c) strengthening the integration between pedagogical theories and use of technologies, redesigning the curriculum and the ability to evaluate the teaching processes implemented;
d) supporting school administrators and, in some cases, the surrounding community;
e) providing three phases for professional development: pre–service, focused on initial preparation on pedagogy, mastery of subjects, management skills and use of various educational

tools (including ICT), approximating the classroom environment as much as possible; in service, including structured face–to–face and distance learning opportunities, based on pre–service training and directly relevant to teachers' needs; and pedagogical and technical support, formal and informal, enabled by ICT, for teachers, aimed at daily needs and challenges.

f) encouraging professional development activities, practices and behaviours supporting teacher collaboration: on this basis, the induction phase of new teachers in the school could have interesting developments, both in the university training phase then in the immediately following phase, and the "new" teachers can represent, if adequately trained, a lever for a critical and relevant integration of ICT in the school.

The "practical" instructions on the use of ICT are needed where ICT is already considered a relevant component of the teaching and learning process, in the awareness that without these technologies, it is impossible to actively exercise citizenship today, since it is present in all spheres of our lives.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210236
pag. 63–76 (december 2018)

Intercultural and media competences in teacher training from a European perspective

The MEET Toolkit

Maria Ranieri, Francesco Fabbro, Andrea Nardi*

1. Introduction

More than a decade ago the European Parliament and Council published a recommendation on key competences for lifelong learning (EU Parliament and Council, 2006). The meaningfulness of this document basically stands in that it shakes up the traditional paradigm of core competences based on literacy and numeracy, extending them to eight competences among which digital competence, social and civic competences, and cultural awareness and expression. In the recommendation, digital competence is defined as requiring "a sound understanding and knowledge of the nature, role and opportunities of IST [Information Society Technologies] in everyday contexts: in personal and social life as well as at work. This includes the main computer applications [...] and an understanding of the opportunities and potential risks of the Internet and communication via electronic media (e–mail, network tools) for work, leisure, information sharing and collaborative networking, learning and research" (*Ibidem*). This definition emphasises the reflective nature of digital competences including both cognitive (e.g. knowledge of computer applications) and metacognitive aspects (e.g. awareness of opportunities and risks), distancing itself from a merely technical understanding of digital skills.

As far as civic competences are concerned, they are "based on

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knowledge of the concepts of democracy, justice, equality, citizenship and civil rights, including how they are expressed in the Charter of Fundamental Rights of the European Union and international declarations and how they are applied by various institutions at the local, regional, national, European and international levels. It includes knowledge of contemporary events, as well as the main events and trends in national, European and world history" (*Ibidem*). According to this definition, the understanding of notions like democracy, justice, equality, citizenship, is key knowledge for future European citizens and requires the assumption of a national and international perspective to understand contemporary society.

Lastly, cultural awareness and expression "includes an awareness of local, national and European cultural heritage and their place in the world. It covers a basic knowledge of major cultural works, including popular contemporary culture. It is essential to understand the cultural and linguistic diversity in Europe and other regions of the world, the need to preserve it and the importance of aesthetic factors in daily life. [. . .] A solid understanding of one's own culture and a sense of identity can be the basis for an open attitude towards and respect for diversity of cultural expression" (*Ibidem*). Along with the capacity to critically understand digital media and the comprehension of civic values, cultural awareness and expression should enable future citizens to promote their own well–being and that of others. This competence requires an open attitude and respect towards cultural diversities not only looking at European society but more generally at the global world.

While teachers are clearly called through this recommendation to promote these new competences among their students, it is much more complicated to understand how teachers should develop knowledge in these new areas as well as how they should teach them to their students. And yet, when considering the contemporary resurfacing of racist discourses in the media and in broader society (Ranieri, 2016), it appears to be more and more crucial for our societies to support teachers and educators to face these challenges through appropriate training and tools. The European toolkit presented and discussed in this chapter was developed with the aim of providing teachers and educators with concrete means to develop their knowledge in the field of media, civic and intercultural education, and respond to the widespread social climate of intolerance which increasingly characterises our societies. The European toolkit was designed

and implemented within the framework of the EC–funded project "MEET, Media Education for Equity and Tolerance" (2016–2018), promoted by the University of Florence (Italy) in collaboration with the University of Vienna (Austria), the Peace Institute (Slovenia), Media Animation (Belgium) and medien+bildung.com (Germany). It was the result of some action research carried out between November 2017 and March 2018, involving 15 teachers and 141 students (aged 15–18) in six secondary schools located in Germany, Italy and Slovenia.

Prior to describing the MEET toolkit, more elements on teacher training policies on media, civic and intercultural education are provided in order to better contextualise the need for and the understanding of the toolkit itself.

2. Teacher Training on media, civic and intercultural education: looking at educational policies through the Italian case

In this paragraph, the authors summarise the main initiatives carried out in Italy in teacher training on media, civic and intercultural education.

2.1. *Media education*

Although Media Education is not explicitly mentioned in the school curriculum guidelines, in the last thirty years several documents have been issued by the Italian Ministry of Education (MIUR) recommending the educational use of media at school along with the need to enhance students' development of media education–related skills/competences. Indeed, since the 1990s the introduction of digital technologies in schools has increasingly become a priority of the educational policies in the country through a number of 'national plans' (e.g. MIUR, 1995; 2002; 2012) aiming at improving schools' technological equipment, enhancing student's ICT and digital skills/competences, and teacher training. More recently, the National Plan for the Digital School (NPDS) (MIUR, 2015) posited in explicit terms the development strategy of students' digital competences within the 'paradigm of education about media' and connected the acquisition of digital competences with the term "digital citizenship". Drawing in particular from the 21st Century Skills framework promoted by the World Economic Forum, the NPDS suggests that young citizens

"must transform themselves from (media) consumers to 'critical consumers' and 'producers' of digital contents". Hence, as claimed in the document, digital competence is key to enable a "full, active and informed citizenship". From this perspective, digital literacy is somehow presented as a new form of citizenship education aiming at "arming the citizen–consumer" (Wallis & Buckingham, 2013), or more precisely the "citizen–prosumer". At operational level, one key action of the NPDS consists of the creation of innovative scenarios for the development of applied digital competences on the basis of a competency–based teaching paradigm. In addition, the plan includes the definition of a common framework for students' digital competences; the creation of a research unit for 21st Century Skills; the introduction of computational thinking in the primary school and the updating of the technological curriculum of the middle school. Finally, and most importantly, the NPDS foresees the presence of an "*animatore digitale*" (digital entertainer or digital "edutainer") in each school with the responsibilities of ensuring the training of her colleagues on the subjects of NPDS, involving the school community in the innovation process and identifying innovative solutions.

2.2. *Intercultural education*

The first guidelines provided by the MIUR on the inclusion of non–EU students into the Italian school system go back to 1989 (MIUR, 1989). Between the 1990s and the 2000s, several institutional documents were issued sharing the emphasis on facing the 'emergency' to integrate students with migrant background in the Italian school system by 'solving' their linguistic and learning problems (Santerini, 2010). In other words, those documents were just loosely related to intercultural education and strongly characterised by an 'emergency approach' in which the presence of non–Italian students tends to be framed as a 'problem'. In this respect, *The Italian way for the intercultural school and the integration of foreign students* (*La via italiana per la scuola interculturale e l'integrazione degli alunni stranieri*, MIUR, 2007a) represents a notable exception. Indeed, the document better reflects a wider concept of intercultural education emerging from the academic debate. It reports a list of principles for intercultural education including foreign students' welcome and integration into the school; Italian as a second language as well as plurilingualism; relationships with foreign families and guidance; interventions

on discrimination and prejudice to link intercultural education to antiracism; an intercultural approach to the contents; and finally, the role of teachers and non–teaching staff. For this purpose, which is particularly relevant for the chapter, the document points out that a new vision of teachers' training inspired to intercultural values should be implemented in the educational system; such training should be based on reflective practices, openness to diversity and ability to understand the cultural background of the students.

This document is still the "pedagogical manifesto" of the current approach to intercultural education in the country as emerged from the new guidelines for the welcome and integration of foreign students (MIUR, 2014). Nevertheless, to some extent an 'emergency orientation' still persists with an emphasis on non–EU students' cultural assimilation.

2.3. *Citizenship education*

Historically, citizenship education in Italy has been tackled with regard to "civic education" (*"educazione civica"*), formally introduced into the school curriculum of middle and high school in the late 1950s (President of the Republic's Decree, 1958). The teaching of civic education was strongly value–oriented by the Constitution of the Italian Republic. From then till the 1990s civic education at school was mainly linked to political aspects. Subsequently, the idea of civic education was reframed in cultural rather than political terms. For example, the document Culture School Person (MIUR, 2007b) outlined an idea of a 'new citizenship' defined as a task consisting of the "offer of educational programmes supporting students in taking independent and useful decisions, as a result of a continuous comparison between their projects and the values of the society where they live". The emphasis is placed on the promotion of aware citizens, able to participate in the construction of multicultural society, combining respect of cultural identity with the idea of a wider community in a global context. More recently, the MIUR reshaped civic education in school as a (sub)subject named Citizenship and Constitution and located it in the field of history–geography and history–social science (Decree Law 137 of 1st September 2008). On a conceptual level the document reflects a wide notion of citizenship education in which liberal, republican and cosmopolitan (or multicultural) ideas of citizenship coexist. The law on the recent school reform (Chamber

of Deputies, 2015) also confirms the presence of 'citizenship education' in the school curriculum consistently with the Citizenship and Constitution document. Currently, the recent National Plan for Citizenship Education and Education to Legality (MIUR, 2016) delineates a strategy of promotion of citizenship–education projects in schools with partners from civil society but also from private business sectors. While systematic actions for teacher training on digital competences and the media have been promoted along with recommendations for preparing teachers to tackle cultural diversities, much fewer systematic actions or plans have been undertaken for teacher training on civic or citizenship education. This might be due to the fact that originally civic education was clearly associated with the teaching of history. However, the rise of new challenges for citizenship today, due to globalisation, post–colonialism and migration, calls for reflection and actions for teacher professional development in this area.

3. A European toolkit for media and intercultural education

The MEET toolkit is a multimedia product structured into four intertwined components: 1) a theoretical introduction about media and intercultural education; 2) a set of guidelines to guide the design of media education activities in/for multicultural contexts; 3) six Learning Scenarios including a wide range of pedagogical strategies and teaching resources; 4) an educational documentary, including three video capsules showing how media education can be taught in multicultural schools.

The idea of developing a European toolkit for media and intercultural education is rooted in a series of considerations. Firstly, there is a lack of instruments that teachers can easily use to seek inspiration on these topics for their teaching practices, especially thinking of tools able to connect different but bordering areas such as media, intercultural and citizenship education. From this point of view, the toolkit and its components can be seen as a self–training tool enabling teachers to understand how to facilitate students' understanding, expression and engagement with (or without) the media in multicultural schools. The design guidelines together with the videos showing how to implement the guidelines can increase teachers' professional knowledge in the field. Secondly, there is a scarcity

of educational resources that teachers can adopt to promote intercultural awareness, students' engagement as citizens, and media analysis and production in school. The Learning Scenarios included in the toolkit and the additional resources (e.g. worksheets, multimedia content, etc.) which are part of it, can be used as teaching materials ready for use. Thirdly, teachers need methodological guidance on new challenges to reshape their professional activities and renew their *repertoires* of practices. For this purpose, the toolkit can be viewed as a design tool which can guide the (re)design of their activities. Indeed, teachers can design new learning paths on the basis of the guidelines or use the guidelines to re–design their existing Learning Scenarios in order to adapt them to their students and contexts.

3.1. *The theoretical introduction and the guidelines*

The first two components of the toolkit are the *Theoretical Introduction* and the *Guidelines*. The *Theoretical Introduction* illustrates the Media and Intercultural Education Framework (MIEF), a theoretical tool developed to support teachers to better identify relevant objectives for media and intercultural education. MIEF is based on different research traditions (Ranieri & Fabbro, 2018). Firstly, it refers to media education studies, in particular to the works of Buckingham (2003) and Hobbs (2011), according to whom critical understanding and creative practices of media production are keys for media literacy education. MIEF also refers to the elaboration of Kellner & Share (2009), who underlined the importance of questioning dominant media representations, values, and ideologies, and Hooks' (1994) and McLaren's (1995) critical multiculturalism. Lastly, MIEF also includes civic values which are inherently linked to media education, evoking concepts such civic agency, participation, engagement and public sphere (Osler & Starkey, 2005). MIEF identifies four frames reflecting both media and intercultural education aspirations, and for each frame indicates specific educational objectives. Teachers and researchers can adopt this frame to identify relevant educational objectives for teaching media education in intercultural contexts (Figure 1).

Along with the theoretical framework, the guidelines support teachers in the design and implementation of inclusive media education practices (Ranieri & Fabbro, 2018). Combining the principles of Universal Design for Learning (Meyer, Rose & Gordon, 2014) with a

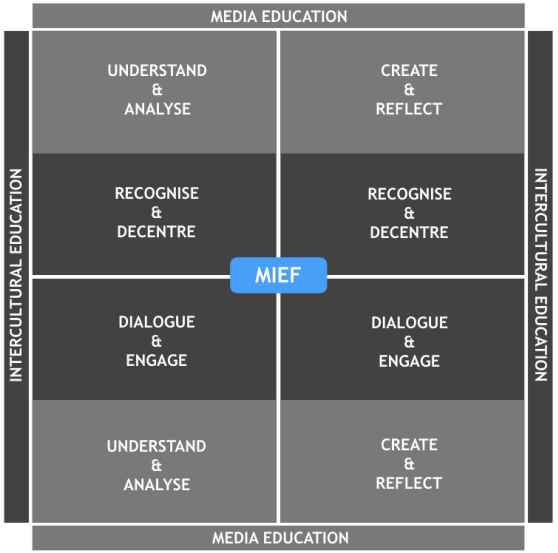

Figure 1. The Media and Intercultural Education Framework.

more contextualised approach based on socio–cultural educational practices (Vygotsky, 1978), they attempt to integrate media literacy education with inclusive strategies for addressing intercultural issues through media literacy education. More analytically, the guidelines indicate specific pedagogical approaches or techniques to facilitate students' understanding, expression and engagement with (or without) the media within intercultural contexts. Examples of these guidelines are: *Provide context and guidance for critical understanding* > Highlight patterns, critical issues, key ideas and relationships (e.g. emphasise key ideas; draw conceptual maps, give multiple examples and cues to underline critical issues and significant patterns; highlight existing skills and knowledge that can be used to analyse and evaluate media); or *Facilitate media making* > Adapt media languages and practice to students' communicative skills and habits (e.g. replace overly demanding media productions/practices with more sustainable ones; progressively integrate familiar and novel media languages and tools); or finally *Ensure opportunities to sustain participation and cooperation* > Enhance cooperation at various levels (e.g. support

opportunities for peer interactions and supports; encourage open dialogue and sharing of experience among teachers and students).

3.2. *The Learning Scenarios*

Six Learning Scenarios were designed dealing with different topics and media languages, as described below.

LS 1 — We are all equally different

The aim of this learning scenario is to raise awareness among young people with regard to the presentation of reality in media and radicalisation. Through the analysis of photographs, memes and videos the students understand the mechanisms of media and how to read between the lines. They learn what fake news is and receive tools on how to reveal this. They also produce posters that contain their slogan for an open and unbiased society. In this way students are guided to visualise their ideas about a future society and to express their views.

LS 2 — In my own words

This learning scenario aims at raising students' awareness of how political communication works, especially when dealing with migration. The first part focuses on political propaganda through a critical analysis of election posters and campaign commercials. The analysis lingers on how the communicative techniques employed in the political propaganda contribute to offer specific representations of different social groups and how they address specific audiences. The second part, instead, deals with the production of students' video statements for an open and unbiased society. The goal is that the students express their own, personal opinion in their own words and take up a position accordingly.

LS 3 — Challenge violence and play your rights

This learning scenario aims at encouraging students to make sense of different uses and forms of violence at stake in videogames and movies, as well as at scaffolding young citizens' ability to challenge violence – particularly violence against marginalised social groups –

in their own school community. In the first part, students critically analyse examples of videogames staging different violent actions and are involved in a detailed analysis of videogames to understand their grammar. In the second part, the young participants engage in a videogame design inspired by real episodes in which some human/equal rights are violated or strongly questioned.

LS 4 — Questioning news media representations of "others" through video–reporting

This learning scenario aims at promoting students' critical understanding of news, particularly referring to fake news circulating through the social media platforms around ethnic and cultural minorities, and to promote their capacity to express alternative narratives through video reporting. It starts with an introduction on critical understanding of news media and continues with a focus on audio–visual–language grammar. The second part aims at enabling students to create a participatory news media tool based on video–reporting with units on how to organise the collaborative work, how to find information and how to report about diversity in alternative ways. The learning scenario concludes with the publication of the collaborative and participatory video–journal.

LS 5 — Building a Diverse and Democratic Community

The learning scenario aims at providing students with skills and knowledge about living in a multicultural society and encourages their engagement for intercultural understanding. Firstly, students reflect on their personal and group identities and the reproduction of stereotypes in the media. In addition, here teachers guide students to recognise discrimination in everyday situations and face it through public campaigns. The second part facilitates collaborative work and development of students' own media production about discrimination and human rights. Specifically, students are invited to produce a pilot episode of a radio podcast to be disseminated in their school and/or in their local community.

LS 6 — Migration between Media Narratives and Digital Storytelling

The learning scenario aims at providing students with critical knowledge to make sense of different media representations and life situations concerning the phenomenon of migration. Furthermore, it intends to teach how alternative media narratives about migration can be developed through the technique of digital storytelling. The first part invites students to explore the relationship between the experience of migration (but also the way media portrays it) and the issues of discrimination, hate speech and human rights. The second part, instead, provides students with concrete opportunities to express themselves about the issue of migration through media messages and stories addressing in particular their peers in the school community.

3.3. The educational documentary

The learning scenarios were implemented in Germany, Italy and Slovenia. Three of them were also filmed in order to show teachers how to concretely carry out media education at school with intercultural purposes. The first video capsule explains how media education can facilitate students' understanding of media and intercultural relations, focusing on videogame education and human rights. It starts by demonstrating how the analysis of video games and movies representing different social groups, including migrants and refugees, in small groups can bring students to recognise the ideological and linguistic aspects of media representations, as well as to tackle the topic of human rights in contemporary society. Moreover, the video illustrates how students' involvement in the design of video games addressing the issues of equal rights can contribute to their critical understanding of media representations and social justice.

The second video focuses on how to facilitate students' expression through the media in order to make them able to address creatively and reflexively relevant cultural and social issues for contemporary societies. Firstly, it demonstrates how students can become familiar with audio–visual narratives and the subject of stereotyping through inspiring examples of videos. Then, it shows how video production, though simple, can lead students to express their voices about migration issues.

The third video concentrates on how students' engagement

through the media in intercultural communities can be promoted in the context of their classroom and school. At the beginning, it shows how the game of identities can improve students' awareness of their multiple identities and the multicultural condition of their classroom. Furthermore, the video documents how role play can be adopted as an effective pedagogical strategy to address stereotyping on ethnic minorities in the media. It concludes showing how the production of a radio podcast on diversity and human rights can provide students with an opportunity to contribute actively to the intercultural community building process in their classroom and school.

4. Conclusions

Teaching media and intercultural education is a significant challenge for teachers, especially in this particular historical period where democratic values such as tolerance, respect, equity and solidarity towards others are threatened by the (re)emerging of political racist propaganda. In this context, teachers need to be encouraged and supported in tackling these complex issues, and media literacy education could be an appropriate pedagogical strategy for these purposes. Training programmes, action research activities, and multimedia tools should be available for teachers to become more acquainted with the challenge of building an intercultural society and more skilled in the use and understanding of the media. The MEET toolkit was developed in this perspective. It was tested with teachers and students, and then revised. The next step is supporting its scaling up to increase the number of teachers who can benefit from it.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210237
pag. 77–89 (december 2018)

Online Teacher–Training and Development for Minor Migrants Education & Inclusion

Raffaella Biagioli*

1. European context and alone minors

Migration processes concern all European States, both the first reception countries, the so–called "frontier countries", and the destination countries of migrants (Biffi, Francia & Editing, 2018). In 2015 there were 88,700 requests for asylum in Europe, 23.1% of them were Unaccompanied Foreign Minors (MSNA). Italy is the third European country with foreign population, it has 5 million of foreign citizens in comparing to Spain with 4.4 million.

All foreign minors have the right to be enrolled in school (ONU Convention Rights, Strasbourg Convention) because the States ratified their enrollment in public schools with their own regulations to complete their education and training, particularly in secondary school, being for 29% under 18 years. In Italy, MSNA arrivals have considerably increased during the last five years, from 4,438 in 2010 to 25,800 today (EUROSTAT, 2017) and the migration phenomenon has undergone a significant evolution. This solicits the consideration that we are facing a new migratory dynamic: Italy is at the center of a crossroads of paths and flows coming and going that makes it a country in encounter and interculturality lived in society and in the school. A crossroads of paths that is made by the family reunification of groups that have long been resident in Italy, of departures from foreigners who have been living for a long time returning to their countries of origin, of children of immigrants born in Italy who have acquired citizenship or not, of young immigrants, trained in Italy who decide to leave and go to work elsewhere. In addition to this mobility there are the escapes, the journeys of those who are forced

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to abandon their land in search of a different and better destiny.

Reports from the Ministry of Education, University and Research (MIUR) regarding pupils with non–Italian citizenship (CNI), have been annually published in the last twenty years and they report the presence of foreign students in Italian schools (see also MIUR, 2014, which provides guidelines for foreign students' welcome in Italy).

It is a well–established fact that migrant students have become an integral part of the national school population, making increasingly multi–ethnic and multicultural the Italian school (Biagioli, 2016).

The unaccompanied foreign minor (indicated by the Italian acronym MSNA, which stands for *Minori stranieri non accompagnati*) for Italian legislation is a minor who does not have Italian or European citizenship, or who is for any reason in the territory of the State or who is otherwise subject to Italian jurisdiction, without assistance and representation from parents or other adults legally responsible for him according to Italian laws.

The number of minors without parental figures reported in Italy has more than doubled in the last five years from 5,984 admissions in 2009 to 18,303 arrivals recorded until December 2017. In the same period, minors who moved away from reception facilities have tripled from 1,754 to 6,357 or from 23% to 31% of young people reported.

The motivations that push MSNA to face the journey are multiple: escape from wars and persecutions, economic necessities, social hardship. In the national context, as well as children on the run and children driven by families who come with a "specific economic migration project" (Accorinti, 2014, p.14), there are young people attracted by new lifestyles or driven by a migration project that does not follow precise and structured routes but is determined by the economic possibilities, opportunities and vicissitudes that arise during the journey. The progressive increase of these minors starting from 2014 with the numerous arrivals by sea posed new problems for the reception, integration and organisational and educational management of the schools.

2. The project QuaMMELOT (Qualification for Minor Migrants education and Learning Open access — On line Teacher)

Unaccompanied foreign minors, as all foreign minors, are holders of the right/duty to education and training, regardless of citizenship

and regularity of their stay, but the abandonment of school–training paths is widespread.

Teachers need a methodological training to implement appropriate learning strategies and the project QuaMMELOT (Qualification for Minor Migrants education and Learning Open access — On line Teacher), which is here presented, promotes teacher education at European level to foster school inclusion, the well–being of alone children at school, intercultural competences and the design of modalities for reception in the classes to improve the participation and learning of alone children (Biagioli, 2018; Biagioli, Gonzáles Monteagudo & Petruzzi, 2018). The perspective here is that of teachers' internationalization (Sieber & Mantel, 2012).

The actions promoted by QuaMMELOT aim to consider students as real protagonists of the project, creating suitable situations to make them more active and responsible for their formative path, and to open a communication channel on fundamental themes such as peace and human rights among students and to develop social and civic competences from different countries and cultures through arts and active citizenship.

The project will support the professional development of teachers preparing them to stem school drop–out, the cultural diversity and to facilitate the learning processes of unaccompanied foreign minors, trying to make learning visible (Hattie, 2009).

The specific priorities of QuaMMELOT are to consolidate the teacher's professionalism in managing diversity for single foreign students; promotion of skills and competences to include immigrant children in school; to support teachers in adopting collaborative and innovative practices; to foster students' academic success; supporting communication activities between teachers and educators of family houses; to improve the first and second linguistic literacies; to promote the recognition of the skills and knowledge possessed by migrant minors; to develop laboratory and technical–manual methods; to promote a conscious and active citizenship.

These priorities are pursued within the framework of the following general goals:

— answering to the urgent needs of EU countries to renew methods and tools of education for unaccompanied foreign minors;
— promoting migrants' integration and social cohesion in the

EU countries;
— offering the tools to the teachers to autonomously act for promoting teaching and intellectual development of unaccompanied foreign minors;
— improving trainers and teachers' effectiveness with new approaches and tools;
— involving schools, universities, public institutions in a renewed dialogue through methods and strategies for the education and inclusion of migrant children;
— producing outputs using ICTs open to target groups at national and European level.

At operational level, the projects will carry out the activities described below:

— implementation of innovative practices in the field of teacher training;
— validation of knowledge, skills and competences acquired by teachers through formal learning;
— cooperation between regional authorities to promote the development of training systems and integration in national and European development actions;
— activities that aim to better prepare and enhance education professionals so that they can better meet the challenges of equal treatment, diversity and inclusion in the learning environment;
— activities that promote the integration of newly arrived migrant minors and develop awareness of their presence in Europe;
— seminars and meetings between university professors involved in the project aimed to the preparation of the platform and materials of the modules;
— international conferences about the situation of unaccompanied foreign minors in Europe particularly referring to the States involved in the project;
— construction of the modules to be included in the platform according to the specificity and skills of the project partners;
— preparation of a Beta platform to test the appropriateness and functionality of the contents as well as the visualisation of the module;

— information from the partner schools in the partner countries for free access to the QuaMMELOT platform through registration;
— drafting of national guidelines for the inclusion of unaccompanied foreign minors in European high schools in each partner State;
— dissemination of access to the QuaMMELOT platform for teachers training by Ministries and regional educational institutions in partner countries;
— dissemination of national guidelines for the inclusion of unaccompanied foreign minors in European high schools in each partner State by the Ministries and regional educational institutions of the partner countries.

3. Online teacher training

The project QuaMMELOT has planned to build a platform for the training of secondary school teachers for the scholastic integration of unaccompanied foreign minors between the ages of eleven and seventeen and for their access to disciplinary learning.

The specific objectives of the project are:

— to promote the social integration of migrants and MSNA through inclusive school education practices;
— to offer up–to–date and effective tools to teachers to support their understanding of migrant children in secondary schools;
— to create a training course for teachers' qualification as "Tutor for the reception and inclusion of foreign minors and MSNA in secondary schools". The programme consists of 240 hours of training for teachers, available in open access format on the websites of the institutions responsible at regional/national level in Italy, Greece, Spain, Denmark.

The platform, available for training, is a unique product and shared among all the Member States participating in the project. In this regard, the activity will consist in the preparation, organisation and management of a technological platform to host both the training contents of the teachers of the four involved countries (Italy, Spain, Greece and Denmark) and the activities of discussion and

sharing of good practices developed during the project.

The fundamental quality criterion resides in the skills of the staff attributed to the task. In particular, the staff will have excellent skills in the management of a Moodle platform and all the digital formats that can be used in online teaching. Personnel must be in possession of excellent pedagogical preparation particularly referring to training processes and must have an adequate level of knowledge of cultural issues allowing them to adapt to any specific difficulties inherent in the different culture, language and teaching methods of the member countries. In particular, the management of the Moodle space involves the following activities:

— uploading and organising the contents during the preliminary phase;
— management of existing content and loading of new products during the teaching phase;
— creation and management of synchronous online events, such as meetings or webinars;
— creation and management of other interaction tools, as forum, blog and wiki;
— groups' management in social network aimed to project's activities;
— assistance in the production of multimedia artefacts: animations, video, video subtitling activities in the languages of partners' project.

The platform is organised into eight training modules that can be accessed by all teachers selected by the partner countries. The modules are: 1) Legislation (from a comparative perspective); 2) First reception; 3) Relational dynamics; 4) L2 Learning (Content and Language Integrated Learning — CLIL — methodology); 5) Active citizenship; 6) Mathematics; 7) Information technologies; 8) Practical knowledge.

The platform is already available online. Teachers started their online course that should be completed by the school year 2018–2019. The training will be validated for each module by the partner Country that has taken care of the insertion. At the end of each module it is required to insert an activity related to the students and to the contents of the module itself.

4. Implementation of the project and first approach with selected teachers

In the context of the first output of the QuaMMELOT project, on May/June 2018, three Focus Groups were organized by the Regional Education Office for Tuscany and a report about in–depth interviews' data was elaborated. The objective was to strengthen basic and transversal teachers' skills in order to support the needs of migrant pupils in educational, scholastic and social contexts, and to improve the dynamics of teaching in schools with strong immigration processes and with the presence of unaccompanied foreign minors. The preparation of the model and the management of the focus groups were entrusted by the team of the Regional School Office for Tuscany, which guided the choice of the research model, the preparation of the questions, the realisation of the focus group and the drafting of a final report. All the material and indications for conducting the interviews were shared with the project partners as a reference model to be used in their contexts. Through the focus groups the research team wanted to gather from the bottom, that is directly from the teachers, a series of needs arising from real situations experienced in classes with high percentages of migrant students and/or MSNA.

The focus groups were organised according to a structure consistent with the scientific methodology of this kind of meetings, involving a moderator who led the discussion following the interview guide with predefined questions, an assistant who re–elaborated the information at the end of each meeting and an external observer.

Each focus group has foreseen the participation of about 10 teachers coming from schools of Tuscany of the same order and degree but who did not know each other. The survey was conducted through free conversations stimulated by closed questions and discussion proposals.

The management was managed according to an open and participatory style. The non–directive process, centered on the interaction among the interviewees, wanted to stimulate creativity and at the same time to loosen the defense mechanisms and the resistance of the group members.

The moderator had the task of introducing the topic to be discussed, orienting the discussion procedures, keeping the group on the topic and helping it to progress in the analysis of the problem. He also schematised the "keywords" that emerged from the answers

by reporting them on the blackboard. The internal observer, on the other hand, had the task of summarising the answers and providing the participants, at the end of the meetings, with an accurate report on the subject.

The external observer participated in the meeting without interacting directly, with the task of verbalising what emerged from the debate and observing the verbal/non–verbal reactions of the participants and the dynamics that were created.

All interviews were recorded by the external observer. The analysis of the material collected with the in–depth interview allowed the research team to bring out a series of opinions, orientations, teaching practices of teachers, coordinators and contacts.

A clear awareness of the profound transformations of the context and of the teaching conditions linked to the increasing presence of students with CNI appears among the interviewees. However, they believe that this presence is far from being fully addressed by the whole teaching body and families, in a shared educational project supported by local institutions. Changes in the curriculum and the pedagogical–didactic model emerged as one of the changes brought to the fore.

From the words of the teachers interviewed by Alessandra Papa and Daniela Cecchi (Partner USR Tuscany), the intercultural education is placed in three dimensions that correspond to many pedagogical approaches.

The first is the dimension of knowledge and appreciation of the "other" cultures referring to pupils' culture, which relate to a static and descriptive vision as well as to the need to create integration and meeting moments. Students become "bearer" of traditional and cultural aspects. The second is the intercultural component which refers to the affective dimension and the mutual exchange, and which is based on values like respect, equality, welcome towards minors with CNI and which places intercultural education within a system of values and ethics. A third approach refers to the disciplines and the revision of the curriculum, generating a process of encounter–exchange–re–elaboration between different cultures.

The real activation of integration measures, the wealth or the poverty of relationships in the classroom, the mastery of tools and linguistic means are elements that favour a real integration between school and family, between school and territory.

Some descriptors are identified — that is, key concepts useful to

define the situation of integration of the student within the class:

a) Method of integration;
b) Competence in the Italian language;
c) Quality of relationships in class with classmates and teachers;
d) Learning results;
e) Self–esteem and confidence in their abilities;
f) Skills in their mother tongue.

Teachers underlined difficulties from school to adapt to changes, the resistance of many teachers, sometimes, the only formal adherence to innovative projects or actions and new methodologies to be put into the system. The knot of learning, and therefore also of integration, is represented by the knowledge of Italian, for communication and study. But the school–family relationship is also identified as a most important critical aspect, due to the shortcomings and difficulties in communication, sharing and mutual support between parents and teachers. Often immigrant pupils' family are present only in the case of community talks about the countries of origin, their traditions, their mother tongue.

5. The Focus group

The planning began with reflecting on the purpose of the meetings. The researcher pondered such questions as (Krueger, 1994):

— Why should such a study be conducted?
— What types of information will be produced?
— What types of information are particularly important?
— How will this information be used?
— Who wants this information?

The answers to these questions were then organized around the following categories: 1. General objectives; 2. Purpose; 3. Specific objectives; 4. Identification of research questions; 5. Issues to investigate and not to investigate.

The questions to be asked during the focus group related to three main topics:

— inclusion and integration: school–family relationship, school–reception context interaction;
— learning of the language of the host country in the different disciplines as well as plurilingualism;
— methodologies and disciplines.

For each topic a series of research questions were foreseen as described below.

Research questions of the Focus n. 1

Inclusion and integration: school–family relationship, school–reception context interaction.

– What are the positive and critical aspects of your teaching experience regarding the presence of foreign students at school?

– In general, what is meant by integration of foreign minors and when and under what conditions can a foreign child be considered positively integrated?

– What indicators can be used to evaluate the integration situation of foreign students and his/her integration process?

–Is there a welcoming project in your school for foreign students?

– What are, according to your experience in the school, the modalities of a positive insertion schooling of foreign students?

– Integration is a two–way path that must involve the school (teaching staff and cultural mediators) and the families of foreign children. What actions and strategies do you think are useful to promote active family participation?

– When you experienced a positive relationship with parents, what strategies have you put in place?

– What can be considered as a positive collaboration between school and territory?

– Please, tell us three concepts that you consider fundamental in this focus group.

–Do you have any suggestions or considerations to add?

Research questions of the Focus n.2

Learning the language of the host country in the various disciplines and plurilingualism.

a) What do you think about the statement by Tullio De Mauro "the Italian language was a second language to be taught as such, starting from the first, which was the dialect"?
b) How do you comment the statement that "as a reason for the slowed down school curricula there is often a reduced competence in Italian, even in the second generations"?
c) How can the school promote the knowledge of Italian as a language of communication and as a language of study in multilingual classes?
d) Language difficulties mostly refer to the use of language for study, which is essential to success at school. In your opinion, what should be done to make foreign students overcome this difficult situation?
e) When you tried out some positive intervention measures, what kind of strategies did you implement?
f) In your experience, is it useful for schools with a high percentage of pupils with migratory background having permanent language laboratories conducted by specialised teachers?
g) Do you think it would be useful to simplify linguistically the content of the different disciplines in order to facilitate the learning of specific disciplinary languages?
h) The integration of foreign students into schools generally follows mainly compensatory approaches, highlights shortcomings and difficulties and does not recognise the competences of each individual, such as language skills in other languages and/or in the mother tongue. How can we enhance multilingualism?
i) Is the mastery of the language of the host country (Italian) determined by the achievement of educational success for students with a migrant background?

Research questions of the Focus n.3

Methodologies and Disciplines.

a) In general, what do you think about multiculural education in Italian school?
b) In the multicultural classes, how important is the climate and the inclusive education for a positive integration?
c) An intercultural curriculum is built on contents and educa-

tional objectives as well as on the teaching methodologies. Do you agree with this statement?

d) In your experience as teachers and with respect to your discipline which methodologies are more effective in multicultural classes?

e) When did you experience inclusive teaching, what methodologies did you use in your classrooms?

f) Which are the teaching strategies that favour the participation of the student in the research and elaboration of his own knowledge through a personalised learning process?

g) Thinking of positive experiences, what were the benefits for the students?

h) Do you believe that adequate teacher training on teaching methodologies could it be useful to carry out a truly inclusive teaching process?

i) Please, tell us three concepts that you consider fundamental to this focus group.

6. Conclusions

The research in progress linked to the QuaMMELOT project is generating an opportunity for Italian, Greek, Danish and Spanish teachers to exchange online their experiences and views as part of the training activities which qualify the educational institutions while allowing schools to share specific practices. In this context the forum has become a powerful instrument through which expressing itself in order to redefine needs and characteristics and to build a relational network among intercultural teachers.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210238
pag. 91–109 (december 2018)

Educators' Data Literacy

Supporting critical perspectives in the context of a "datafied" education

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1. A datafied society

The digital revolution started early in the Nineties by an exponential sharing of information, in terms of texts. Later on, that information became multimodal, and more audios and videos were shared than ever. Then the web became social and we found ourselves throwing more and more personal content across social networks and social media sites. Nowadays, the digitalised data underlying the enormous mass of transactions on the web, expanded by our mobile phones and the Internet of Things, is at the core. Unmindfully, we go here and there on the web living our digital footprints that become countable variables: how many clicks on that image or video, how many posts on that social network, how many friends engaged in our own images; shop habitudes, time walking, heart rate while biking in the city. Our self is quantified (Lupton, 2016), and the self–tracking practices lead us to make sense of our daily activities or forms of engagement that go from social practices (sports, tourism, work, etc.) to highly personal practices (spare time preferences, health, dating, etc.) throughout the aggregated data represented in graphical interfaces. However, the other side of the coin is the huge amount of data left on the web that is used as part of the contemporary social fabric, including public services and new business models. The so called "Big Data" movement brought in enthusiastic consensus on the treasure of data to configure new business models, new services and new jobs (Kitchin, 2015). However, more recently it has encompassed a number of concerns, mainly relating the eth-

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ical issues lying behind the algorithms used to mine data. Whose data? With whose consent? Over which theoretical assumptions the mathematical models adopted to make sense of the sparse data are built? Or even more ethically dangerous, which further operations, services, recommendations do we intend to enact through those models? These are the type of questions over the table at the current state of play, and the algorithms have been called into question as "weapons of math destruction" to borrow the terms of Cathy O'Neil, a mathematician whose initial work related the engines of Big Data and moved towards ethical concerns and political debate of such data (O'Neil, 2016). So the exponential grow of digitised data, elaborated through statistical treatments and further algorithmic operations, assumes in our contemporary society an unprecedented relevance. What once had to be induced through data collection, turned out to be a sort of "treasure" that could be extracted, the reason why the neologism "data mining" was coined as an effective semiosis of what was underneath as social process. These are the foundations of the "Big Data" movement, which progressed from the problems related to the management of masses of data, physically based on multiple servers (sometimes, thousands of servers); to the technicalities of extraction, and the type of actions that could be triggered, from attractive visualisations to recommending products or decisions by the end consumers. However, the most controversial issues relate actionable connections between data and personal or institutional decision–making. Namely, who is trustworthy in order to issue financial aid, whose students will surely drop out and do not deserve much attention or could be even excluded from higher education; which neighbourhoods must be patrolled the more, and so on. While these debates became more and more contentious, the data availability activated other more constructive movements in a balance between the utopian and dystopian accounts on data (Boyd & Crawford, 2012). Upon the incremental digitisation and the request of public control over public funded activities, it became obvious that the data yielded from such activities had to be available to the society (Zuiderwijk & Janssen, 2014). Thus, the Open Data movement was born, not to contrast but to complement the concept of Big Data, bringing a sense of democratisation of knowledge. Indeed, the Open Data movement is embedded into the activism relating Open Access and Open Science (OKF — Open Knowledge Foundation, n.d.; Sieber & Johnson, 2015). Discourse of public monitoring and the opportunity

to generate new skills and new jobs based on Open Data emerged. According to these, citizens could become "hackers" engaged in controlling governmental transparency, but also in socially relevant actions like humanitarian aid, like the case of earthquake support on the basis of geolocalisation (Johnson & Robinson, 2014); smart cities (Wolff, Kortuem, & Cavero, 2015), eHealth (UKtransparency & CabinetofficeUK, 2012) political debate for power resistance (Baack, 2015).

However, the utopia of access to data came across a problem which was not new in its configuration, but only in its content. We refer to the typical problem of digital divide in the Internet era and all the discourses on openness. The issue of abundance, immediately recalls the competence to navigate such abundance (Jenkins, 2009). Some authors paragon the problem of the appropriation of data by citizenship to the long debate on the digital divide (Gurstein, 2011). In fact, since the access to data by citizens becomes public policy control, the citizenship should understand which problems and which objects are analysed through the data tracked; they should also possess skills to summarise data into effective narratives integrated with data visualizations (Zuiderwijk, Janssen, Choenni, Meijer, & Alibaks, 2012). And this would be the lowest level of public data use, if we take into account the problems data collection and sharing between researchers operating in the paradigm of Open Science (Janssen, Charalabidis, & Zuiderwijk, 2012). The considered literature spots a gap between the disruptive potential of Big and Open data and the current, emergent practices. As a research problem, this gap is increasingly receiving attention, from Economics and Management focus on new business models and open innovation (Huizingh, 2011); to Political Sciences on e–engagement and open government through Open Data (Sieber & Johnson, 2015); or the Sociology of science with studies focusing the forms of opening up data as key for an Open Science strategy (Salmi, 2015). In the area of educational research, it seems that several strands of research are starting to move into exploration of the problem. A first concern has been data literacy and school teachers' data literacy (Gould, 2017; Mandinach & Jimerson, 2016; Raffaghelli, 2018), digging into topics relating the conceptual frameworks and activities to improve students skills that go beyond statistical elaboration. The increasing use of data as evidence of quality teaching and education has also been considered. Not specifically connected to teachers' data literacy, but as an emerging concern, we can mention

the data–driven practices connected to learning analytics both by teachers and students (Ferguson, 2012; Persico & Pozzi, 2014; Wasson, Hansen, & Netteland, 2016). More recently, the idea of using Open Data as Open Educational resources has also raised interest but it seems there are still few practices in place (Atenas, Havemann, & Priego, 2015; Raffaghelli, 2018). Lastly, critical approaches to the problem of datafication and the new literacies required to deal with personal data have emerged very recently (Lupton & Williamson, 2017; Pangrazio & Selwyn, 2018).

2. Surviving in the oceans of data: cultivating data literacy

In this context, the need for developing skills to deal with data in personal and professional activities is gaining momentum. The different existing definitions coincide on the following key elements of *data literacy*: extraction, management and processing, ethical and critical approach to data handling. According to a literature review by Maybee & Zilinski (2015), on the basis of the analysis of 8 frameworks for data literacy, the following elements can be identified: a) Awareness: Understanding data and its role in society; b) Access: Understanding how to identify, locate and appropriately use datasets and databases (i.e. a collection of structured data); c) Engagement: Evaluate, analyse, organise and interpret existing data. Make decisions based on data; d) Management: Plan and manage data, including organisation and analysis, security protocols for data storage, sharing data, and data–driven documentation; e) Communication: Synthesise, create visualisations and data representation; f) Ethical Use: Identify diversified data sources, in particular data from human and social activity, considering the risks of managing such data. Understand the issues implicit in the use of data; g) Preservation: Be aware of long–term practices of storing, using and reusing data.

In line with the above mentioned research, the very recent European debate on the Digital Competence, with the framework DigComp 2.1. (Carretero, Vuorikari, & Punie, 2017) focused on data literacy. The concept of Digital Competence, already present in the prior framework of Key Competences for Lifelong Learning since 2006 (European Commission, 2007), recalls the importance of the skills to live in a digital era. However, while the first framework (2006), as well as the framework DigComp 2.0 never included the

idea of skills to handle data, the latest version of 2017 (2.1) introduced the component of "data literacy" together with the information literacy dimension. A more critical approach to data literacy came from Pangrazio and Selwyn (2018), whose work addressed the concept of "personal data literacies". According to these two researchers, data literacy models are limited for they deal with technical layers of data handling. As they put, "not all the stakeholders have the same degree of agency when it comes to social media data" (Pangrazio & Selwyn, 2018, p. 8). Moreover, aligning with the analysis of data literacy framework hereby reported, the mentioned authors pointed out that computational science studies focus highly technical skills; information science models on data literacy focus on the cycle of scientific information (searching, retrieval, managing, elaborating and presenting); and until now it seems that the contribution of social media studies have not been applied to data literacy. Therefore, adopting the lens of media education, the authors formulate the concept of personal data literacies, whose focus is the concern on ethical, political and power issues underlying each form of data collection and usage. Particularly, they aim at understanding how personal data is left on the web and their potential usage in profiling, data recirculation and other controversial practices.

3. The datafication of Lifelong Learning

The datafied social context translates in several practices in education that could be considered "data–driven". According to Williamson (2016, p. 404),

> Educational data science is an emerging, transdisciplinary field, building on both data scientific practices and existing knowledge from the learning sciences (itself a combination of psychological, cognitive and neurological sciences).

Based on the advancements of computer science, machine learning, natural language processing and human–computer interaction at the crossover with data science (Piety, Behrens & Pea, 2013, cited in Williamson, 2016, p. 404), the field offers a number of possibilities to track learners activities and to show synthetic visualisations, built upon pedagogical concepts. In time, the data visualised should

support positive actions such educators' pedagogical guidance, support to learners at risk, empowerment and personalisation, and self–regulation (Viberg, Hatakka, Bälter & Mavroudi, 2018).

The interesting fact is that these approaches do not relate only specific educational levels (school education, Higher Education, professional learning) or types of learning (formal, informal and non–formal).

Relating childhood and pre–primary education, we could consider the increasing use of toys that are connected to webapps, generating the phenomenon of the "Internet of Toys". The children's activities are tracked in order to inform the parents on the playing routines and the cognitive development, addressing potential intervention for early education and stimulation. In this case, the numerous commercial investments eagerly assemble pedagogical theories with neuroscientific advancements (Chaudron *et al.*, 2017; Holloway & Green, 2016).

The same digital architectures are being applied in the case of multimodal learning analytics in classroom settings at school. Wearable sensors, eye–tracking as well as audiovisual and accelerometry data from sensors worn by the teachers encompass data collection over several complex processes in class, like the orchestration of collaborative activities (Prieto, Sharma, Kidzinski, Rodríguez–Triana & Dillenbourg, 2018) or the social regulation of learning in groups (Noroozi *et al.*, 2018). The main concerns raised by researchers engaged in this area relate both the technicalities of data cleaning and organisation in relevant ways, namely, in relation to relevant pedagogical constructs like orchestration and collaborative learning; but also to the simplification of graphical user interfaces. In this vein, the investigation conducted by the Oulu University research group is attempting to generate easier dashboards for both educational researchers, teachers and learners (https://www.oulu.fi/let) (Noroozi *et al.*, 2018). Moreover, the Tallinn University (https://www.tlu.ee/en/dt/centre\T1\textendasheducational\T1\textendashtechnology) in collaboration with the Ecole Polytechnique de Lausanne (https://chili.epfl.ch/) is analysing modelling to reproduce orchestration settings for teachers' professional development (Prieto *et al.*, 2018). Multimodal learning analytics are considered promising in terms of both designing for learning, teaching, learning and assessment, but the technical gaps of real time data collection, cleaning, organisation, modelling and translation into actionable graphics for teachers and learners (Blikstein & Worsley, 2016) point out that this is a field in its

infancy.

These principles are already in place in the case of professional learning, both as part of what have been called the "smart working environments" where data on tasks, time, outputs, emotional and social activity is collected, crunched, aggregated and finally sent to the worker and management in order to support learning processes at work (Ruiz–Calleja, Prieto, Ley, Rodríguez–Triana & Dennerlein, 2017). In specific professional areas like medical education, these elements achieve even more importance since the data collected inform adaptive learning processes to perform complex technical tasks like surgeons' training or interventions in urgent cases like cardio pulmonar resucitation (Di Mitri, 2018). The complexities in this case appear to be same as a school classroom, with the additional factor of fuzzy pedagogical concepts adopted in professional learning at the crossroads with technical concepts pertaining to the professional domains. Moreover, in this field it is difficult to generate authentic evaluation settings to scale up the technologies connected to data tracking and visualisation.

Learning analytics in Higher Education have built an entire sector of research with most contributions exploring the forms of using the massive students' data not only to support teaching and learning processes but also for institutional purposes as is the case of academic analytics (Ferguson, 2012; Siemens *et al.*, 2011). In fact, students' data is massively connected both through the learning management systems where blended or fully online learning occurs, but also through data collected for administrative purposes. Numerous studies have addressed issues like drop–out prevention, support to better learning design, monitoring and assessment, students' feed–back and self–regulation. However, the current state of development shows little advancement in learning analytics' uptake, raising concern for the authentic validation and scalability of the technologies like predictive learning analytics and dashboards for learning (Viberg *et al.*, 2018). Moreover, the ethical issues of data usage are not considered enough to build institutional policies that integrate learning analytics as part of quality education models (Vuorikari *et al.*, 2016).

Along the several examples presented hitherto there are commonalities to be highlighted. Particularly, it seems that the theoretical and empirical reliability of the several technologies explored is still a problem. While it is true that the lack of authentic contexts of validation generate a problem relating to empirical consistence, maybe

more worrisome are the issues relating to the theoretical, political and ethical validity of the constructs lying behind data aggregation, modelling and visualisation. Moreover, data collection occurs in contexts where the learners are not always aware of the type of data released, an issue that introduces the ethical question of the forms of surveillance enabled which entails the trade–off between personal privacy, personal approach to the quantified self, and the institutional usages of big data.

In order to explain the pitfalls of naïve and positivistic discourses on the development of educational data mining, it is worth recalling here the conceptual work of post–modern sociologists like Pierre Bourdieu as well as Gilles Deleuze and Félix Guattari. The first concept relates issues of symbolic power (Bourdieu, 1986), addressing the generation of the politics and aesthetics of dashboards as organised visualisations of psycho–physio–neuropedagogical concepts. These are allegedly objective, but they always encompass semiosis rooted in science as a discourse of power. The data–driven technologies are hence deeply entangled with political and classist phenomena defining dominant discourses of "normality" in cognitive development, social and professional behaviour connected to learning performance. Moreover, these dominant discourses lie behind the design of devices, apps and the algorithms predicting behaviours. As a matter of fact, in the case of early education and care and primary school, as Williamson denounced, there are forms of "biocodification" of childhood (Williamson, 2016), in terms of structures that define learning objectives, acceptable moods and emotions, happiness and well–being indicators, based on a number of techniques of sentiment analysis. The positivistic and micro–level approach of neuropedagogies could end up in neglecting the effects of a mass psychological surveillance of childhood towards desirable learning outcomes. In the case of professional learning, the forms of surveillance are entangled with the worker's freedom to define their own time and productivity, with the risk of entering in neo–Taylorist structures that control an invisible pacing machine (Busch *et al.*, 2015). Since the most developed field of research relates to learning analytics in Higher Education, in this case there are several researchers pointing out the risks of a naïve approach to the application of algorithms that encompass strong stigmatisation of poor, slow students, with the excess of models based on prior data collected (Prinsloo, 2017; Perrotta & Williamson, 2018), as well as the myths of an efficient

university that will personalise, and hence fragment, the whole social experience of being a student in relation with a teacher, both engaed in the making of academic knowledge (Williamson, 2018).

The second concept embraced here relates *assemblages* as a collection of things which have been gathered together to make sense of a social process. The concept was coined by Gilles Deleuze and Félix Guattari (Deleuze & Guattari, 1987) as an ontological framework defining the changing nature of social entities and their interconnectedness. In fact, assemblages capture the idea that data are entities that operate jointly with the social definitions used to make sense of them, the forms in which data is collected, whether the system forces or ignores consent, and whether this data extracted supports political aspirations of administration and control throughout other entities such as dashboards, institutional reports, rankings, and so on. These entities are mediated by algorithms, which are actionable mathematical conceptualisations. For example, after a student obtains a score, or after a number of clicks on resources in an online environment, the statistical operations will lead to the prediction of learning outcomes, and an algorithm may trigger a web–message or an AI tutor. The simple fact of selecting pedagogical support, or just informing the student that the learning outcomes will probably be negative at the end of a semester, encompasses strong pedagogical assumptions. On these bases, we can assume that data assemblages entail socio–material components, the social components being practices, beliefs on effective learning, prejudices of the end user's ability to adopt the system, myths on the systems effectiveness; and the second, the required infrastructures, the statistical modelling, the computational code, and the digital interfaces.

As one can imagine, this situation encompasses specific data literacy which we could denominate "pedagogical data literacy". Beyond the discussion around the massification and centrality of data assemblages in society, we observe that educational data mining includes the need of understanding the materiality and social practices entangled on a given educational data–driven environment. Within this framework, not only should data literacies address technical comprehension of learning dashboards but the underlying data used. Educators and learners should be given the opportunity to understand the connections between data assemblages and the complexity of their own experience as learners, with other sources of data that are complex, incommensurable and ephemeral, like conversations

that leave deep impressions and trigger insights of heuristic value for one's own identity construction.

4. A plea for action taking: towards educators' data literacy

4.1. *Issues relating educators' professional development on data literacy*

The evolving situation relating to data in society and particularly the case of data–driven practices in education requires urgent intervention and research in the area of educators' data literacy. By *educators* we mean all profiles intervening in lifelong learning, namely, early education and care professionals, traditional teachers, academic teachers, trainers, coaches and community managers in the workplace, as well as adult educators. We brought relevant evidence on the fact that each of the areas of lifelong learning is being affected to some extent by the external pressures of developing technical as well as personal and critical data literacies; last, but not least, the same context of education is offering a number of challenges relating to data assemblages that requires what I have called pedagogical data literacy.

A brief analysis of the literature shows that most studies investigated the topic of teachers' data literacy, in terms of data assemblages present at school, in formal learning contexts (Mandinach & Jimerson, 2016).

Models, areas of data usages to inform professional practices (from teaching to institutional evaluation), as well as the barriers to effective data–driven practices at school have been explored by several authors (Bowen & Bartley, 2014; Dunlap & Piro, 2016; Kippers, Poortman, Schildkamp & Visscher, 2018). In these studies, it seemed necessary to align the various understandings of teachers on what is data, over its significance for their own work and to cover the students' needs. Moreover, most studies emphasised some variables for professional development on teachers' data literacies, like principal's co–creation of data usages, collaboration between teachers, project–based activities, discussion with the students and the families and correct infrastructural support (Jimerson, 2014; Mandinach, 2012; Mandinach & Gummer, 2016). Not surprisingly, most variables of professional development were common to professional learning for technology uptake (Twining, Raffaghelli, Albion & Knezek, 2013).

According to the literature review of Mandinach & Jimerson (2016) and my own re–elaboration in the present work, a *data literate* educator should:

Identify problems

a) Focus on a problem of educational practice, understand the learner level within the problem, understand the educational context, involve stakeholders, discuss privacy issues.
b) Consider how an educational problem can be informed and the solutions created throughout an ecological use of data.

Use data

a) Identify sources of data and its purposes, properties and quality; understand how data is generated; understand how data can be extracted; use multiple (quan–qual) measures/sources of data; understand how to analyse, manage, and aggregate data, enact collaborative use of data within the professional activity.
b) Consider data use for each sequence of the pedagogical practice: Designing, Developing, Implementing, Assessing, Evaluating.

Transform Data into Information

a) Understand how data can be visualised, represented and shared; generate hypotethical connection to instruction; test assumptions; assess paterns and trends; synthesise diverse data; articulate inferences; summarise and explain data.
b) Consider the ethical concerns of all data–driven processes.

Evaluate Outcomes

a) Determine next instructional steps, monitor learners' performance, diagnose students' needs, make adjustments, understand the contexts of decisions.
b) Support learners' data literacy and pedagogical data literacy, by discussing the data assemblages adopted throughout a learning process/activity.

Doubtless, this approach meets the lines of research and theorisation on teaching documentation, linked in turn to learning design as a form of reification of complex teaching processes and learning (Conole, 2010; Raffaghelli, 2014). However, it moves further as it seeks in the culture of data the forms to support critical understandings of evidence towards more participatory and transparent processes in data–driven education. In this sense, the reflection of Wasson, Hansen and Netteland (2016) over data usage in Higher Education looks promising, but not sufficient. The authors proposed a model in which the teacher and the student must master the skills to learn in highly digitised environments. In fact, these data–rich environments require knowledge and skills to interpret data transformations into useful information for regulating (and in particular self–regulating) learning processes. However, their approach focuses on partially pedagogical data literacy and does not consider personal data literacy in terms of critical and ethical concerns. In the same vein, the so–called "Open Learning Models" become an interesting example of application, for they allow a progressive metacognitive mastery of the learning environment, based on the data obtained and displayed in dashboards that the student can customise (Pardos, Whyte & Kao, 2016). On the teacher's side, this implies a wise use of these tools, towards configurations that better synthesise emergent learning processes.

We observe that most studies on educators' data literacy are concentrated in the area of teachers within the school environment, with some contributions coming from Higher Education. This is probably due to the connection between the interest in developing a movement of evidence–based education, where evidence is intended as highly quantitative data (Calvani, 2012; Slavin, 2002).

However, the lack of debate in other areas of lifelong learning is rather astonishing. While in Higher Education the topic of learning analytics could easily be connected to blended or online teaching, adult education (both continuing and permanent education) triggers a number of new concerns for the educators' effective professional practices. Moreover, critical personal data literacies and pedagogical data literacies require empirical work in order to support frameworks and models towards the mainstreaming of professional development on the issue.

Taking into consideration the conceptual issues surveyed in the literature, the table 1 introduces the educators professional activity and its connections with the expected professional data literacy skills:

Table 1. Educators' Data Literacy: areas of development.

Professional activities – Areas of activity	Using Data as Educational Content	Using data to inform pedagogical practices
Ethics and Politics of data	Focus on data use in the educators' discipline/ area of professional knowledge Show/practice with tools to raise critical awareness and data manipulation of personal and social data.	Promote critical awareness in students on the data generated along the teaching and learning processes.
Techniques of data	Train on techniques to promote data search, appraising, mining, preparing for analysis, analysing and visualising in the field of teaching/training.	Acknowledge the critical use of data as evidence informing teaching and learning processes: what can and cannot be said. Promote pedagogical data awareness in students to support self-regulated and self-directed learning.
Aesthetics and narratives of data	Train on activities of data storytelling	Promote understanding of how educational data can be used into lifelong learning.
Transversal professional skills Learn	Engage in collaborative and interdisciplinary engagement in projects that adopt data as content	Engage in collaborative and interdisciplinary engagement in projects that adopt| data to support institutional or pedagogical practices.
Expected Learning outcomes	Technical and Personal Data literacies	Pedagogical Data literacy

Individual, co–operative and collaborative data use will enable the educators to develop cases and reflections leading to models, travelling from *professional development for data use to data use for professional development*, as Vanhoof and Schildkamp (2014) pointed out.

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Part II

NATIONAL EXPERIENCES

Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/97888255210239
pag. 113–125 (december 2018)

Using Digital Public History for future teacher training

Opportunities, challenges, implications for practices

Gianfranco Bandini*

1. Teacher Education: a challenge for the global society

The 21st century started with reinforcing the idea that change, today, must be always seen on a global scale as an integral part of our history. Compared to a very recent past, it is no longer continuity that marks social evolution, but discontinuity. In recent decades globalisation's waves have made us aware of a new scenario including original, changeable and rapidly changing characteristics, starting from the social, economic and technological context (Hopkins & Wallerstein, 1996; Wallerstein, Aguirre Rojas & Lemert, 2012).

We are faced with a situation having peculiar aspects that have arisen for the first time in the history of humanity, leaving us baffled and doubtful about the direction to be taken, both as individuals and as organised communities.

However, this uncertainty must not be considered as a negative aspect because it is actually the sign of an awareness of the challenge that awaits us. A complex and very difficult challenge because it must combine elements that the school systems have always struggled to keep together, in particular two that can be indicated as follows: 1) the ability of stakeholders – especially national – to identify clearly and quickly the strategic lines to be undertaken, as well as the persistence over time of school policies; 2) the flexibility of organisational structures and teaching practices to change quickly and effectively (Asia Society/OECD, 2018).

Taking into account this new global scenario means, among

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other things, that designing change entails having a "cross–eyed look": sensitive towards the territory and the local social context where the training activity takes place, but in parallel also aimed at the global perspective which cannot be disregarded in order to avoid the marginalisation and uselessness of training efforts.

This argument leads us to outline one of the desirable general characteristics of the school system, the so–called "glocalism". While the school in the past could reasonably concentrate on the national or even local context, this is no longer possible today. Certainly, it can still be invoked and practiced to strengthen (patriotic or religious) identity, but it basically appears as a nostalgic withdrawal, close to the one that instead of entering the school with the world of work today, prefers to focus on yesterday's lost jobs.

All this does not mean rejecting the local context, not at all! Rather, it suggests looking at a second and important feature of a school today that we could define as "social empowerment": the school's ability to be useful to its local context, entering a relationship with the many social expressions of the territory, putting its own knowledge and human resources at the service of collective growth.

Going further with the argument, still keeping to general considerations, a third emerging feature of the school is its constant reference to the "best interest of the child", a real beacon for orienteering teachers' actions and educational institutions. Article 3, Para. 1 of the *Convention on the Rights of the Child* (1989) states: "In all actions concerning children, whether undertaken by public or private social welfare institutions, courts of law, administrative authorities or legislative bodies, the best interest of the child shall be a primary consideration".

In accordance with the international charters and documents from the Twentieth century, the school has the difficult task of applying this seemingly simple principle, but which can be undermined by the inevitable asymmetry of the relationship between adults and children. History shows us, in fact, that educational institutions and agencies are not exempt from forms of violence that leave traces in unwritten but unfortunately persistent traditions and habits (Bandini, 2012). In many cases it is, therefore, a matter of giving voice to childhood and its specific needs, beyond adults' demands: this means, for example, that even the always desired continuity between family and school must not be considered as a goal to be pursued in any case, if this conflicts with the well–being of the child.

A fourth characteristic, as emerges strongly from the history of school and teaching in the last two centuries, is certainly the focus of teaching activities on the scientific method, with an increasing deepening, through the various scholastic degrees, of scientific knowledge and their peculiar characteristics. This entails gradually approaching students to the understanding of how scientific communities do work, to the validation criteria of working hypotheses, to the methods of argumentation and experimentation. The growing complexity of knowledge makes teaching practice increasingly difficult, which now requires more extensive mathematical skills and, in general, a greater level of abstraction and symbolization (just think of Einstein's Theory of General Relativity or Quantum mechanics).

It is an intervention field which, since the scientific revolution, has progressively eroded the centrality of other aims of the school, especially those related to religious and identity aspects. To give an example, just think of the Nineteenth–century dispute between "sacred history" and "homeland history" in Italian schools: the prevalence of a history understood as a lay narrative, with no Providence interventions (which were argued from the theological point of view), refers to a wider change in schools' orientation reflecting the preference for scientific knowledge which becomes the cornerstone of a secular and rational education (Ascenzi, 2004, p. 28 ff.).

In this context, however, it should be noted that today's schools have not completely abandoned the purpose of reinforcing the identities of subjects during their formation: indeed, the current nationalist and sovereign political tendencies (in Italy as well as in Europe) rekindle the function of the school as a working tool at the service of (national) identity. These tendencies provide the ground for a dangerous and implicit argument according to which children naturally own a precise identity and the role of the school would be making it more evident and stronger, even in contrast with other identities (Sen, 2006). This vision of the role of school assigns it some tasks that can easily conflict with the contemporary scientific culture that never tires of repeating that identities are not biological data, they are not immutable, but are formed over time and in the various contexts of life (Aime, 2004; Remotti, 1996). Indeed, the same concept of identity should be set aside since it can be seen as the result of a progressive involution of the thought that has removed the idea that every man, as a living being, is first of all a citizen of the world (Appiah, 2015; Bettini, 2011). Rather than being a tool at the service

of developing rigid identities, the school has the role of highlighting that identity is a historical and social construction, thus supporting the freedom of choice of individuals within the framework of the liberal and democratic paradigm characterising the European school system.

From this point of view, as Richard Dawkins rightly underlined, contrary to what is usually done, children could not even be labelled as Christians, Catholics, Muslims, Buddhists or others. This would pertain to the religion of their parents but not their personal choices:

> A child is not a Christian child, not a Muslim child, but a child of Christian parents or a child of Muslim parents. This latter nomenclature, by the way, would be an excellent piece of consciousness–raising for the children themselves. A child who is told she is a 'child of Muslim parents' will immediately realize that religion is something for her to choose — or reject — when she becomes old enough to do so (Dawkins, 2016, p. 382).

One last feature of the school, which is thought of with increasing insistence, is the education to creativity. With this expression we are not referring to facilitating expression, especially artistic expression, that marked the Seventies, but to creativity as meant in the scientific field, particularly in the STEM (Science, Technology, Engineering, and Mathematics) area. We realised that neither the transmission model of school, focused on knowledge, nor the active school, centred on competences, takes into account that we live in a context of continuous change and that the predictability of future scenarios is only partial and probabilistic in nature. This leads us to consider the strategic importance of preparing subjects able to find solutions and reflect on the multiple issues in an innovative and not repetitive way. Basically, we need teachers who are capable of promoting divergent thinking, of schools that instead of killing creativity and curiosity, make it a daily use. In this sense, special attention must be paid to "gifted children", since it is now clear how important the school is for the expression of their potential (Ambrose & Sternberg, 2016; Montgomery, 2009).

Beyond the key concepts and words mentioned above, there are obviously many others that can be added and supported with adequate arguments. However, I think it is important to focus on these general characteristics since they are macro–concepts containing many others: a school conceived in glocal terms, for example, must strongly engage with intercultural education and cannot disregard

high digital literacy skills; a school aimed at favouring with its means the "best interest of the child" cannot forget to nurture a positive affective climate within the school. But the most interesting aspect of these guiding categories is the common element that unites them: they emerge strongly from the history of school systems between the twentieth and twenty–first centuries, especially in a comparative perspective, as markers of a general change and acceleration of society whose presence and strength are well perceived even within the scholastic institutions.

2. Training people with Digital Public History

If we look at the various ways in which one becomes a teacher in the OECD countries, we realise that very often the study of the history of education is required, especially for teachers who will dedicate themselves to children. As an example, we may read the description of the MA in History of Education from the New York University[1]: "Study in the history of education is designed to prepare people for careers in teaching and administration at both the high school and post–secondary levels, or in the management of non–profit organizations, especially philanthropic foundations". It clearly emerges from this sentence that the history of education is viewed as an intellectual tool particularly effective both for teaching and leadership. We could repeat the analysis checking the description of other university courses and we would get a similar answer. Interestingly, we can observe that it was exactly for the presence of specific teaching chairs on history of education in Teacher Education courses that history of education, especially meant as history of the school system, and its different variations, such as history of pedagogy, history of teaching, history of educational theories, and so on, have developed. This institutional presence has been very useful over time to consolidate the discipline and provide it a precise identity. Although the history of education is a topic on the border of many other fields, and involving many aspects which are still under discussion, with no doubt its placement within university courses has marked it, providing it a precise physiognomy and connecting it to teacher education (McCulloch,

1. New York University, MA in History of Education, https://steinhardt.nyu.edu/ash/history/ma.

2011).

While being a discipline born in the school context, clearly useful and relevant for professionals, the increase in the number of scholars and its progressive consolidation in the university setting favoured its development as an academic field with its specific research methods and background. An example of this can be found in the history of the most important association in the field, that is the *International Standing Conference for the History of Education* (ISCHE)[2] which, founded in 1979, currently brings together 26 national associations and in the last conference in Berlin (in 2018) saw participants coming from 35 countries (Lüth, 2010).

Now, if we look at the institutional policies on in–service teacher training or at the training activities promoted by associations dealing with post–graduate teacher training (e.g. AEDE[3], ATEE[4], EERA[5]), we can observe a very peculiar phenomenon. The historical approach (but also what we could define as "philosophy of education") disappears. There remain many other aspects that characterise university education and the attention to the practical aspects of class management is rightly accentuated.

To explain this phenomenon, we can certainly call into question the lower incidence of the humanistic disciplines (and of history in particular) both in the collective imaginary and in the political discourse. However, rather than looking outside the historical discipline, I think it is appropriate to reflect on the parable of the studies of the history of education, briefly mentioned above. The low attention to the historical approach could also be due to internal causes in the history of education (and historical studies in general). These internal factors might have facilitated the connection with or provoked the progressive, but not inevitable, separation from the professional world.

The written words come to mind, long ago, by Friedrich Nietzsche who in the preface to *On the Use and Abuse of History for Life* (1873) proclaimed:

> We need history, certainly, but we need it for reasons different from those

2. International Standing Conference for the History of Education, https://www.ische.org/.
3. AEDE, Association Européenne des Enseignants, http://www.aede.eu.
4. ATEE, Association for Teacher Education in Europe, https://atee.education/.
5. EERA. European Educational Research Association, https://eera\T1\textendashecer.de/.

> for which the idler in the garden of knowledge needs it, even though he may look nobly down on our rough and charmless needs and requirements. We need it, that is to say, for the sake of life and action, not so as to turn comfortably away from life and action, let alone for the purpose of extenuating the self–seeking life and the base and cowardly action. We want to serve history only to extent that history serves life.

In this short text, perhaps one of the least known and appreciated, Nietzsche has very harsh words for the types of the history of his time — "monumental", "antiquarian", "critical" — of which he analyses sharply the various characteristics. What unites them is above all the distance from life, the separation from the usefulness for action. Words that are prophetic in a sense, that can be re–read today to verify how much historical knowledge has been mixed with the events of society, how much they have spent so that their studies circulated and were the object of reflection.

An answer to these questions came during the second half of the twentieth century from Public History, an approach to the study of history emerged, not without difficulties and misunderstandings, in Northern America (Conard, 2015; Noiret, 2005) and which reached a considerable size in terms of quantity and quality of its advocates. This process of reconnecting historical studies with society has produced not only a multiplicity of initiatives, but also an extension to the "non–professionals" of the legitimacy to "make history". The distance between historians and non–historians, between society and academy, between history and memory (just to remember some classic dichotomies) has been shortened or cancelled in the name of Public History. This process of change of the historiographic paradigm has also started in Italy and has had its moment of official start with the constitution of AIPH[6], the Italian Association of Public History[7] (Conferences Convention of Ravenna, 2017).

It is in this context that many initiatives have been organised beginning to delineate, in an increasingly interesting and engaging way, a new presence of historical knowledge dialoguing with society (Bertella Farnetti, Bertuccelli & Botti, 2017; Ridolfi, 2017).

This is the new framework within which we can place the present proposal of teacher training based on the history of the teaching profession.

6. AIFPH, International Federation for Public History, http://ifph.hypotheses.org.
7. AIPH, Associazione Italiana di Public History, https://aiph.hypotheses.org/.

3. Public History, history for life, even professional life

The experiences of Public History can be developed profitably at all school levels through different methods and types of involvement of students and population. When dealing with teaching training, of course we have to do with pre–service teacher training referring to the university context as well as with in–service teacher training which relates to a longer period. The first experience in this sense was carried out in 2014 within university courses devoted to the training of primary school teachers (Bandini, 2017). The training was centred on the use of video interviews with retired teachers who were uploaded to YouTube in order to ensure easy and wide accessibility. These exploratory activities allowed students to reconnect the history of teaching with the social memory of the school, making the future teachers reflect on aspects that usually remain in the shade, despite their relevance. Among these aspects, one of the most important is the emotional component of teaching that stands out strongly from the teachers' accounts: for instance, think of the thousand aspects of daily relations with many children, but also, from another point of view, the great effort to reach the work place, often located far from home on mountainous and inaccessible areas.

Based on these assumptions and supported by a grant from the University of Florence, it was recently possible to bring together a large group of teachers (from universities and schools) and students around a table to discuss *Public History* and the prospects it offers for professionalism. The conference, particularly the session on *Public History of Education 1st National Meeting*, was thus a starting point for a wider project (see the International Conference on *Educational and Career Professions: the contribution of historical knowledge to awareness and knowledge of one's own work*, 5–6 November 2018, Florence[8]). It pertains to this project the idea of extending the use of digital sources for training that has resulted in the creation of a portal collecting, like a big video–blog, a large number of teacher interviews (www.memoriediscuola.it). A similar and parallel project, led by Stefano Oliviero and Emiliano Macinai, has dealt with educators'

8. The Conference and the related activities were granted by the University of Florence, through the *Bando per il finanziamento di progetti strategici di ricerca di base per l'anno 2015 (Grant for founding strategic research projects in the year 2015)*. The scientific committee was made up of Gianfranco Bandini, Pietro Causarano, Patrizia Guarnieri, and Stefano Oliviero.

memories, thus covering even the care activities addressed to the first and very early childhood (www.memoriedinfanzia.it; Macinai & Oliviero, 2017a, 2017b).

Based on these collections (and other activities that are not listed here for the sake of brevity), this fledgling community of public historians is launching Public History events in the area, aimed primarily at in–service teachers to promote historical reflexivity directly on–the–job. Public History, in fact, is a great resource which does not belong only to historians, but to all those who, specialists or not, moving from their specific cultural competences, aim at adopting their dialogue style, social commitment and methodologies.

In fact, what must be underlined is the same contribution that history can offer to the training of a reflective practitioner, that is, of a subject able to observe what is happening as well as himself, going beyond the immediate commitments of daily routines to critically evaluate them and orientate his action towards the improvement of his training, thus developing new knowledge (Schön, 1993, 2006; Striano, 2001). The use of online video resources is a central aspect because it allows viewers to dwell on all aspects of teachers' accounts, including the interviewee's pauses, his hesitations or the emotions shining through the face, the gestures, the voice, while telling their personal stories. The video allows one not only to appreciate all these elements — which would be hopelessly lost in a transcription — but also to return several times to some "frames", especially within a focus group. From this point of view, using digital resources is useful not only to simplify access to testimonials (practical aspect), but also to increase their value since it enriches their meaning (transformative aspect). This approach — which is both didactic and historiographical in nature — goes beyond the boundaries and the tradition of oral history, while maintaining its main and fundamental characteristics. Therefore, it benefits as a whole from different research traditions and, in particular, from the important contribution which was offered especially by English scholars (Gardner & Cunningham, 1997; Gardner, 2003) to the understanding of the value of testimonies for a renewed school history.

Building training scenarios based on the use of digital resources, preferably open, has also two further relevant aspects.

The first element is connected to historical sources that, in the digital context, are suitable to interpretive acts which are partly different from the traditional ones, first of all the paper–based ones.

Furthermore, in the two specific cases that I presented, the sources are natively digital with no analogical precedents. Their acquisition and online loading have therefore an inherent high value of documentation and social memory (Noiret, 2011). As Roy Rosenzweig prophetically wrote a few years ago, history can also be open source and, precisely for this communication mutation, it owns the most suitable characteristics to generate training scenarios of Public History (Cohen, & Rosenzweig, 2006; Rosenzweig, 2006).

The second aspect that should not be forgotten is the contribution that this approach can give to digital and media literacy, that is to an essential element of teacher training (Ranieri, 2005; Ranieri & Bruni, 2018; Verniers & Tilleul, 2014). In fact, digital historical sources, in order to be used and interpreted, require that teachers develop this competence, providing opportunities to apply it during all the phases of the training process entailing the combination of historical and communicative aspects.

For its ability to capture continuity and discontinuity in social behaviour, history appears to be a particularly effective tool for educational professionals, although of not easy and immediate use. Here are some — absolutely current and complex — themes that can be addressed through learning proposals based on digital public history:

— students' assessment;
— the adult–child empathic relationship both at school and in the family;
— the choice and use of textbooks;
— active teaching methods;
— the relationship between school, identity, scientific knowledge;
— school–family relationships;
— the school and globalisation processes;
— immigrant children and their learning needs.

These are multi–problematic aspects of the teaching experience, which require daily choices from teachers. This approach, moving between past and present, contributes decisively to navigate among *multiple perspectives*:

> An important concept shared by both social studies and multicultural education is the concept of 'multiple perspectives'. This concept says that it is

> possible to view any idea, event, or era in more than one way. Stories from history and important civic issues involving humans can almost always be viewed from more than one perspective, and often involving conflicting perspectives (Fry & Schrock, 2016, p. 17).

Providing some tools for a critical understanding of the school, Public History can guide teachers' choices and be useful to modify and improve professional activities. This approach, which often moves from a piece of video (but also from historical photographs or other documents), revolves around historical bifurcation points which deserve to be analysed through *What if...?* questions. It is the question we reflect on to deepen the historical dynamics, but also the contemporary ones resulting precisely from those crucial transitions. Sometimes we can face real dilemmas that — because of their characteristics of ambiguity and difficulty to be solved — lead to the activation of meaningful learning, a real transformation of our perception of the professional context and, sometimes, even of our own personal life (Mezirow & Taylor, 2011).

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/978882552102310
pag. 127–136 (december 2018)

A step back into the future. Recovering Papert's lesson using free software tools

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1. Introduction

In the eTwinning publication titled "Growing Digital Citizens", digital citizenship is described as being based on three pillars: belonging, engagement and protection (Ferrari & Martens, 2016, p. 11). The respective senses of belonging, engagement and responsibility, are all intertwined but they can be fully developed only by means of appropriate digital skills, nowadays. However, what do we actually mean by "digital skills"? The question is relevant since they may involve quite a broad range of competencies, but not all of them require the same degree of commitment as well as the same cognitive involvement. The attribute of "digital native" is by no way sufficient to grant, in a thorough and productive way, the senses of belonging, engagement and responsibility. A large majority of youth is just familiar with digital environments but here the term digital is somewhat misleading. For instance, the ability to sign up to some online service, or the ability to move around the buttons of whatever interface, is just a matter of habit, but such skills are scarcely related to any relevant competencies, usually they are not. The awareness about the digital nature of data and the way things happen in computers or networks is limited.

This means that what people can do is mostly determined by features of graphic user interfaces, which depend upon software design and commercial strategies, and not so much on mastery of the universal symbolic systems underpinning natural languages

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and mathematical thought. It is by means of manipulation of those systems of symbols that one is able to develop deep thought and thorough comprehension of facts. The practice of coding, in its traditional form, involves the manipulation of symbolic information and it is generally recognised that it allows students to create and not only to use. Actually, the discourse on coding practices is embedded in the broader one on computational thinking. Recently, the EC devoted an extended study to the state of the art of computational thinking (Bocconi, 2016). What comes out is that if the sense of urgency to introduce computational thinking in compulsory education is quite strong, at the same time a lack of consensus is still there, even about the mere definition of the concept. Thus, we find ourselves in the uncomfortable situation of acting urgently but without having the possibility of being in control. Things move fast, actually. The time to give shape to the significant lessons learned through ongoing experiences and to take full advantage of them is lacking. This is exactly what is happening to the evolution of coding practices in the educational context. To put it in few words, it seems that, in front of the explosion of languages and devices of every kind, the sound, deep pedagogical and technical motivations that inspired the earlier educational coding experiences have vanished in a sparkly cloud of fancy activities. Nowadays in most school contexts, coding is synonymous with Scratch or, at any rate, of block–based languages. These languages are quite smart for providing a first programming experience to kids. And they are even powerful, allowing for a broad range of coding experiences. Moreover, Scratch fostered the spread of coding a great deal, through its social platform. However, within the whole process, the general idea of coding leaned over the production of animations, which might be fine, because to realise them some quite advanced programming methods are required. What are we missing then? To understand this, we have to recall the lesson of Seymour Papert.

2. A step back into the future

The idea of including computer programming among the educational activities is due to Seymour Papert. Papert, a South African mathematician, arrived in the United States in the mid–1960s after having worked with Jean Piaget for five years. He released the first

version of Logo in 1967, when working at the MIT Artificial Intelligence Laboratory. Logo was an advanced language conceived at the intersection between the fields of artificial intelligence and developmental psychology, as a tool for improving the way children learn and solve problems. Its key idea, using Papert's famous expression, was to allow for a low floor and a high ceiling. For this reason, even if apparently simple in the first steps, its inner architecture allowed users to extend their capabilities in a virtually limitless fashion. A great number of educational languages have been derived from Logo, among which Scratch, by far the most successful. Scratch is a relative of Logo being developed by Mitchel Resnick, a former student and successively coworker of Papert at the MIT. Actually, the basic functionalities of Logo can also be found in Scratch that, however, has many more features, among which the block–based instead of text–based interface and the possibility of building animations or true video games. On the other hand, Logo was thought as a way to explore mathematical concepts in a body–syntonic way, another Papertian expression which refers to the idea of building a geometry — the Turtle Geometry — in analogy with the body geometry which is well known by kids, before they get in touch with formal math. So, what if Logo is in some way included in Scratch? The fact is that all the considerations on what is actually going on when kids are let explore with Logo, all the awareness about the importance of personal discovery of mathematical concepts, all the strong emphasis on creative approach to study scientific ideas have almost completely disappeared. Not because Scratch, or other similar languages, makes such perspectives impossible but because the whole interface is much too skewed towards the childish side. This does not mean that you cannot do quite complex stuff with Scratch, even extremely complex ones. Instead, it is about the fact that most of the activities done in Scratch are about the production of animations and simple games, and by far most of the projects are very basic and short lasting, as has been shown by some recent studies based on scrapping of the Scratch database (Aivaloglou & Hermans, 2016; Matias, Dasgupta & Hill, 2016; Scaffidi & Chambers, 2016). Ironically, the childish flavor, thought to facilitate the introduction to programming, turns out to be a limiting factor, basically because students crave hard: if you complete a hard task you have proven yourself, if you fail... after all it was not so easy (Krouse, 2016a). Paradoxically, Scratch may be frustrating because everything seems so easy but soon it might get much harder.

Because coding is hard. Like math. Making life much easier is not always a good idea. A number of studies have revealed that a Scratch introduction to programming does not necessarily facilitate the transition to conventional coding languages (Lewis, 2010; Lewis, Esper, Bhattacharyya, Fa–Kaji, Dominguez & Schlesinger 2014; Weintrop & Wilensky, 2015). That is why new approaches for easing the transition to "true languages" are emerging (Homer & Noble, 2014; Price & Barnes, 2015; Krouse, 2016a). But still something is missing.

Let us recall some reasoning of Seymour Papert (1986):

> Welcome to the Logo tapes. These tapes are about logo but they are not just about logo, beyond logo they are about thinking. They are about how to think about computers, and how to use computers to think about other things. They are about how to use a Logo experience, to develop new thinking skills for yourself as much for you students. But even beyond thinking, the tape has much to say about feelings. People, adults as well as children, have strong feelings about computers, and their experience with computers influence the way they feel about many other things. For example, about school, about learning and most relevantly here, people's experience with computers often influences the way they think about themselves.

The lesson of Papert is by no way a purely technical one. Nor is it limited to specific competencies, or accessing information, sharing and so on. Papert's idea of using computers in education is a holistic one. Logo was conceived to explore geometry, math, or even science, by means of clever simulations. But even more than that:

> The main purpose of Logo is not what they call "computer literacy" — of course it serves that, based on anything else I can think of, but the real purpose is not to have better understanding of computers but through computers to have better understanding of everything else including, I'd like to say, yourself. [...] I'm not trying to give you a theory of what causes children to be so involved and engaged with a computer, I'm trying to encourage a way of thinking that looks beyond the role of the computer in teaching one or another corner of the curriculum and tries to look at the emotional roots of what's going on.

Papert's thought emphasises the pleasure and benefit of discovering learning, appropriation, making knowledge your own in a way you feel good about it, seeking resonance between the immediate learning experience and the larger experience that makes up the learner's life.

> In this tape, I tried to show how a teacher can use Logo to play the role of intellectual glue, the role that mathematics has made for me. At other end, by some reflections, unpacking the intuition every teacher has, that is good to make connections... well why? There is a cognitive side: connections help you understand, you understand the new by referring to the old, they help you remember. But there is a deeper side, one that has to do with how you feel about knowledge and how you feel about yourself. Connecting new knowledge to things you know and love and things you can do makes you feel good about it, makes you take it in a form that is your own, but taking knowledge in form that feels to you as you, you change your feelings about you as well. You no longer think about yourself as somebody who can do math but doesn't really understand poetry, or can draw but doesn't have the head for numbers. Instead, you appropriate all knowledge in a form that is yours, that you can do, that you can love. And through loving what you know you love yourself more.

These words have been extracted from a video series made in 1986. However, even if the technologies used by Papert in these videos may appear quite obsolete nowadays, and even if the software derived from Logo in these thirty years are extremely valuable, we feel that the vision of Seymour Papert still belongs to the future and it is something we still have to strive for. We believe that these considerations give the right tone to bring people from the lower to the upper ladders of the digital participation process described in "Growing Digital Citizens": from watching to sharing, to creating and, finally, to harness the potential of technology for a better society (Ferrari & Martens, 2016, p. 12).

3. A step back into the future

3.1. *Free software*

According to Article 2, first clause, of the Treaty of European Union:

> The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities.

According to the Free Software Foundation[1]:

1. Free Software Foundation: https://www.gnu.org/philosophy/free-sw.en.html.

> "Free software" means software that respects users' freedom and community. Roughly, it means that the users have the freedom to run, copy, distribute, study, change and improve the software.
>
> [...]
>
> A program is free software if the program's users have the four essential freedoms:
>
> *a*) The freedom to run the program as you wish, for any purpose (freedom 0).
> *b*) The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
> *c*) The freedom to redistribute copies so you can help your neighbor (freedom 2).
> *d*) The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

Free software can be adapted by local communities and minorities to suite their specific needs and languages, particularly in the multicultural and multilingual context of the European Union. It is ethical and useful to use it and spread it freely. It counteracts the tendency of breaking proprietary software, which is against the law. It can be modified and improved by anyone who is capable of doing it — and many young people are perfectly able to do it. It fosters collaboration and cooperation on complex shared projects. Free software is a powerful incentive to a creative and ethical approach to the use of technology. It is therefore a relevant instrument of democracy, particularly in educational contexts, in harmony with the founding values of the European Union. One can use free software by adopting different levels of commitment. The most radical choice is to use the Linux operating system. Linux is a smart operating system with several advantages for most users and nowadays can be installed rather easily. However, even if virtually any user could afford the transition, in practice many users might have reasons to keep their systems, no matter whether Windows or Mac OS X. However, free software can be adopted at the much easier level of single applications. There are very good applications which can be installed on all operating systems, such as the office suite LibreOffice[2], the Gimp[3]

2. LibreOffice is a community–driven and developed software from the not–for–profit organization, The Document Foundation: http://libreoffice.org.

3. Gimp: http://gimp.org.

image editor and the Audacity[4] audio editor, just to mention some among the most popular ones.

3.2. *Free software*

The appropriateness of the free software model for multicultural contexts stands out in the case of LibreOffice: some 50 worldwide communities are active in developing and maintaining their respective localized versions of LibreOffice[5] but right now 178 languages are supported to some degree, that may include localized user interface, localized help system, auto–text lists, auto–correct list, spell–check dictionaries, hyphenation patterns, Grammar check and Thesaurus (synonyms)[6]. LibreOffice includes all the typical applications of office suites for writing, presenting, organizing data, drawing and so on. But the reason why we are stressing here the interest in LibreOffice is because, among the numerous functionalities there is LibreLogo[7], a pretty thorough version of the Logo language, available by default among the standard LibreOffice tools since the 4.2.3.3 version (2014). Recalling Seymour Papert's principle of a low floor and a high ceiling, LibreLogo is a very clever implementation of Logo. The "floor" is extremely low since to begin with you have to enter Writer (the standard LibreOffice word processor), then write down some Logo instructions and run the code just by pushing a menu button. If the code is correct an image is embedded in the document as a standard LibreOffice vector graphics. That way it is extremely simple to begin experimenting with Papert's "Turtle geometry". As we have said, actually Scratch was derived from Logo but, instead of being coded by means of text instructions, it uses colored blocks which can be put together in a Lego–like manner to compose a program. The advantage of this system is that of avoiding the possibility of orthographic and syntactic errors. This may lower the floor at the beginning but successively, it may even hamper the transition to "true languages", as we have pointed out before. In LibreLogo you have to type text instructions, which at the beginning may be more demanding but

4. Audacity: http://www.audacityteam.org/.

5. Native–Lang LibreOffice Projects: http://www.libreoffice.org/community/nlc/.

6. LibreOffice language support: https://wiki.documentfoundation.org/Language_support_of_LibreOffice.

7. LibreLogo: http://librelogo.org.

no more than writing simple English sentences. Indeed, it is good that the same kind of skills may be useful in different areas. LibreLogo can be used off line, without having to be connected to a web service, something that can cause some digital divide problems — in many regions this is still an issue. Even the sharing of programs, for exchanging problems and solutions, is extremely easy since it simply requires sending short pieces of text, by whatever means, again without having to rely on an online platform. Finally, with LibreLogo the emphasis is naturally put on math and science, again, which is a good thing since the spread of a true scientific culture is still an issue. Last but not least, perfectly in the spirit of free software, we got in touch with Németh László, the Hungarian computer scientist who wrote LibreLogo, in order to collaborate to improve the software, following the experience we made in the university courses. We hope to profit from this contact because the objective to foster the development of a relevant European competence on the subject is quite interesting.

3.3. *The experience in the primary schoolteacher curriculum at the University of Florence*

At the University of Florence, we made an extensive experimentation of LibreLogo in the Educational Technologies Lab of the Primary Schoolteacher major[8]. The class was composed of 250 students. Moreover, we proposed the same approach to a class of 34 teachers in an online continuous training course. In these classes a text written by one of the authors was used to let the students explore LibreLogo according to Papert's Turtle Geometry (Formiconi, 2016). The basic idea was to foster learning by discovery as much as possible, exactly in the same way the schoolteachers will be expected to do with their pupils. A fundamental role was played by the forum, where the students were encouraged to share problems and solutions, simply by exchanging relevant pieces of text codes within the forum posts. During the 9 weeks of course, they wrote more than 400 posts of this kind. Many of them experimented what they learned right in their training activities, whereas the schoolteachers attending the continuous training course brought their new Logo expertise in their classes and reported feedback in the forum. The discovering

8. We are using here the *term* major referring to the Italian *corso di laurea*.

learning approach was appreciated pretty much, as several students commented: — It seems you are treating us like kids: this is useful for us! A great deal of ideas and unexpected approaches emerged from the class, with powerful emulation effects. We had those exploring the drawing fancy alphabetical letters, those who realized digital Tangram figures, those creating a zoo of funny animals, the more math inclined explored the construction of complex geometrical shape and, most interestingly, those that mixed the mathematical control in drawing figures with a kind of aesthetics research, looking, at the very end, for the most pleasant results: kind of STEM to STEAM path.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/978882552102311
pag. 137–152 (december 2018)

Visible traineeship

A video–enhanced path for pre–service teachers' competences

Laura Menichetti*

1. Introduction

In Italy, teacher training is entrusted to the University and to accredited entities decided by Ministerial decree, so that the same legal value is guaranteed on a national level and various Universities can propose equivalent curricula[1].

The main characteristics of the courses (duration, number of training credits, disciplinary scientific sectors, etc.) are pre–established, while each University sets specific learning objectives, teaching methods, types of assessments and course programmes.

The training of pre–service teachers includes a traineeship, to be carried out partly at the university (indirect traineeship) and partly at school (direct traineeship). This traineeship constitutes a moment of potential virtuous interaction between theory and practice for novices (Baldacci, 2010) and an opportunity for the whole teaching body, pre–service and in–service, to rethink the profession (Schön, 1983).

If properly interpreted, the traineeship allows the various subjects involved to share values, behaviours, practices and to achieve learning *for* the school: the learning of the individual becomes a common capital for a learning organisation (Argyris, 1999; Senge, 1990).

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1. The main legislative principles are contained within the Testo unico delle disposizioni legislative in materia di istruzione D.lgs. No. 287/1994 as further amended, the D.P.R. 275/1999, the D.M. No. 249/2010 Regolamento per maestri della scuola dell'infanzia e della primaria, the Law 107/2015 per il riordino, l'adeguamento e la semplificazione del sistema di formazione iniziale e di accesso ai ruoli dei docenti, the D.lgs. No. 59/2017 per docenti della scuola secondaria, oltre che dal contratto collettivo dei docenti (CCNL).

The trainee, however, must be adequately prepared by the University to recognise and critically assess good teaching behaviours, to design effective educational activities, to put in place dynamics of profitable interactions with the pupils and the peer community, otherwise he/she will tend to adopt as references the practices that he/she will find in the hosting sections/classes and he/she will conform to them regardless of their real quality, limiting himself/herself to reproduce the current educational system, without taking into account the innovations and the results of the most recent research (Calvani, Menichetti, Micheletta & Moricca, 2014).

In the academic year 2011–12, the Primary Education Degree at the University of Florence launched a project aimed at improving the quality of the traineeship (Calvani, Biagioli, Maltinti, Menichetti & Micheletta, 2013) and today the result is a structured process that characterises the curriculum path (http://www.qualitaformazionemaestri.it/).

2. Professional standards for Italian pre–service teachers. A competence profile

The reference national legislation for the University path for pre–service teachers in childhood and primary schools does not define the competence profile and each University, although within certain constraints, has construed the legislation by organising different education paths (Falcinelli, 2011; Galliani & Felisatti, 2001).

The first question addressed by the group of experts of the University of Florence concerned the competences that the trainee would have to achieve. An explicit reference model that guides the process of acquiring expertise has to be defined.

Such a model has to address all the main subjects involved in the traineeship process:

- University students, in their current role as trainees, during their training as pre–service teachers;
- In–service teachers who welcome trainees in their sections/classes (School Tutors);
- Expert teachers who are seconded to Universities to perform coordinating activities for the trainees (University Tutors).

The purposes of model are:

— the transparency of the traineeship process and of the initiatives aimed at its continuous improvement;
— a non–subjective assessment of the expertise acquired by the trainee;
— the creation, around the traineeship, of a well–integrated community of practice, where University and School, University Tutor and School Tutor jointly participate with defined roles;
— the achievement of a good class practice and of a good class teaching interaction, documented for the purposes of continuous improvement;
— the possession by the trainee of all the basic literacy;
— the achievement by the trainee of an appropriate level of transversal competences — including, for instance, digital and English linguistic competences — for teaching activities and for his/her professional development;
— the availability, within the Primary Teacher Degree, of a tool to identify the critical area for the trainee, at an early stage, in order to implement any compensatory measure or professional re–orientations;
— the availability, within the Primary Teacher Degree, of a tool and a specific procedure to set a possible additional score to be assigned in the final degree assessment.

From a research and planning activity, we have derived a framework of competences that we have called S3PI[2].

This exhaustive framework for the expected competences is suitable for promoting shared ongoing feedback and a final certification (Bandini, Calvani, Falaschi & Menichetti, 2015).

The achievement, over a period of 4 years[3], of at least a basic level for each of these standards is an essential condition for the teaching qualification in childhood or primary Italian schools.

The educational consideration conducted on the development of competences of pre–service teachers — the trainees — relies on

2. In Italian *Standard Profili Professionali per Primaria e Infanzia* (Standard Professional Profiles for Primary and Childhood School).

3. The Primary Teacher Degree has a global duration of 5 years, but the traineeship starts from the second year.

the one hand on the elicitation of expert practices coming from the school environment (through the tutors[4]), on the other hand on the results of scientific research at international level (i.e. Danielson, 2007; 2011; 2013; Perrenoud, 2002; 2006), and also on the comparison of institutional systematisations created through the work of commissions specifically designated by other countries (i.e. Qualified Teacher Status in the UK, InTASC in the U.S.A., French model, Quebecoise model) (Bandini, Calvani, Falaschi & Menichetti, 2015).

Within the various international systems and models, albeit with different formulations, there are some common competences which are considered as key elements of the professional action of an expert teacher and from these it is possible to deduce those of a good trainee. The model is then structured as follows:

Role (pre–service teacher)
→ Area of competence (4)
→ Competences (23)
→ Descriptors of competences.

Here below is a summary of the framework. For each competence, the assessor is indicated — School Tutor (ST) or University Tutor (UT) — together with the annuity in which the competence develops.

2.1. *AREA 1 — Values and behaviours*[5]

1.1. Interpersonal sensitivity and positive expectations (ST, 1, 2, 3, 4) — The trainee connects with the children and emphatically understands their emotions and needs and creates a stimulating environment that values diversity.

1.2. Ability to cope with unforeseen critical situations (ST, 1, 2, 3, 4) — The trainee establishes balanced educational relationships, showing promptness and effectiveness even in the face of stressful, unforeseen, situations of conflict.

1.3. Sensitivity towards contextual factors (UT, 3, 4) — The trainee knows how to deal with the territory and the social, cultural

4. Boffo (2014) defines the action of the tutor as "the guidance of a magister for a scholar" ("la guida di un magister rispetto ad un allievo"), he/she who transmits an orientating direction to the educational process.

5. This area concerns key elements for every care profession; for a teacher, it is difficult to accept shortcomings even in one of these competences.

and family contexts in which the children live and identifies constraints and potentialities.

1.4. Responsibility (ST/UT, 1, 2, 3, 4) — The trainee adopts the professional ethics of the reference community, behaving responsibly towards the school, colleagues and tutors. Teaching is made transparent and accountable.

2.2. *AREA 2 — Knowledge and understanding*[6]

2.1. Use of language (ST/UT, 1, 2, 3, 4) — The trainee can communicate in Italian (oral and written) in a clear, correct, suitable for the context way, at all levels of language (phonology, morphology, syntax, vocabulary). He/she is able to write with various tools: pen, pencil, chalk, keyboard, digital pen for the interactive multimedia whiteboard.

2.2. Numeracy (ST/UT, 1, 2, 3, 4) — The trainee can easily apply the four arithmetic operations, the calculation of fractions, the percentages, the graphs. He/she performs mental calculation operations and uses elementary geometry.

2.3. Manual and visual communication (ST, 1, 2, 3, 4) — The trainee can set up games with various materials, integrates oral communication with visuals.

2.4. Disciplines (UT, 2, 3, 4) — The trainee has mastered the fundamentals in the various disciplines and knows how to translate them into appropriate courses to achieve the targets set by the ministerial indications.

2.5. English (UT, 1, 2, 3, 4) — The trainee can understand texts, even complex, related to his/her own field of specialisation, is able to interact orally with fluency, he/she can produce articulated texts on topics related to his/her professional field.

2.6. Digital skills (UT, 1, 2, 3, 4) — The trainee uses digital technologies in an effective and responsible way for his/her professional development, he/she can assess their use in relation to the different teaching methods, he/she supports the developments of the students' digital competences.

2.7. Legislation (UT, 3, 4) — The trainee knows the basic legislation on school organisation, on school autonomy, on the

6. The competences related to this area are the basic skills for those who aspire to become a teacher.

functioning of the collective bodies, on the work contract.

2.8. Strategies and evidence–based methods (UT, 4) — The trainee can gather information through libraries, documentation centres, online resources. He/she knows how to identify scientific documents informed by evidence and undertakes to translate them into practice.

2.9. Observation form and evaluation tools (UT, 1, 2, 3, 4) — The trainee knows how to operationalise a teaching objective and associate it with a final verification tool. He/she can provide ongoing feedback, conduct systematic observations and certify competences.

2.3. *AREA 3 — Teaching interaction*[7]

3.1. Planning of the educational activity (ST/UT, 1, 2, 3, 4) — The trainee can properly operate a teaching plan, he/she selects appropriate strategies and activities, manages time and space, controls the coherence of all the elements of an educational activity.

3.2. Structure of educational activities (ST, 3, 4) — The trainee can plan and conduct a lesson/activity, by sharing the objective with the children, recalling the previous knowledge and activities already performed, keeping attention high, concluding the educational activity with metacognitive thinking.

3.3. Cognitive quality (ST, 3, 4) — The trainee shows a mastery of the contents. He/she adapts the activities to the children's cognitive abilities, by working in their zone of proximal development, he/she simplifies or varies the communication channel, especially when facing learning difficulties or talents. He/she has a problematising approach, launches challenging proposals, focuses on the essential points.

3.4. Quality of communication (ST, 3, 4) — The trainee uses clear language, creates an emotionally involving atmosphere, modulates the tone and rhythm of the voice, coherently uses non–verbal communication. He/she presents information without creating cognitive overload, dispersion, inconsisten-

7. The competences related to this area concern the teaching planning and the related implementation of the educational activity in the section/class, with a focus on the cognitive, communication and management dimensions.

cies.

3.5. Class management and quality of feedback (ST, 3, 4) — The trainee manages the section/class in an inclusive manner, calibrates the alternation of frontal lessons and practical activities, controls the timing, provides feedback, provides positive reinforcement.

3.6. Organisation and rules (ST, 3, 4) — The trainee puts emphasis on the respect of rules by the children. He/she makes the section/class perceive the sense of his/her presence (withinness).

2.4. *AREA 4 — Professional community and training*[8]

4.1. Teamwork (section/class) (ST, 1, 2, 3, 4) — The trainee shares the various aspects of the process of teaching–learning with the School Tutor, thereby developing the professional community.

4.2. Collegial work (centre/institute) (ST, 1, 2, 3, 4) — The trainee shares projects, initiatives and work plans with the School Tutors, he/she manages the common activities, he/she participates to the meetings between the sections and the classes in an appropriate manner.

4.3. Relational and communication (shared) (ST, 1, 2, 3, 4) — The trainee establishes positive relationships with points of reference in the school (School Tutor, technical and administrative staff, parents, school principal).

4.4. Rethinking and self–assessment (UT, 1, 2, 3, 4) — The trainee is able to critically review his/her own training experience, by identifying weaknesses and strengths. He/she has an open approach towards continuous improvement. He/she documents his/her experience with consistency, clarity, critical ability.

As can be seen, the model complies with the current Italian legislation.

Moreover, in order to implement it in practice, the model is accompanied by a set of tools, such as a training register (shared

8. The competences related to this area concern the ability to establish relationships with the relevant professional community, with the families and with the local structures.

between the trainee, the tutors and the school principal so as to keep track of each person's responsibilities and activities), a workbook (used by the trainee to document his/her thinking activities and shared with the UT at the end of each year), summary sheets for annual assessments[9].

3. Make learning visible. A video–enhanced path

The S3PI model indicates the objectives that the trainee must achieve during the entire training course.

This being said, a question arises as to which may be the most appropriate path and strategies to achieve these goals.

Area 3 of the S3PI model refers to an active phase, in which the trainee physically goes to the school and gets in touch with a class, but it has now been established that for the creation of expertise, what matters is not the practice itself, but the "practice as a deliberative goal–directed activity" (Hattie & Yates, 2014, p. 96). It is therefore necessary that the trainee — in particular when developing the competences indicated in Area 3 — alternates phases of action and phases of thinking, in cyclical processes.

At the University of Florence, we experimented a theoretical–practical methodology that we called MARC[10] (Calvani, Biagioli, Maltinti, Menichetti & Micheletta, 2013; Calvani, Menichetti, Micheletta & Moricca, 2014; Calvani, Maltinti, Menichetti, Micheletta & Orsi, 2015; Maltinti, Micheletta & Menichetti, 2015), whose foundations lie in two methodologies based on authentic experience: lesson study and microteaching.

The Lesson Study (Figure 1) is a methodology born in the East and subsequently spread in the United States, which aims at the professional development of teachers and involves them in a recursive process of teaching planning, teaching, thinking with observers. At the basis of the Lesson Study there is the group of teachers that develop the planning (also called research lesson): a teacher carries out an educational activity that comes from the joint planning, in the presence of colleagues who observe the students' reactions, i.e.

9. All the material is available on the website http://www.qualitaformazionemaestri.it/.

10. In Italian *Modellamento, Azione, Riflessione, Condivisione* (Modelling, Acting, Rethinking, Sharing).

how they interact and participate. If the expected results are not achieved, the group of teachers integrates and modifies the lesson plan. And this is done in an iterative way(Cheung & Wong, 2014; Lewis, Perry, Friedkin & Roth, 2012; Stigler, Gonzalez, Kawanaka, Knoll & Serrano, 1999; Timperley, Wilson, Barrar & Fung, 2007). The entire cycle of fine–tuning of a complete academic path for a strategy or a subject is usually accomplished within a couple of years of work, it requires a strong motivation and willingness to give and receive suggestions.

Microteaching (Figure 2) is a programme created at the University of Stanford, oriented towards the training of the teachers (Allen, 1967). It proceeds by observing the behaviour of a teacher holding a micro–lesson (around 10 minutes) in a class. The observation makes use of a video recording that allows a review alone, with experts, or with peers. The goal is to gain awareness of one's own potential and weaknesses, the physical track represented by the recording is used for the transparency of the process and to allow a rethinking spaced in time and with different modalities. Microteaching has now

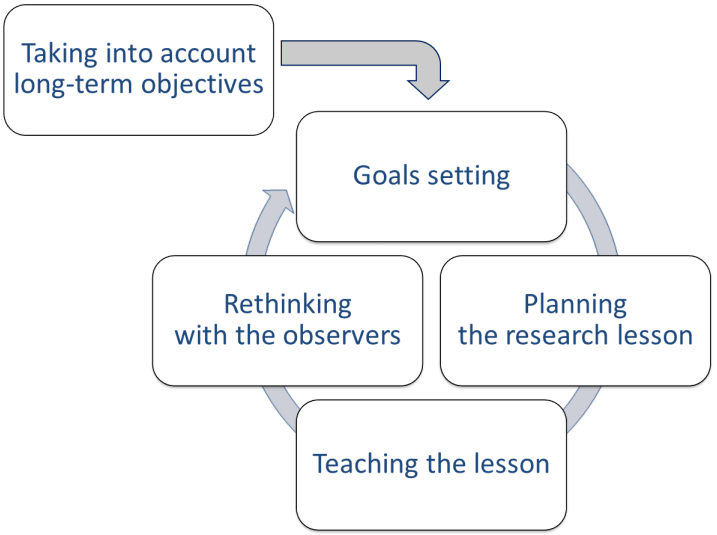

Figure 1. Chart of the lesson study. Source: Adapted from Lewis, Perry & Murata, 2006, p. 4.

Figure 2. Chart of microteaching.

acquired a new significance thanks to the flexibility allowed by digital editing and remote viewing of films via Internet (Seidel, Stürmer, Blomberg, Kobarg & Schwindt, 2011).

Videotaping, which is optional in the lesson study and constitutes a characteristic element in the microteaching, allows triangulations between multiple observers and, through an appropriate training programme for the observers, a reduction of the effects of personal equation, which can introduce errors in judgment caused by individual characteristics.

MARC is therefore a video–enhanced path developed in 4 phases (Figure 3):

— Modelling. It takes place in the University context: in this phase, the trainee receives from the University Tutor both the methodological input to realise his/her educational activity, and a guide for video analysis, in order to grasp the significant aspects of the teaching behaviour;
— Acting. The trainee carries out an educational activity in the section/class, with children from childhood or primary

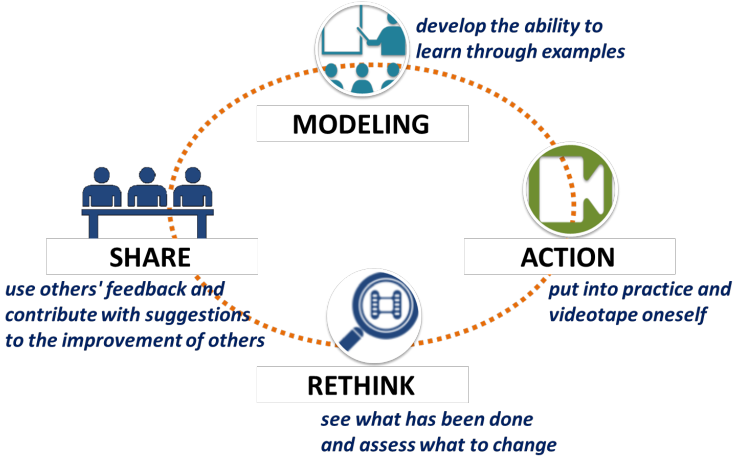

Figure 3. Chart of MARC, video–enhanced path for pre–service teachers.

school. With a digital device (smartphone, tablet, etc.), he/she is recorded while holding a microlesson;
— Rethinking. The video is assessed by the trainee himself/herself;
— Sharing. The trainee examines the video in the University context, with his/her peers and under the supervision of the University Tutor.

Over the last years, research has made significant progress and has shown the most effective strategies to teach. There is wide positive evidence that high levels of learning can be achieved when both teaching and learning are made visible (Hattie, 2012). Videos recorded at school allow one to document the implementation of educational projects — that trainees have designed at University — and constitute good feedback in themselves, which is necessary for improvement. However, the realisation of the project is also supported by some ad hoc tools. Research tells us that novices, if not guided, tend to focus on superficial aspects shown in the video (dress, tone of voice, etc.), while behaviours and decisions should be detected

instead (Santagata, 2013). To give an example[11], in the MARC, guided forms for video observations are provided, so that the trainees can more easily intercept the characterising dimensions of an effective lesson: the start, the development, the conclusion (Calvani, 2014). For the starting phase, the form asks if the teacher has set up the environment, has focused the attention on himself, has activated the previous knowledge of the pupils. During the course of the lesson, the focus is put on the communicative, cognitive and management dimensions: have the teacher and the pupils been put in a position to use multimodal expressions? Has the teacher monitored the cognitive load? Has he/she used visual communication? Has he/she also used a challenging approach, has he/she proposed problem solving, has he/she applied content in different contexts...? And again, has he/she shared the rules with the section/class, has he/she provided feedback, has he/she interacted with peers, has he/she encouraged everyone's participation...? In the conclusion phase, has he/she used a metacognitive approach to consolidate learning and encourage self–regulation and acquisition of study strategies? The videos are accompanied, together with the educational resources which are strictly necessary for an effective teaching, also by tools that are used to assess the path. From an assessing point of view, protocols were defined and specific tools were created. Some of them are used only in the experimentation phase, others are periodically reapplied for a constant monitoring, in order to allow the detection of positive or negative changes with respect to the values used as benchmarks. These tools are able to detect the trainee's change towards the behaviours that they attribute to a good teacher, verify how students and tutors perceive the path in terms of effectiveness, its sustainability and its attractiveness[12].

4. Conclusions

"The quality of teaching is one key factor in determining whether the European Union can increase its competitiveness in the glob-

11. For further developments on all educational resources related to videos, see the website http://www.qualitaformazionemaestri.it/.

12. For further developments on the results achieved, see Calvani, Maltinti, Menichetti, Micheletta & Orsi (2015).

alised world. Research shows that teacher quality is significantly and positively correlated with pupil attainment and that it is the most important within–school aspect explaining student performance (its effects are much larger than the effects of school organisation, leadership or financial conditions)." (European Commission, 2007).

Scientific research has shown that the competence of professionals, and therefore also that of the teachers, is acquired through cycles that start from experience and, through observation, rethinking, conceptualisation and modelling, they progress into new experiential situations (Le Boterf, 2000; Kolb, 1983; Lewin, 1946). The University of Florence, after having designed a framework of expected competences for pre–service teachers (S3PI), has dealt with the improvement of the traineeship by adapting a theoretical–practical circular methodology focused on the children–teacher interaction, called MARC, which exploits the potential of video–education.

For the Degree in Primary Teacher Education, recording a video in the section/class is one of the steps of a wider process of planning, action, systematic observation, rethinking that the trainee recurrently carries out during the four years of traineeship. When the MARC project was being experimented, however, all the subjects involved experienced a climate of embarrassment and feared judgement for what was perceived as the final assessment element, as if the pluriannual path was to be evaluated only on the basis of a 10–minute video.

For the trainees, the critical aspect was the camera, the School Tutors lived in a non–serene atmosphere because they considered their class to be investigated and the University Tutors felt judged in their ability to observe. So far, in Italy the professional identity of the teacher has been perceived in individualistic terms, the section/class is seen as a private space in which to act behind a closed door and this also has consequences on an emotional level. However, the change has been largely metabolised: the recurrent application of MARC in many Tuscan schools, accompanied by a training programme directed to in–service teachers is slowly changing the widespread mentality; the pre–service and in–service teachers are more willing to give and receive suggestions.

In the meantime, what initially was the *project* MARC has now undergone an institutional rooting: the model, approved by the Council at the University, has been extended to all training groups.

There remain some critical issues related to archiving, storage

and retrieval of videos, aspects that on the one hand are merely technical and on the other have to follow educational criteria.

At the level of general framework, significant progress has been made in particular in the preparation and involvement of University Tutors, as well as in the relations with the schools, by including the description of the traineeship model in the agreement between the schools of the regional territory and the University of Florence.

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/978882552102312
pag. 153–163 (december 2018)

Thinking aloud about digital pictures

How to promote reading comprehension in Teacher Education

Stefania Carioli*

This chapter illustrates the application of the metacognitive teaching technique called Think Aloud to the reading of pictorial narratives to develop reading comprehension processes from preschool to early elementary school.

Starting from the analysis of the main comprehension processes involved in reading of texts conveyed by different media, it suggests the suitability of some high–quality texts in digitised format — such as the narratives in wordless picture books — which, rarely present in school libraries, are instead available on the Internet. These are published both as a preview and as a complete version.

The training proposal described can be identified as a workshop for preschool and primary school teacher education.

1. The importance of promoting Reading Comprehension

The reading comprehension is the activity of making meaning from a text and its outcome is a coherent mental representation of the text (McNamara, 2007). This mental representation is based on an interactive set of operations and complex cognitive functions (Woolley, 2011), whereby the main operations consist of inferential processes. Through these, the reader identifies meaningful relations between the various parts of the text and integrates text–based information with the reader's background knowledge (Kendeou, Bohn–Gettler, White & van den Broek, 2008). A good reading comprehension is the result of a long learning process, which is rooted within narrative

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comprehension, fundamental to begin reading (Paris & Paris, 2003). In fact, an important aspect that emerges from research is that early narrative comprehension skills "uniquely predict reading success when the child enters elementary school" (Kendeou, van den Broek, White & Lynch, 2007, p. 41). The comprehension of children who are not yet literate is similar yet systematically different from that of older children, as the specific sensitivity to the causal structure of narrative and the ability to focus and to make connections, develop with age (Kendeou *et al.*, 2007). Nevertheless, if guided and supported, pre–literate children can interconnect events in the stories they hear or see, can generate inferences, can draw on their background knowledge, and ultimately construct a coherent, mental network representation of the narratives (Kendeou *et al.*, 2007).

The first implication for educational practice concerns the importance of promoting reading comprehension processes at a young age and a method for instruction for such development. In other words, the fact that preschoolers' comprehension skills predict the later verbal text reading comprehension, suggests that fostering comprehension skills in preschool children may help them better comprehend when they begin to read verbal texts years later. Although it is recognised that a balanced reading programme would include the development of comprehension skills, "comprehension has often been overlooked in early reading instruction" (Kendeou, Lynch, van den Broek, Espin, White & Kremer, 2005, p. 92).

1.1. *Interrelation across the reading comprehension of texts conveyed by different modes and media*

A series of studies have investigated the degree to which children's inference generation ability is generalised across texts conveyed by different modes and media — pictures in printed books and written texts in printed books (Paris *et al.*, 2003), written texts in printed book, aural texts via audiotape, audiovisual texts via television (Kendeou *et al.*, 2005; Kendeou *et al.*, 2007; Kendeou *et al.*, 2008). Findings suggest that there is a highly inter–relation across the reading comprehension of texts conveyed by different modes and media. Namely, the processes used during comprehension of texts conveyed by different media are considerably similar:

> When children look at pictures in books, the process of meaning making

> is like the cognitive efforts to construct meaning from printed words. For example, children construct relations among characters, actions, and events in pictures or text based on the contextual clues and their prior knowledge (Paris *et al.*, 2003, p. 39).

The positive transfer of comprehension skills across media is plausible for several reasons:

> first, the structural story factors that predict which events children will recall when they are presented with a story are not medium specific. [...]. Second, children's ability to make inferences follows a developmental pattern that is consistent across different media (Kendeou *et al.*, 2007, p. 32).

With the aim to develop reading comprehension processes, we propose the use of high–quality pictorial narratives in digitised format — such as wordless picture books.

2. The opportunities offered by the visual reading of digital pictures

Reading the digital version of a pictorial narratives on a screen (for example, using an interactive whiteboard) allows a dialogic experience (Kajder & Swenson, 2004; Mercer, Hennessy & Warwick, 2010) — as digital pictures can be manipulated, projected, zoomed and analysed in the details — and talking can be used as a tool for "thinking together" and as a "resource for organising and focusing children's involvement" (Mercer, Fernandez, Dawes, Wegerif & Sams, 2003, p. 81). Moreover, wordless picture books with high narrative–aesthetic qualities are hardly present in printed version in school libraries, also because of their high price, whereas, they are instead available on some online platforms, or on some sites of important publishers of children's literature. Indeed, the Internet offers a range of quality resources, such as the preview or full vision versions of books from self–publishing platforms (Carioli, 2017). The pictorial narratives proposed in this chapter are available — within legal compliance — in the electronic publishing platform ISSUU, in scanned version to make them available online. In this case, the picture books are maintained "in [their] entirety, retaining the original design, keeping intact features such as the cover, endpapers, book shape, double spreads, illustration placement, and font. Nothing was added; nothing taken

away" (Yokota & Teale, 2014, 578). An eventual availability of the same picture books also in paper version allows further integration between printed and digital text.

Besides being texts that can be used by pre–literate children, the pictures can be read by pupils who have difficulty understanding the alphabetic text, for example, non–native speakers (Verhallen & Bus, 2010). Furthermore, the opportunity to read pictures is linked to the preponderance of this type of text in our media landscape.

3. Guiding the visual reading comprehension with the Think Aloud instructional technique

The scientific literature has shown the effectiveness of curricula centred on the promotion of the ability to understand through metacognitive techniques, based on modelling interventions, such as the Think Aloud (Baumann, Seifert–Kessell & Jones, 1992; Bauserman, 2008; Block & Israel, 2004; Davey, 1983; Dorl, 2007;Gold & Gibson, 2001; Ness, 2016). This has also recently been adapted to develop online reading comprehension with older children (Carioli & Peru, 2016; Coiro, 2011). In the TA "a teacher verbalizes thoughts aloud while reading a selection orally, thus modeling the process of comprehension" (Harris & Hodges, 1995, p. 256). This technique is based on the assumption that students learn best when they have the opportunity to observe a good model, and therefore, listening to the verbalisation of the thoughts that guide the teacher's reading: the attention that she/he places on certain informative details contained in the text, the recollection and the connections with previous knowledge, the hypotheses that she/he advances (Block *et al.*, 2004). In addition to modelling, the TA consists of two other phases — The guided practice and collective reflection — which the teacher will adapt according to the age and needs of the children.

But an effective application of the TA requires specific training (Pressley, 2002). The training proposal described in this chapter for preschool and primary school teacher education implies:

a. clarifying the main processes involved in the comprehension of texts conveyed by different modes and media — that is, the recollection of previous knowledge, identification of important parts of the text, inferential reasoning;

b. preparing the verbalisation of thoughts and strategies during

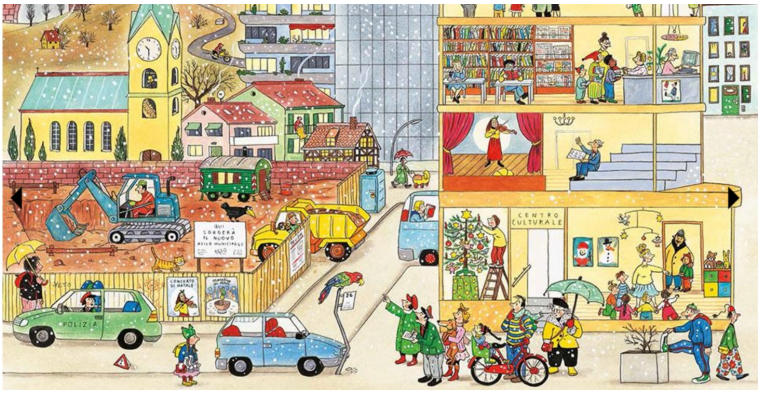

Figure 1. Picture taken from the wordless picture book (wimmelbilderbücher) *Inverno*, a visual text teeming with activities, people, games, animals. SOURCE: Rotraut, Susanne Berner (2018). *Inverno*, Milano: Topipittori. https://www.topipittori.it/it/catalogo/inverno.

reading comprehension of pictorial narratives in digitised format.

3.1. *Clarify the main processes involved in the reading comprehension*

The digital picture chosen by way of example is extrapolated from a wordless picture book (see Figure 1), offered in preview version by the publisher. This pictorial narrative lends particularly well to the development activity of the processes involved in reading comprehension: there are many characters that do something, there are many hidden elements that can be searched. The text can be decomposed, analysed and understood in the details of its sections, and to be recomposed into one, just as it happens in the verbal text: the individual parts that make up the image, although also self–consistent, and therefore significant for themselves, together they represent a coherent and cohesive text.

To clarify the main processes involved in the reading comprehension it is necessary to:

a) identify the important information from the text;
b) recall the previous knowledge;
c) activate the inferential processes.

Table 1. Model that teachers can use to teach inferences. Source: Adapted from: http://www.readingrockets.org/pdfs/inference-graphic-organizer.pdf.

Step 1 Write the question	Example: Why did the car hit the pole?
Step 2 Find information from the text that will help answer the question.	Example: Falling snowflakes
Step 3 Think about what you know about that information.	Example: The prior knowledge that when it snows, the road is frozen and that the icy road is slippery.
Step 4 Combine what the text says with what you know to come up with the answer.	Example: The accident (the car that hit the pole) was caused by frost, which made the road slippery.

Let us focus on a piece of this swarming picture. The fixity of the picture is a prerequisite for the thoughts to have the time to emerge and express themselves. To comprehend what is happening in the lower centre section, it is necessary to integrate, through the inferential processes (3.), the information provided by the text (1.) (that is: falling snowflakes; a car that has hit a pole) with previous knowledge (2.) in the reader's possession, implicated in the comprehension of this text (that is, the knowledge that when it snows, the road can be frozen, and that the frozen road is slippery) from which it could be inferred that the accident was caused by the frost that made the road slippery.

Continuing with the visual reading of this picture section, we can see: a parrot perched on the pole; many people dressed in coats, scarves, that are watching it. To understand what is happening, it is necessary to integrate this information provided by the text with previous knowledge (2.), that is that parrots are not birds that live free in our cities, as could be in the case of sparrows or robins, which makes it possible to infer (3.) that the parrot has escaped from a cage (see in the Table 1 a model to teach inferences).

3.2. *Verbalise thoughts aloud during visual reading comprehension*

To verbalise the thoughts that stimulate the processes of understanding, the teacher can draw inspiration from the expressions gathered

Table 2. Expressions from which the teacher can draw inspiration to apply the Think Aloud technique. SOURCE: Adapted from: https://readingmentors.weebly.com/uploads/2/6/4/1/26411042/think-aloud-checklist.pdf.

Think Aloud Strategy	Cue Words
Predicting	I predict… because…
	In the next part I think… because…
	I think this is… because…
	There should be ...
Questioning	I wonder if….?
	Who…?
	What …?
	When…?
	Where…?
	How…?
Should there…?	
Visualising	I see…
	I picture…
Personal response	I feel…
	My favorite part…
I liked/disliked…	
Clarifying	I got confused when…
	I'm not sure of…
	I didn't expect…
Summarising	I think this is mainly about…
	The most important idea is…
Reflecting	I think I'll… next time.
	Maybe I'll need to… next time.
	I realised that…
	I wonder if…
Making Connections	This is like…
• personal connections	This reminds me of…
• text-to-text connections	This is similar to…
	If it were me…

in Table 2.

For instance, when teacher's thoughts are said aloud while reading the cover of the picture book *Where the Wild Things Are* (Sendak, 1963), she/he can focus on the giant furry monster and say: "I think that this monster is the main protagonist of the story (Predicting), because it is portrayed on the cover". Then, beginning to flip through the first pages of the picture book, teacher could add: "I did not expect to find a child as the main character of this story. I got confused when I saw the monster on the cover" (Clarifying) (see Figure 2).

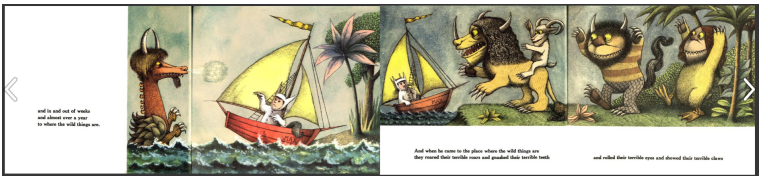

Figure 2. Sendak, M. (1963). *Where the wild things are*. New York: Harper & Row in digitised format. Source: ISSUE, https://issuu.com/calebjamesstultz/docs/maurice_sendak_-_where_the_wild_thi.

To verbalise thinking related to the emotional components, the teacher could say: "My favourite part is the ending: when Max comes back to his room and finds the dinner still warm that his mother had brought him" (Personal response).

With older children, it's possible to face more complex and demanding meanings. For instance, the "teacher could have figured out of the meaning of 'mischief' by looking at the pictures of Max doing some activities of dubious value" (Bauserman, 2008, 168). Remaining on the overview the text, the teacher could make personal connections, saying, for example: "I know that Sendak, to portray his monsters, was inspired a bit to the monsters who lived in ancient Greece and in Italy so long ago, such as the Griffon, the Chimera and the Minotaur" (Making Connections).

4. Conclusions

The workshop path described in this chapter has tried to address the need to develop reading comprehension processes from preschool to early elementary school, proposing the Think Aloud metacognitive technique applied to digital pictures.

In fact, although comprehension is acknowledged as fundamental part of the reading programme, distinct from the equally basic language skills (such as phonemic awareness, print, graphic, morphological, and syntactic awareness), often it has been overlooked. The training proposal described here can also be regarded as part of the current reading literacy, as trans–medial ability, that moves across different devices and platforms (Frederico, 2017). Lastly, it is also a way to draw parallels between children's print narratives and

similar digitalised narratives (Carioli, 2018), and to raise the teacher's awareness of the significant opportunities that digital medium offers "in reshaping the way in which narrative for children is conceived and presented, [...] to continue its time–honoured role in constructing meaning for children" (Madej, 2003).

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Teacher Education & Training on ICT between Europe and Latin America
ISBN 978-88-255-2102-3
DOI 10.4399/978882552102313
pag. 165–173 (december 2018)

Teachers and professional development

The experience of an online post–graduate course at the University of Florence

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1. Introduction

In this chapter, we present the "Digital competences in the school" post–graduate course, activated at the Department of Education and Psychology of the University of Florence in 2016/2017, and discuss the results of its experimentation as a case of online training of in–service teachers on the topic of digital competence and educational technologies.

In the past 15 years, in Italy there have been numerous training initiatives for teachers on this topic, which have progressively gone from an approach aimed at the acquisition of instrumental skills towards the integration of methodological and didactic knowledge (Parigi, 2016). With the law no. 107/2015 and the publication of the PNSD — National Digital School Plan (MIUR, 2015), a new impetus was given to ICT in teaching and learning and a new training plan at national level was implemented in order to reach teachers from Italian schools of every order and degrees. This new formative initiative was coherent with the evolution of European policies and scientific literature, which highlighted the importance of digital competence for lifelong learning and civic participation and gave schools a key role for its promotion, thus making teachers' update necessary (Ranieri & Bruni, 2018; Redecker & Punie, 2017). As shown in research about the educational needs of Italian teachers, the area concerning digital innovation and technology is one of the most required, also by teachers who have already participated in training courses. Indeed, according to Calzone & Chellini (2016), there is a

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positive correlation between the number of courses taken and the expression of further training needs: the more teachers know the potentiality of ICT for education, the more they want to continue training, experimenting new approaches and contextualising their practices on a theoretical level.

During the past years, national training initiatives on this topic have been proposed by the Ministry of Education both as training in presence, at a distance or in blended modality (Parigi, 2016): in particular, mixed or distance solutions seem to give opportunities for teachers professional development, as they allow different forms of participation and a greater level of personalisation in terms of time and effort (Loiodice, 2011; Slattery, Ledwith & Hyland, 2017).

The course "Digital competences in the school" was delivered in blended modality and aimed at training school professionals for the design, management and evaluation of educational activities geared to developing children and adolescents' digital skills. In particular, the course provided a theoretical framework of digital competence through the comparison between the different models developed at national and international level (Calvani, Fini & Ranieri, 2010; Ferrari, 2013). The programme also intended to respond to the need for teachers to decline the components of digital competence according to the different disciplinary perspective: this issue was addressed by giving the opportunity to each participant to choose one specific area of reflection and group work.

2. The context: course methodology and participants

The course was designed according to the methodological model developed by the Laboratory of Educational Technologies of the University of Florence (Calvani, Fini, Molino & Ranieri, 2010). The model is based on the concept of virtual learning community and sustains a gradual development from individual study to work and exchange in small groups in order to improve the quality of learning. In fact, the transition from a wider community to smaller groups could facilitate the evolution from information exchange to forms of collaboration or cooperation, in which each participant contributes in an active way. Concretely, 4 areas of study were proposed, each coordinated by a tutor: digital skills for scientific disciplines, digital skills for humanities, digital competences and computational think-

ing, digital skills and ethical–social dimensions. Each trainee was asked to choose one area and, subsequently, to join other students for collaborative group work: in this way the course provided the possibility to take part to in–depth and design activities in a specific thematic area. In the following, we summarise the methodological model presenting the 4 phases from individual to group work:

a) Technological and social familiarisation: the main aim of this phase was to enable all the participants at the use of the online platform, through the exploration and testing of tools and features of the learning environment. At the same time, ice breaking activities were proposed, such as the participants' presentation;
b) Personal documentation: the objective of this phase was to make each trainee acquire the fundamental knowledge of his/her area of work. The tutor provides initial contents and asks for an individual online activity (e–tivity), conceived as a form of support for self–learning;
c) Group formation and topic definition: in this phase the tutor facilitates the creation of collaborative groups, aggregating the participants on the basis of possible shared interests and work ideas;
d) Collaborative work: participants engage in project–based work, ranging from the development of written projects to the analysis of case studies and good practices, from the construction of shared repositories to the production of objects or multimedia. The tutor of the thematic area monitors and provides guidance on how to work.

The course was delivered between April and October 2016 in blended modality: two online plenary sessions were organised on transversal topics, and a face to face meeting was realised at the end of the course for sharing of project works and final exam.

In total, 31 people enrolled in the course, coming from the different orders of schools: 7 were primary–school teachers, 12 middle–school and 10 secondary–school, including a school manager. Also two University librarians signed up. Participants were mostly women (26), aged between forty (13) and fifty (12) years: only 4 students were under 40. In line with expectations, the course collected most of the enrollments from teachers involved in the National Dig-

ital School Plan (MIUR, 2015) as agents of the diffusion of digital culture in the school: half of them were digital animator (9) or member of the digital team (6). It is therefore not surprising that, when self–evaluating their digital competence, only 2 participants placed themselves at a low level, while 19 were at medium level and 10 at high level. As for previous experiences of online training, the trainees defined themselves as not beginner: 17 have already taken courses on the Moodle platform, and a third has also had the opportunity to use it as a teacher (8) or administrator (3).

3. Results from the experimentation

Despite the design choices made, the course presented some difficulties, which we will try to deepen in this paragraph, focusing in particular on the issue of participation. Indeed, the levels of involvement were very different between participants, with negative repercussions on the group dynamics and output. Data about challenges and difficulties encountered during the training experimentation became precious material to reflect and redesign the course, according to a renewed understanding of practical needs of teachers as lifelong learning professionals.

As seen, the design of the course was based on a project–based approach strongly oriented to stimulate collaboration with colleagues on common themes. However, participants expressed a kind of resistance to this approach, showing a tendency to prefer transmission and compilation modalities — less time–consuming — and individual instead of group work. The team of course teachers and tutors reflected on the levels of participation, identifying 4 different profiles of trainees:

a) Collaborative — Participants who actively collaborated within the group and realised a good or excellent product, taking advantage of the coaching offered by the tutor;
b) Normal solitary — Participants who preferred to do the final work individually, just responding to the requested level of performance;
c) Outstanding solitary — This profile is referred to participants who set and achieved ambitious goals with respect to the others, but in absolute autonomy;

d) Pragmatics — Participants who have an advanced level of knowledge and experience in the field, and preferred to re–use a previous work for the final project. They opted for both solo and group work, where interests could easily intersect.

Having to quantify the different modalities of participation in the course, it emerges that only half trainees belong to the collaborative typology, which was expected from the methodological model of the training path. The rest is divided between those who opted to work autonomously, except for a smaller number of pragmatic teachers, who carried out the project work starting from work already realised.

An insight of these different modalities of participation can come from an analysis of the scheduling of the course and the rhythms of the school year. According to the university organisation, post–graduate courses generally start in spring time, and this was also the case of the "Digital competences in the school" course. This means that the work in thematic areas started in May with the documentation phase, groups and topics were defined in June and collaborative work took place between July and October. If we evaluate this timing from the point of view of a school teacher, it is easy to note that this is a rather challenging part of the year, since it coincides with the end of the school, a moment full of commitments and bureaucratic activities.

During the group work phase, tutors reported having received trainees' complaints about difficulties of following the course, due to the overlapping with school activities. Except for this formal expression of difficulties, also a lower than expected level of participation was detected, which led the course staff to propose an additional online activity called "trainees' evenings". These were conceived as informal moments in which trainees are involved by presenting their ongoing work to colleagues, receiving feedback from their own peers. Participation in the evenings was optional, but the level of response, both as speakers and as audience, exceeded expectations, highlighting how these informal moments among the trainees can activate effective exchange.

4. Discussion and conclusion

The realisation of the course highlighted the difficulties that working adults can have to reconcile training activities with professional ones. In particular, it seems that university offer should be revised in order to respond to the needs of teachers as lifelong learners, for example redesigning the training as a form of learning directly embedded in the professional practice (Federighi, 2009).

The choice of taking the course with collaborative and cooperative methods requires a greater effort from the point of view of commitment and time availability, with consequences on sustainability. That is why among the conditions of possibility and effectiveness of an in–service teacher training we should mention motivation and formal recognition, but we also have to consider the presence of a concrete institutional support. Too often, if not usually, the enrollment in lifelong learning activities for professional development is an individual choice, and is not followed with the availability of permits or other forms of concrete support (Ranieri *et al.*, 2017). Teachers are frustrated, because they cannot dedicate enough time and energy to training: they often end up studying in the clippings of time, at night or on weekends, thus failing to have the desired level of participation.

Alongside this macro–problematic, however, it seems to be also a difficulty linked to the nature of the present society characterised by a kind of over–stimulation and saturation of attention, which ends up limiting the capacity and attitude of people towards concentration, in–depth study and even collaboration.

In consideration of these reflections and of the experimentation results, we summarise in the following the proposals of course redesign in order to enabling forms of positive and productive participation, even in a context of fragmentation of time and interests:

a) **Personalisation**: the need for greater personalisation seems to emerge from the numerous difficulties in order to respect time and deliveries. Trainees ask for more flexibility, which should be reached replacing standard deadlines with delivery windows, so that each trainee can organise him/herself as best, accordingly to professional commitments. In terms of personalisation, we especially have to consider the typology of "outstanding solitary" participants, who worked individually developing their own specific in–depth project, which could

hardly be channelled into a group path. For this type of target, a certain flexibility is essential to allow to complete their high–level work;

b) **Microlearning**: a further strategy for the reshaping of the training offer is constituted by microlearning, that is the involvement of the students in self–consistent bit–size activities. Microlearning consists of moments or episodes of structured learning, which are short in terms of time and circumscribed to a specific topic in terms of content (Hug & Friesen, 2007, p.17). This type of training may be more sustainable for adult professionals in training, who can better manage their time and attention, facing a sequence of circumscribed tasks, rather than a more extensive task;

c) **Recognition of informal competences**: participants that we have called "pragmatics" deserve a particular reflection in order to understand the motivations which lead professionals to enrol in a post–graduate training course and then follow it only marginally. These cases can be linked to an emerging issue in the context of continuing education, which regards the recognition of skills acquired in informal context or on the field: for these teachers the course is a way to certify skills already gained in their professional practice (Cedefop, 2016);

d) **Peer learning**: it seems consistent to rethink the course with ways that can further encourage and enable participatory behaviours and original contributions, with the belief that all participants could benefit from sharing and collaboration with other colleagues and experts. A possible strategy in this direction is to introduce a form of peer reviewing oriented towards mutual constructive criticism: this dynamic of exchange, and the greater visibility of the work process, could in fact motivate the participants to a more effective participation. In general, all the methods that rely on peer–learning, from peer instruction to peer learning to peer evaluation (Boud *et al.*, 2014; Nicol, 2014) should be emphasised. As emerged during the experimentation, the model of "trainees' evenings" should be further developed: synchronous and informal moments for free confrontation can stimulate participants' protagonism. Such moments can therefore lead to develop affinity in research interests, and thus facilitate collaboration.

The contribution illustrates a case of post–graduate training in blended modality that saw the participation of adult workers, mainly belonging to the school world. During the course, some issues emerged, which were the subject of reflection by the working group, making reference to the literature on lifelong learning and distance learning: the revision process lead to a redesigned hypothesis, which connects the topic of participation with the contemporary situation of stimuli overload and lack of time. Thus, it seems consistent to structure times and training offer with a view to greater sustainability of activities (microlearning) and flexibility of time (personalisation). Furthermore, those strategies that best support in–service training, such as the use of strong coaching, in which the tutor is available to personal interests, and peer learning, are to be preferred, possibly fostering forms of training that are incorporated into their professional reality.

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Printed in December 2018
by «The Factory S.r.l.»
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on behalf of «Gioacchino Onorati editore S.r.l. – unipersonale», Canterano