

# Attitude to the introduction of ICT in schools

## What the teachers say and what they really mean

[ Ferrari M., Mura G., Diamantini D. ]

**Abstract**— By analysing a field research carried out between 2014 and 2015, this paper examines the situation of ICT use in primary and secondary schools in the Municipality of Cinisello Balsamo located just north of Milan.

The primary aim was to look at the relationship between technology and learning, in particular between teachers' willingness to learn and then concretely adopt the use of technological devices in the classroom; their degree of sensitivity towards ICT and the relative employment of it as an "end-tool" for knowledge acquisition. We have also looked at the amount of time that teachers are genuinely willing to dedicate to training or self-learning amidst the myriad of training opportunities they are offered.

Lastly we considered whether there was a reprocessing of experiences and personal habits, bearing in mind the extensive presence of ICT tools in everyday life.

**Keywords**—Lifelong Learning, ICT, Education, Teaching Training.

## I. Introduction

This paper looks at the problem of the relationship between technology and learning, between technology and training, between the use of new and powerful means of representation and communication on the one hand and the practice of teaching on the other.

Over the last few decades technology has become part of everyday life, reshaping the relationship between teacher and pupil, as well as the practice of teaching and learning. Modern society has transformed technology from a *means* to an *end* (Ghisla, 2010) giving life to completely new ways of behaving, in some ways strengthening the concept that if technology doesn't always improve lifestyle, it certainly changes it and influences its structure. We can no longer look at technology as mere expression of technological supremacy, as oppose to the philosophical nature of contemplative knowledge, but must start to think of it as a true expressive form in its own right.

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Technology has become a tool for self-awareness (*ibidem*), something that simultaneously stimulates reflection and is reflected on. That means that we must necessarily reconsider our experiences and their meaning in context of a "technological past", with the relative consequences on our being and our existence. However, critical awareness and the necessary detachment needed from technology is made even harder by the appeal of technology; because of the considerable usefulness of technological devices and the gratification in using them; because of routine habits that facilitate the acquisition and assimilation of the different lifestyles that technology brings with it; and lastly because of the speed that technology has instilled on our increasingly compact and fast-paced daily life.

This is the context in which our research is set, with the aim of placing emphasis on technology, the teaching profession and education.

Technology is thus both a *means* and an *end*, but also a "end-tool" for the acquisition of new skills and renewed human relations. Indeed technology provides an efficient means for archiving information and creating new communication processes, such as social media (Facebook, Twitter et.). This inevitably implies the need for new professional know-how and a more widespread technological culture.

## A. Theoretical background

The teaching profession (Weber,1999) was once defined by *cursus studiorum* - that is the endorsement by an institution of one's knowledge and skills - and by teaching autonomy. Today, thanks also to new technologies, the capacity to "reflect" (Schön, 1983) has become crucial and teachers are expected to contemplate their methods and approach.

Education has also changed. It must therefore take into consideration the experiences of the subjects involved, favouring both formal and informal methods and thus moving increasingly towards a blended approach. New media are to be considered the "narrators of the present day" (Rivoltella, 2010): new habits, new models of thought, new languages, new social practices, new relationship hierarchies: all of these stimulated by information communication technology (ICT). Consider smartphones, latest generation iPods and mobile devices: in general they call for reflection on the role of teachers, on their contribution to the acquisition of new skills, as well as stimulating reflection in work-related contexts. Dewey (1916) stated that education must go beyond mere literacy and that study programmes must be considered in context of the needs of day-to-day life. Technology, therefore, not only implies the need to reflect, but also the need to place

particular attention on the planning of study programmes, whether aimed at the very young, adult learners, or teachers in all areas and levels of education who are increasingly adopting new technology to teach and educate. These changes in traditional tools in addition to the use of innovative technology (LIM, tablets, smartphones...) in teaching, contribute to building new teaching-learning relationships (Comi, 2010).

Our research is placed in a Knowledge Management perspective (Wiig, 1999, p.4), intended as a systematic, explicit and deliberate construction and application of knowledge in order to maximise the efficiency of organisation linked to the knowledge and benefits that derive from its cognitive assets. Knowledge Management can be intended as a moment of “harvesting information” and, in this logic, is easily linked to the consequence of the massive presence of ICT in our existence. Indeed technology allows not only for the storage of information, but also for the development of relationships and knowledge heritage which will then form the richness of the organisation itself, whether for educational or productive purposes. Knowledge is indeed always heritage. But for knowledge to become a true legacy it must be shared and even in this case technology has helped, particularly when considering “second generation” Knowledge Management which has made sharing possible (Rivoltella, 2010). Thus a passive instrument, perhaps distributed through intranet, emails, social media and other platforms, today becomes an active tool for encouraging sharing and contemplation as well as stimulating reflection on organisational practices: collaborative writing, peer evaluation and tagging are examples of the redefinition of the hierarchical relationships that promote “horizontal dimensions” in relationships even between leaders and employees, between directors of school complexes and new members of teaching staff. Moreover, the huge growth in available information further stimulates the debate on the importance of access to, as well as use of, information itself, creating a viscous cycle between use, re-use, re-working, archiving and relating, which is not anchored to old hierarchical systems. In this context education must keep different structures in mind: on the one hand the prevailing technological dimension and on the other the need of individuals to adopt technology, to familiarise with it, to use it as a tool for social interaction. Although it must be said that the massive growth of information and the proliferation of interpretations and theoretical models available make it more complicated to analyse the school system and to develop training programmes in the teaching world.

The meaning of “information society” is linked to the problem of knowledge (Castells, 2003) where value is no longer solely linked to material goods and information has been elevated to the status of “good”. The problem that ensues in terms of school organisation is the management of the process through which the *good* is produced and shared. It therefore becomes of primary importance to train a “knowledge operator”, such as a teacher, who from a constructivist point of view believes that knowledge is constructed by the individual (Merril, 1991) and technology is a support to the representation of knowledge and the management of communication flows; knowing, representing and communicating become the fulcrums of a knowledge and learning process. Knowing becomes, from the constructivist point of view, the result of an individual

construction and the elaboration of personal experiences (Ausubel, 1963); learning is an active process, where the teacher takes on the role of facilitator (Merril, 1991), yet is also a collaborative process (Vygotskij, 1978). In this sense context is of primary importance (Brown, Collins et al., 1989) and evaluation is an intrinsic dimension to the cognitive process (Piaget, 1969; Ausubel, 2009; Freinet 1966). Environment, context and the specific situation in which the acquisition of knowledge takes place put emphasis on the situation (Wenger, 2006).

Therefore, the idea of a socio-constructivist perspective can be helpful for examining the relationship between technology and learning: one could say that social interactions are the basis for building skills and that having complex skills could allow the individual to take part in complex social interactions which would, in turn, provide the basis for developing even more complex skills (Carugati, Selleri, 2001) in a cycle of industriousness that is the very characteristic of learning and knowledge.

It is in this context, where technology becomes the opportunity for learning and creating one’s learning environment (Cattaneo, Comi et al., 2010) putting emphasis on the social dimension of learning (Koschmann, 1996), that our research is positioned.

## II. The research

### A. *Aim of the research*

The investigation carried out intended to detect the attitudes towards the integration of ICT in the classroom among a group of primary and secondary school teachers involved in an extensive program of training and innovation of their school technological infrastructure. Considering the relevance that meta-cognition assumes when ICT enters the classroom, it seems extremely important to understand the vision that the teachers are adopting towards these new tools in order to improve their integration. Our initial hypothesis stems from the consideration that such integration is quite often difficult, and that the attitude of teachers plays a key role in the final outcome of any innovation program (Diamantini, 2014). The final scope of the research is to gain an accurate description of the representations of a group of teachers training in the use of ICT, and consequently some suggestions on how such training could be improved.

### B. *Instrument*

To collect the information a questionnaire of 36 items was created. The questions (single choice, multiple choice and Likert scales) included in this analysis investigated the following areas:

- ICT skills
- Representation on the use of ICT in training
- Attitudes towards training in the use of ICT
- Vital data

### C. Sample

The sample includes 209, mostly female, teachers, (87.7% women; 12.3% men) between the ages of 28 and 67 years old (average age: 52 years). They are mainly primary school teachers (75.8%), but there is a small group of middle school teachers (22%) as well as a few from secondary schools (1.6%) and kindergartens (0.5%). On average, teachers have been employed for 24 years.

## III. Main results

### A. ICT skills before the training

The interviewed teachers rated their own level of ICT skills mainly as reasonable (45%) or “just enough” (31%). At the two ends of the scale we found 15.5% of teachers with a “good” level and 8.5% with a “limited” level of skills.

Self-evaluation of the teachers is congruent with the main use of ICT detected among the respondents: ICT is mainly used to carry out basic activities, mostly connected with the work, while more sophisticated functions and activities connected with daily life and free time are scarcely declared.

Only 50% of teachers have previously undertaken courses on the introduction of ICT in the classroom:

- 18% online courses
- 18% autonomously organized courses
- 16% courses from service providers
- 15% ministerial courses
- 13% private courses
- 11% university seminars.

TABLE I. ONLINE ACTIVITIES REPORTED

Activity	Frequency <sup>a</sup>	%
Research for school	63	30%
Email	42	20%
Didactic projects	39	19%
Personal training	25	12%
Research for personal interests	24	11%
News	15	7%
Administration	11	5%
Home-banking and similar	7	3%
Online discussions (forum, newsgroups...)	3	1%
Leisure	3	1%
Chat	2	1%
E-commerce	1	.5%
E-governance	1	.5%

a. Number of respondents signaling this activity

### B. Representation of ICT in teaching

When asked to rate the usefulness of ICT in the different areas of their work on a scale from 1 (not useful at all) to 10 (very useful) teachers are quite united in their very positive evaluation ( $M = 7.42$ ;  $ST = 1.6$ ).

Accordingly, 81% of teachers declare they would feel very comfortable in a technologically improved classroom, while 15% is not very attracted to technology and 4% would actually feel uncomfortable in such a classroom.

This data is confirmed by the answer to the question on the impact that ICT can have on students’ learning: 55.3% and 38.3% evaluate it respectively as “quite good” and “very good”.

Observing in more detail what benefits are expected by the introduction of ICT we found that:

- for 46% of the respondents ICT can help students be more passionate about their studies, and
- for the 36% ICT should help students understand the core concepts of a subject.

Lower percentages of the teachers signal that ICT can:

- be a stimulus for more discontinuous students (25%),
- be a stimulus for self-regulated learning (24%),
- promote creativity (22%),
- support the transmission of contents (22%)
- support personalized teaching (21%).

For a very small group of teachers ICT can also:

- promote group work (12%),
- promote peer learning (6%)
- promote self-confidence in the students (4%),
- help evaluate students’ work in a more detached way (2%).

### C. Attitude towards training in ICT use.

78% of respondents is interested in receiving training and updates on the new possibilities offered by ICT in the classroom.

However, the number of hours that the respondents would feel comfortable to dedicate to such aim is quite limited:

- 36% think that 16 hours or less would be enough,
- 36% is willing to dedicate between 16 and 40 hours to such a training,
- 10% would spend more than 40 hours and
- 3 % would dedicate 100 hours to this aim.

During the training provided as part of the project in which the research took place, the respondents mostly

declared to have gained technological and didactic skills (62%).

Accordingly, 68% declare that as a result of the training they will effectively be able to integrate ICT in their teaching.

However, the declared intentions highlight the propensity to only use ICT as support to a traditional pedagogical approach, never too distant from already consolidated teaching strategies.

Most of the teachers are prepared to use ICT to show videos or prepare tests (56%) and provide relevant definitions (45%). Only 30% intend to promote learning strategies mediated by ICT, while another 30% would adopt them to simply show graphs, schemes and tables.

The options more deeply representative of the innovative impulse that ICT can bring to didactic learning, part of a more student-centred approach, are undoubtedly less popular in the respondents preferences: 20% will use them to promote group work, 11% to communicate with the students, 11% to try out flipped classroom strategies, 6% to organize practical activities.

#### IV. Discussion

The interviewed sample has been familiarized with the use of computer and Internet but only at a very basic level and it is possible to say that, apart from some simple functions, ICT does not play a main role in their daily life (at work or at home). Previous training on the integration of ICT in the pedagogical practice is limited.

On a superficial level, the declared attitude towards the integration of ICT in the classroom is very positive, but a deeper analysis reveals a “hidden” resistance: ICT is seen as useful support for traditional teaching methods, but its use in truly innovative ways is far less popular. This incongruence is highlighted both on a more abstract level, when considering the various positive changes that ICT can bring to the classroom, and on a more concrete level, when reporting the intentions of use of ICT in one’s own activities.

Still, ICT is expected to bring positive change in the academic results of pupils. This highlights a conflict that should definitely be addressed during training sessions. Moreover, teachers apparently expect to achieve this positive outcome in their students’ results with very little training on their side, another aspect that should be addressed and corrected to avoid frustrating outcomes.

In fact, the expressed intention of ICT use after the teachers undertook training confirms the difficulty of a real, deep change in the pedagogical attitude, putting the whole project at risk of failure.

#### V. Conclusions

In the light of the research carried out between 2014 and 2015 it appears that, if on the one hand the Ministry of Education has, for several years now, shown a degree of sensitivity towards the use of ICT, and although Italy has invested considerably in literacy and didactic innovation through technology at all educational levels, it also appears

that, 15 years after the first initiatives were introduced (D.P.R. 275/1999), there is still much to do. Some goals have been reached, such as the introduction of ICT in primary schools, and there are positive results in overall literacy, but the use of technology as an “end-tool” for acquiring new knowledge and as a tool for promoting the acquisition of new skills, still remains a very distant goal. What emerges from the 209 interviewed subjects is a certain level of “awareness” of this tool but not a widespread daily use of it. The absence of computers, tablets or mobile devices in general on teachers’ desks makes the acquisition of IT skills even harder and the reluctance to their use more understandable, creating a vicious cycle between the impossibility of using an IT tool and its excessive complexity.

The current relationship between technology and learning appears firmly anchored to a strong feeling of resistance and unwillingness to change.

Reflection on one’s own practices seems to forget the limited time one is willing to dedicate to acquiring new knowledge even through the use of ICT.

The importance of technology at a social level for “renewing relationships and methods of relating” between colleagues, pupils and parents still remains an ideal possibility in the background.

There is therefore a long journey ahead in terms of technological improvements to be made to bring Italian educational realities in line with the already consolidated practices in some European countries.

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