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What Do Italian Students and Teachers Ask About Digital? Data and Reflections From Schools Participating in National Operational Programs

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What Do Italian Students and Teachers Ask About Digital? Data and Reflections From Schools Participating in National Operational Programs

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Abstract: The school digitalization policies in Italy have a long course, which has provided important infrastructural investments alternating, and in some cases integrating, with investments dedicated to teacher training. Upstream of these initiatives, the scientific and cultural debate on the usefulness, relevance and effectiveness of the technologies in the classroom has continued to remain on. Within this composite framework, the contribution brings data and reflections coming from the large-scale observation of the attitudes, needs and digital practices of Italian students and teachers. The analysis is based on two surveys, carried out by INDIRE in 2018, out of 6.127 students and 1.674 Italian teachers who took part in the courses provided by the 2014-2010 PON structural funds. The results show that there is a clear ambition, among students, to learn to use the web for their social and cultural growth, and for their integration into the professional world. Respect to this, the most digitally skilled teachers are responding, working in particular on teaching access and effective use of online knowledge. However, much work still needs to be done to extend these practices to the majority of teachers, and to strengthen the link between digital behaviors and soft skills, especially for the weaker students.

Keywords: digital competencies, learning needs, digital policies, digital capital

Introduction

Since the treaty of Lisbon (2000), the introduction of information and communication technologies (ICT) in education has been a priority of the Italian political agenda. It was characterized by phases of important infrastructure investments, alternated and, in some cases, integrated with other phases of investments dedicated to training teachers (Gui&Gerosa 2019). In the last decade, within the "La BuonaScuola" law and the National Digital School Plan, various actions have been dedicated to the pedagogical use of technologies in the classroom.

Furthermore, the National Operational Program (PON) "For the School: competences and environments for learning" 2014-2020 - in continuity with the above-mentioned programs - provides support for initiatives to combat the risk of digital exclusion, the promotion of digital skills in the classroom and the growth of availability of technological equipment[1].

Upstream of these initiatives, the scientific and cultural debate about the usefulness, relevance and effectiveness of technologies in the classroom, as well as the analysis of what effectively means the concept of digital competence, declined in its various fields and targets, have continued to go on (Avvisati et al., 2013; Hattie, 2012; OECD, 2015).

Recently, several studies have flourished aimed at defining the main competency dimensions related to digital issues, for example: Calvani, Fini e Ranieri (2009); Calvani&Menichetti (2013); The Digcomp (Carretero et al., 2017), the Digcomp.edu (Redecker, 2017), the TET-SAT tool developed and tested at European level (Abbiati et al., 2018). A specific comparative study, carried out by Iordache et al. (2017), individuated 13 different digital competency analysis frameworks, and helps to compare them.

Although a specific training need on the use of technology, and in particular on digital technology[2], is still widespread, the educational challenge is increasingly oriented to overcoming the conception of the educational institution as "transfer of knowledge" between teachers and students, and supporting the spread of a school able to help learners to "understand the reality" (Capogna, 2018; Gui 2019).

In other words (Nirchi, 2016, p. 188): "the […] time has come to accept the challenge and change course, no longer settling to simply equip schools with the needed technological infrastructure. But it should ensure that teachers

[1] In addition to regional funding, we recall the ERDF initiatives of the PON 2007-2013 and PON 2014-2020 programs that have expanded the technological equipment of the schools.

[2] Digital innovation training for school staff is activated within the framework of the National Digital School Plan (PNSD) and is supported by the initiatives of the 2014-2020 PON Program aimed, among other objectives, at the conscious use of technology to support the learning activities.

really know the pedagogical potential of digital tools and they consciously use technologies as part of their educational action".

The complementary objective is, therefore, to support students in an equally conscious use of ICTs. In this perspective, the issue of the digital gap also evolves towards "a divide in learning between skilled and unskilled students using ICT" (Lau, 2014). More generally, in agreement with Livinsgtone and Helsper (2007, p. 673), the academic debate "has reframed the digital divide in terms of the social inclusion agenda, refocusing attention on digital inclusion" (ivi, p. 12). The research focus is switched on how the people use the Internet, who-and-how and in what circumstances uses the Internet, the practical skills required to maximize the benefits of Internet use (Wey & Hindman, 2011, Livingstone & Helsper, 2007). Overcoming the binary vision between those who have and those who do not have access to technology, the question is addressed at several levels: "the first digital divide that refers to the differential access to computers and the Internet, and the second digital divide that includes disparities in computers and Internet use (…) As in most recent studies found, it is the most important for examining potential divides" (Wei & Hindman, 2011, p. 218).

The digital skills development is crucial in enriching the range of uses and potentialities of the Internet and it is also fundamental for the acquisition and growth of entrepreneurship. The latter is considered by the European Commission a key element of inclusive and sustainable economic growth, as well as the creation of new jobs and the support of innovation (Council of the European Union, 2018). In fact the continuing changing in the world of work, partly due to technological innovation, brought several fundamental changes to employment opportunities and professional profiles required by companies (European Schoolnet, 2015; Gavosto & Molina, 2019). Various studies have highlighted the need for young people to develop, beside the basic knowledge and adequate levels of literacy and numeracy, a set of specific personal and relational skills for being properly trained for the current work market (Ragone & Capaldi, 2019; Fontana at al., 2019). Some specific qualities are therefore needed, such as proactivity, perseverance, foresight and the ability to clearly define the objectives to be pursued both individually and collaborating as a group. For developing entrepreneurship, especially in the contemporary world of work, it is crucial to jointly foster digital competence considered as the ability both to use technology and to critically think and to reach aims in a creative way (Gavosto & Molina, 2019, pp. 178-179). In this perspective, the Council of the European Union has given precise indications regarding the characteristics that the training pathways should have, in reference both to the use of digital technologies for improving learning and to the organization of activities that allow students to have

practical entrepreneurial experiences, such as creativity challenges, business simulations (Council of the European Union, 2018, pp. 25-28).

In Italy the OECD registered a poor matching of supply and demand of skills in the national labor market: 21% of workers are under-qualified concerning the tasks they perform and 6% have basic skills. Furthermore, a significant percentage of workers are over-qualified (18%) or have skills over their job (11.7%) (OECD, 2017, pp. 12-13).

All this brings to think in-depth about the most proper training pathways and the role that the school system and teachers have for supporting students in their learning process to get adequate competences.

The digital and entrepreneurial skills, which lead to increasing specific personal and relational skills, are in fact both of help to citizenship and social inclusion and of support young people in a path aimed at having adequate preparation for the current working context (Chiomento, 2017).

Digital development for learning, inclusion and reduction of gaps, and digital skills development for work appear as priority assets in today's scientific and policy framework.

Methodology

The present contribution aimed at analyzing some key elements related to this scenario, starting from some main questions:

1. What are teachers' digital practices, especially in relation to their level of *self-efficacy* regarding ICT today?
2. Are teachers also using ICTs to support students in their path towards the world of work?
3. How do students use the Internet, in particular those who show a more learning-oriented approach to digital?
4. Do the teachers' activities and training needs meet the students' training requests?

The analysis is based on two distinct surveys: one addressed to teachers (1.674 respondents) and the other one to students (5.331 respondents). The surveys were run between April and September 2018, addressed to the participants (teachers and students) at the PON Operational Program "For the School: competences and environments for learning" focused on "Training needs and digital skills of teachers and students". This study was designed in continuity with a previous analysis of INDIRE (fund PON - FSE "Competences for the development" 2007-2013) and starting from a broad survey of the main models and frameworks for analyzing digital skills at international level (Calzone & Chellini, 2016; Buffardi & Taddeo, 2017). The questionnaire addressed to teachers investigated six different areas of analysis: socio-demographic data and professional profile; professional skills; technological

habitat; training needs; attitude for digital and professional innovation; digital skills and self-efficacy. While the questionnaire addressed to students investigated the following four areas of analysis: socio-demographic data and student profile; cultural and media habitat; training needs and digital skills.

Data have been analyzed through mono and bivariate, regression and cluster analyses.

Teachers' digital practices

This part of research is focused on digital practices of teachers.

The composition of the sample of teachers who participated in the survey is illustrated by the following table and figures.

Table 1 - Teachers by Region.

Regions	**Respondents teachers**
Basilicata	9
Calabria	173
Campania	325
Puglia	371
Sicilia	280
Tot. Less developed Regions	**1.158**
Abruzzo	16
Molise	1
Sardegna	43
Tot. Transition Regions	**60**
Emilia Romagna	31
Friuli Venezia Giulia	47
Lazio	54
Liguria	9
Lombardia	111
Marche	12
Piemonte	51
Toscana	54
Umbria	31
Veneto	14
Tot. More developed Regions	**414**
No place of employment	42[1]
Total cases	**1.674**

[1] During the survey the respondents' teachers do not have place of employment.

Figure 1 - Teachers by age (Data base: 1.674 respondents)

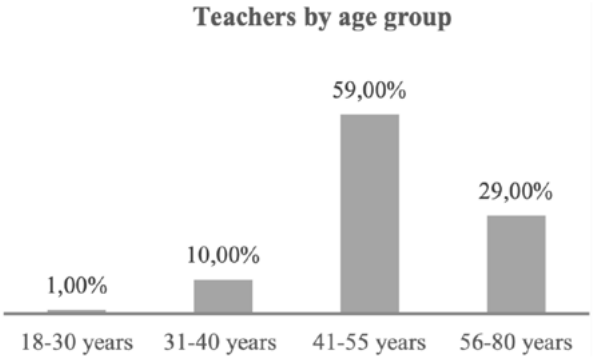
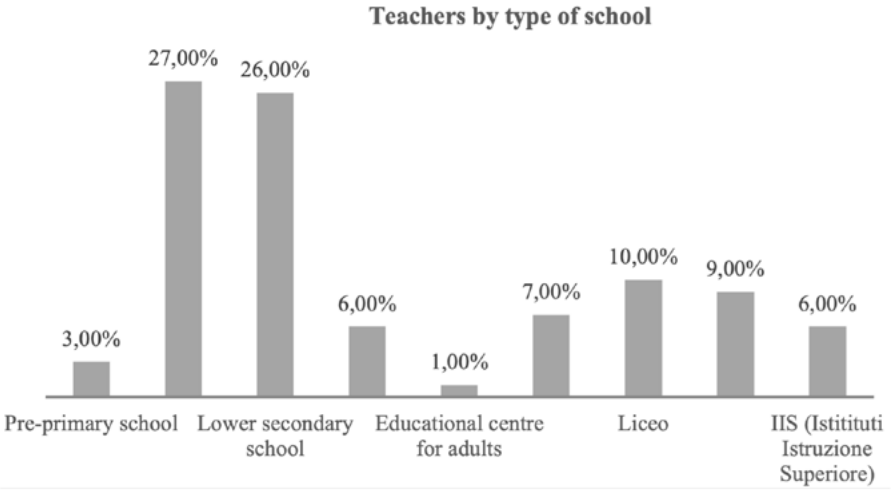


Figure 2 - Teachers by type of school (Data base: 1.674 respondents)



About the first research question, the study considers the teachers' practices and their perception of digital skills in carrying out digital practices.

The 79% of teachers generally believe they have good knowledge of the use of digital tools in teaching: they use the opportunities offered by digital, but they seem to do so in an uncooperative way.

For example, over 40% of the sample declare to search for online content every day to prepare lessons and almost 46% of respondents carry out weekly educational content, exercises and digital activities for students. But only less than 10% of interviewed teachers publish continuously their self-made materials on sharing platforms and only 16% declare to guide young people to work collaboratively through the Web. The lack of attention towards a sharing culture seems to be confirmed by the low availability (10%) to ex-

change materials, resources and opinions with colleagues through the Web and/or dedicated environments.

To analyse the research question in-depth, we examined the teachers' behaviour toward ICTs in relation to their level of self-efficacy on digital competencies. To do that, we divided the teachers of the sample into two groups through the "Two Step Cluster Analysis" technique based on two different kinds of variables: the independent variables were gender, Region and subject taught; the categorical variables refer to teachers' answers to the question of the questionnaire "to what extent do you feel comfortable with?" in relation to different activities showed in table 2[3]:

Table 2 - How much do you feel at ease?[Activities]

1	To produce texts using a word processor
2	To use mail for communicating
3	To take photos, videos or digital audio
4	To edit and/or publish photos, videos or audiodigitals
5	To create texts, online content, links and images
6	To create a database
7	To create online questionnaires
8	To organizei files in computer into folders and subfolders
9	To use a spreadsheet
10	To create a multimedia pesentation
11	To take part in a discussion in a online forum
12	To create and mantain an online blog or a website
13	To take part in a social network
14	To download and install software on your computer
15	To download and install apps on smartphones
16	To download or upload learning resources from websites/on sites or school platforms
17	To use cloud computing tools to share resources (e.g. Dropbox, Google Drive)
18	To write and review online in a collaborative way the same content (e.g. through wikies or collaborative platforms)

[3] The measurement of the quality of cluster analysis has emerged as sufficient.

The two groups, named "technology savvy" and "technology not savvy" due to how they use technological tools, consisting of 39.9% and 60.1% respectively of the sample of respondents. The variables that mostly affect this distinction are showed in the Table 3.

Table 3 - Most relevant activities

1	To download and install software on your computer, tablet, etc
2	To use cloud computing tools to share resources (e.g. Dropbox, Google Drive)
3	To download and install apps on smartphones
4	To download or upload learning resources from websites/on sites or school platforms
5	To create texts, online content, links and images
6	To write and review online in a collaborative way the same content (e.g. through wikies or collaborative platforms)
7	To create a multimedia pesentation

We considered "technology savvy" teachers that have a good knowledge of digital devices and by their ability to confidently use and create digital content. They are teachers who are probably less exposed to the obstacle of the "ICT anxiety" (Muñoz et al., 2016) and they can transform their classroom into a laboratory[4]: "if teachers are given the skills to solve ICT problems [...] they can only improve their level of competence, but also their level of confidence in using technology and thus, reduce their physiological activation and discomfort associated with their fear of using technology in class" (Muñoz et al., 2016, p. 2).

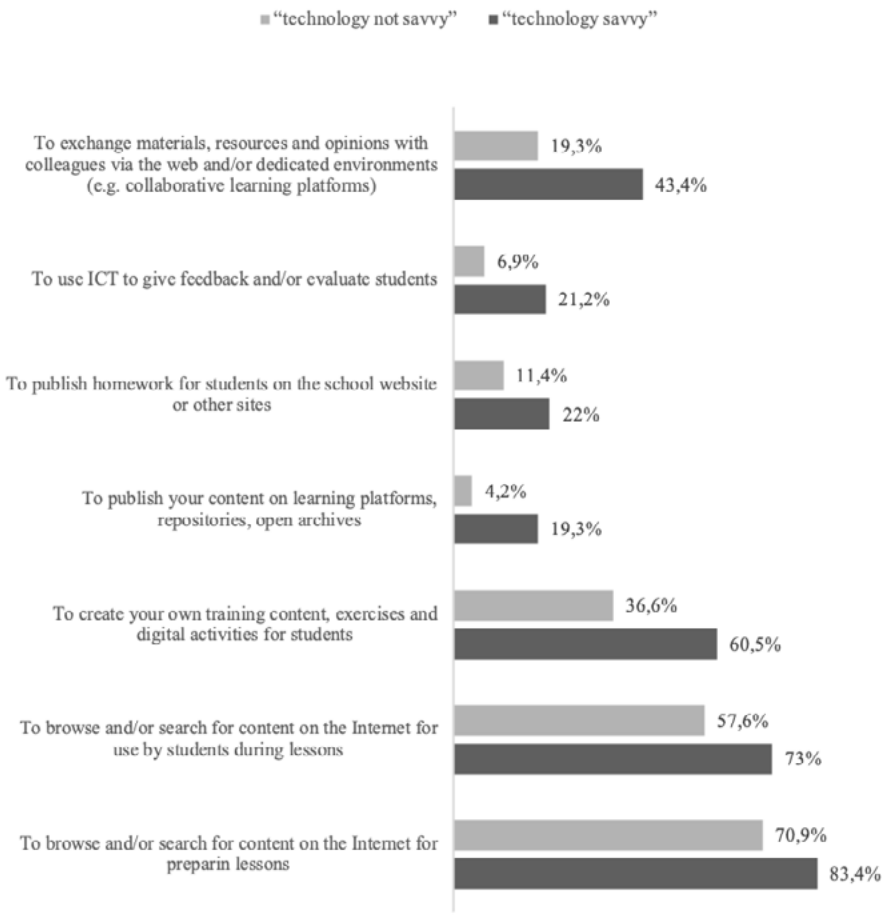
Technical competence allows you to be at ease, for example, in the choice of digital learning tools: "how to operate a computer is a direct prerequisite for successful DLM (Digital Learning Materials) usage and therefore it seems evident that teachers who feel they lack the necessary skills to use ICT will be less inclined to make use of DLM" (Van Acker et al., 2013, p. 509).

Considering the first group of questions on activities performed outside school hours' lessons (Figure 3), the behavior of the two groups is quite different: the "technology savvy" teachers declare that they carry out all the digital activities more frequently (every day or weekly), with a gap of up to

[4] In recent years in Italy, thanks also to initiatives such as "Classi 2.0" and "Scuola 2.0" (MIUR), the consideration of the classroom as a space for methodological innovation has become widespread: the classrooms thus become learning environments where experiment and carry out laboratory activities (Tosi 2019).

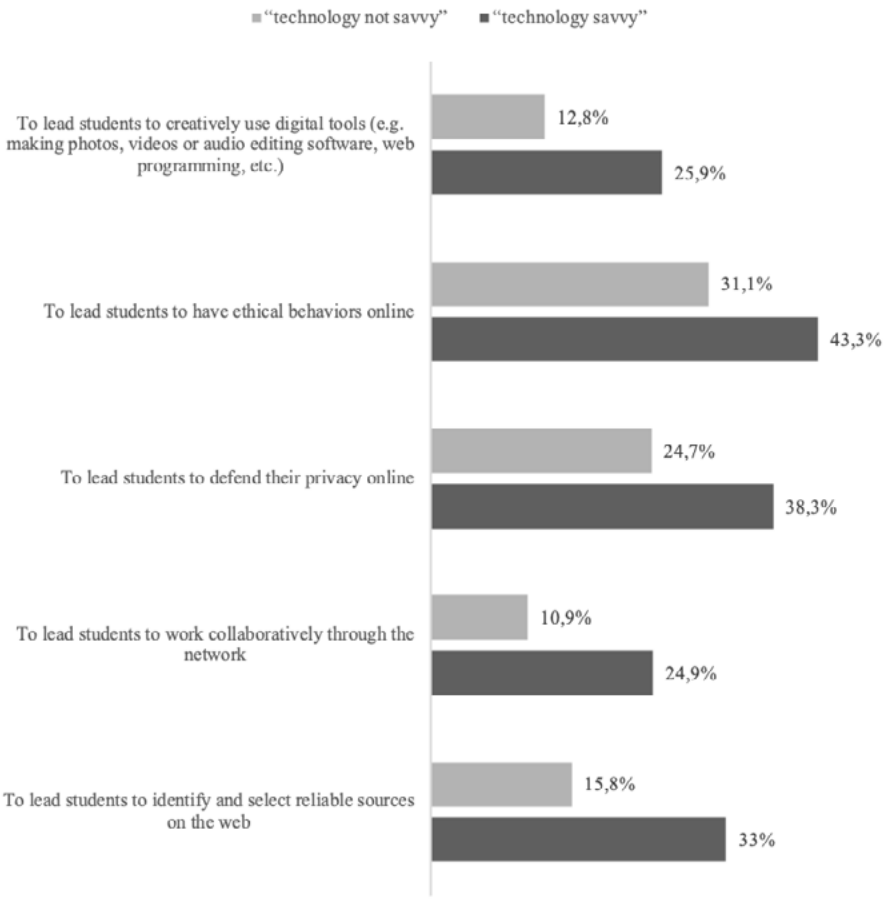
20% in respect to "technology not savvy" ones, in particular about the items "material sharing" and "creating educational content". This group of teachers is also characterized by greater use of ICT to give feedback or to evaluate students, in line with the Recommendation of the European Parliament and of the Council of 18 December 2006 (Figure 3).

Figure 3 - How often have you performed the following activities outside school hours? [every day/weekly] (Data base: 1.674 respondents)



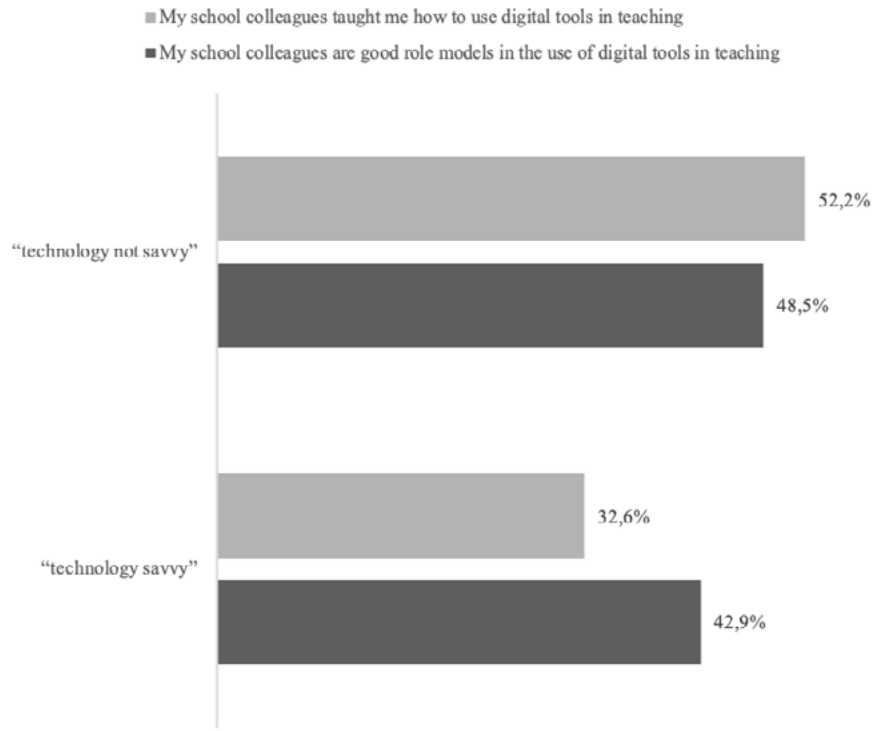
Even considering educational activities at school (Figure 4) the difference between the two groups is wide: the "technology savvy" teachers declare that they carry out all the activities more frequently, in particular about the items "to lead students to identify and select reliable sources on the Internet" (the gap between the two groups is of 17%) and "to lead students to work in a network collaboratively through Internet" (14%).

Figure 4 - How often, since the beginning of the year, have you done the following educational activities with your class? [every day/weekly] (Data base: 1.674 respondents)



The difference between the two groups is also high about the issues of privacy (13.6%) and of online ethical behaviour (12.2%): these are themes on which is focused a wide social sensitivity and is increasing the demand for a wider investment for the training. Almost 90% of the "technology savvy" teachers say they frequently emphasize the ethical issues related to the use of social media in the classroom. Compared to this last activity, the "technology not savvy" teachers are more "uncertain" (17% vs. 9%) and claim to be influenced, in the use of digital tools in the classroom, by school colleagues (Figure 5).

Figure 5 - To what extent do you agree with the following statements? [agreement] (Data base: 1.674 respondents)



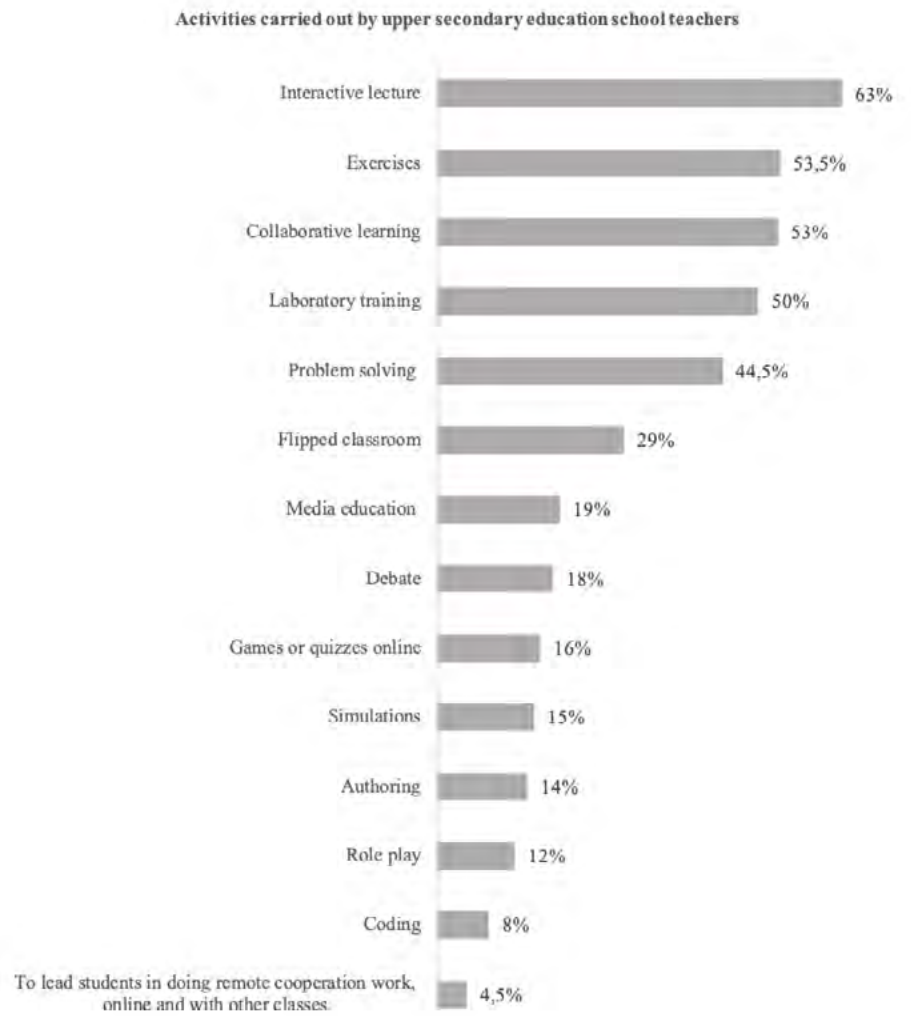
Summarizing, the "technology savvy" group of teachers is characterized by the capability to use technology as a "reagent" (Rivoltella, 2013), useful both for solving organizational problems and for adopting expressive and communicative methods that promote creativity and self-reflexivity among students (Vayola, 2016). They are also more able than the not-savvy to share and give feedbacks through digital means, using ICT not only as background tools, but embedding them in daily professional practices as communication means.

Activities carried out by teachers for supporting students in their path towards the world of work

Regarding the second research question, the analysis considered the activities that interviewed teachers carry out for supporting upper secondary education school students in their development of entrepreneurial and transversal skills.

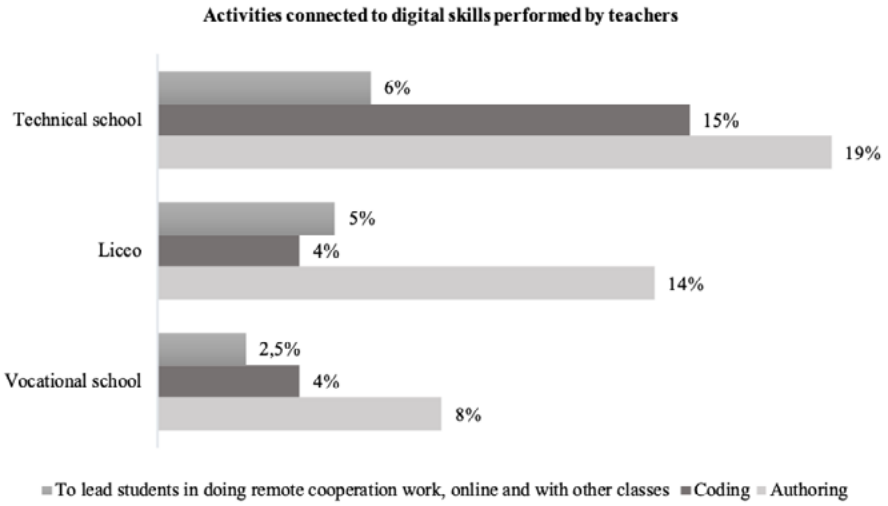
About the soft skills indicated as functional to the development of entrepreneurship and digital skills, this study shows that the teachers of our sample in upper secondary education schools privilege only a few fundamental activities and methodologies, such as collaborative learning (53%), Lab activities (50%), problem solving (44.5%) and to a lesser extent the flipped classroom (29%). Teachers instead focus little attention on activities such as media education (19%), debate (18%), role play (12%) and remote cooperation work, online and with other classes (4.5%). Activities of authoring (14%) and coding (8%) are also less frequently carried out (Figure 6).

Figure 6 - Percentage of activities carried out by upper secondary education school teachers (Data base: 447 respondents)



The data (Figure 7) show that the activities privileged by the teachers are performed in a broadly homogeneous way in the various types of school, except for the use of some methodologies, such as authoring and coding, which are recently considered pivotal for the acquisition of competencies useful in the workplace (European Commission, 2020; European Training Foundation, 2018; UNESCO, 2018; World Economic Forum, 2015). In fact, such methods, especially coding, are applied more frequently by the teachers of technical institutes than the others and the teachers of vocational schools are the less involved in such activities. Regarding instead the actions of leading students to perform remote cooperation work, online and with other classes, as one of the functional methods for the entrepreneurial competence development, the teachers show to be less active.

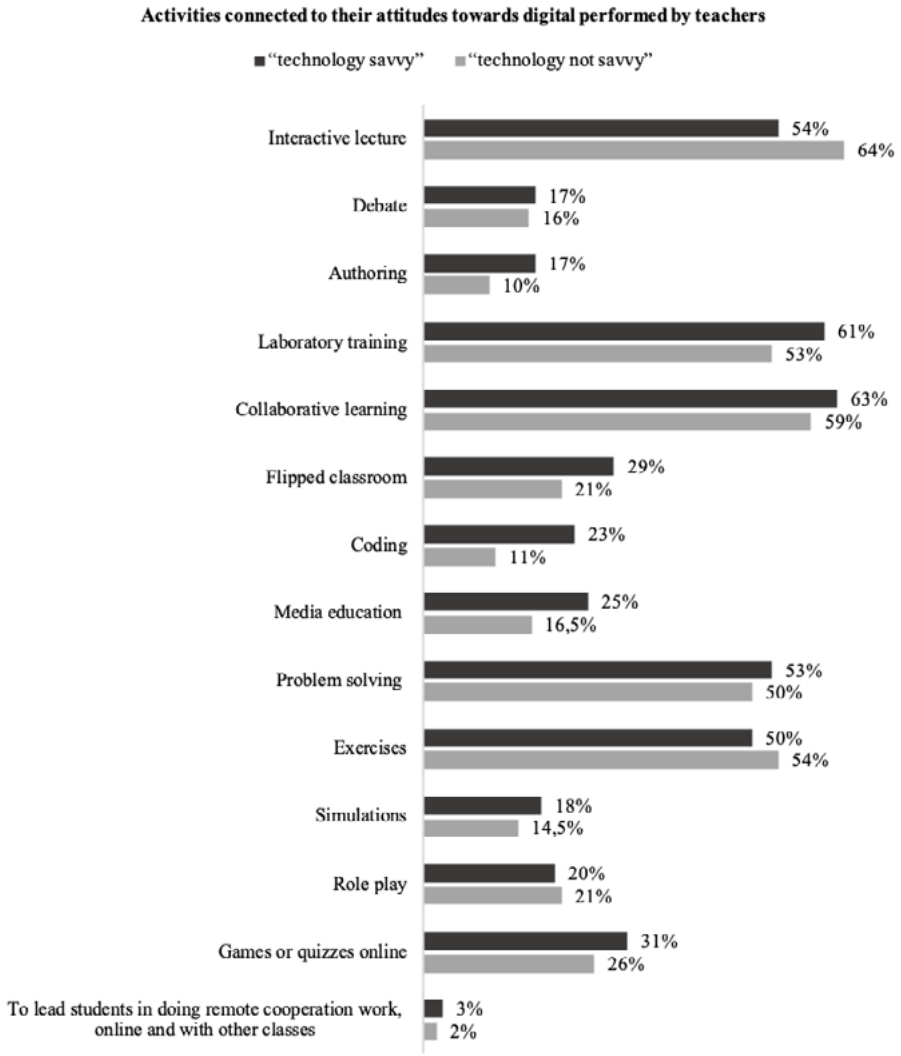
Figure 7 - Activities related to digital skills carried out by teachers (Data base: 447 respondents)



It's worth analysing which methodologies just indicated are used in relation to the teachers' attitudes towards digital and considering the two groups of teachers ("technology savvy" and "technology not savvy", as defined in § 1). Through the use of Pearson's chi-square test we have verified the existence of a relationship among the type of teachers' group and the implemented activities. This statistical test revealed that the first group performs most innovative and ICT-related activities: such as coding, authoring, flipped classroom, lab activities and media education; while the second group more frequently carries out interactive lectures[5] (Figure 8).

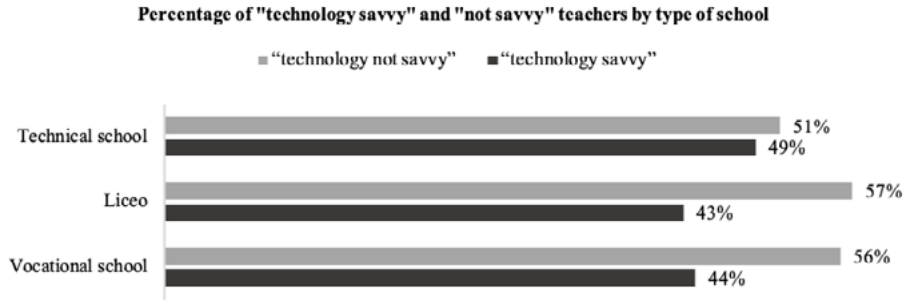
[5] Pearson's correlation=0,000.

Figure 8 - Activities performed by teachers in relation to their attitudes towards digital (Data base: 1.674 respondents)



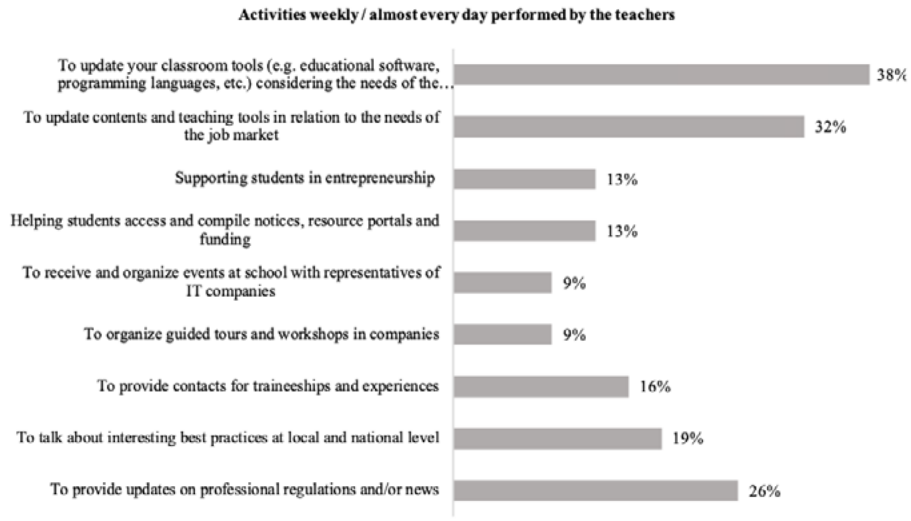
The diversity of behaviour between the two groups of teachers is partially explained in relation to the various types of school. In fact, the gap between "Technology savvy" and "not savvy" presence is more evident in Liceo and Vocational schools (Figure 9).

Figure 9 - Percentage of technology savvy and not savvy teachers by type of school (Data base: 447 respondents)



About the activities aimed at supporting students in approaching the job, teachers focus their work weekly or almost daily on the updating of classroom work tools (38%), of contents and teaching materials (32%), and information on laws and news concerning the profession (26%). Direct contacts with companies, through the organization of guided tours and workshops (9%) and school events with representatives of IT companies (9%), are instead actions not frequently performed (Figure 10).

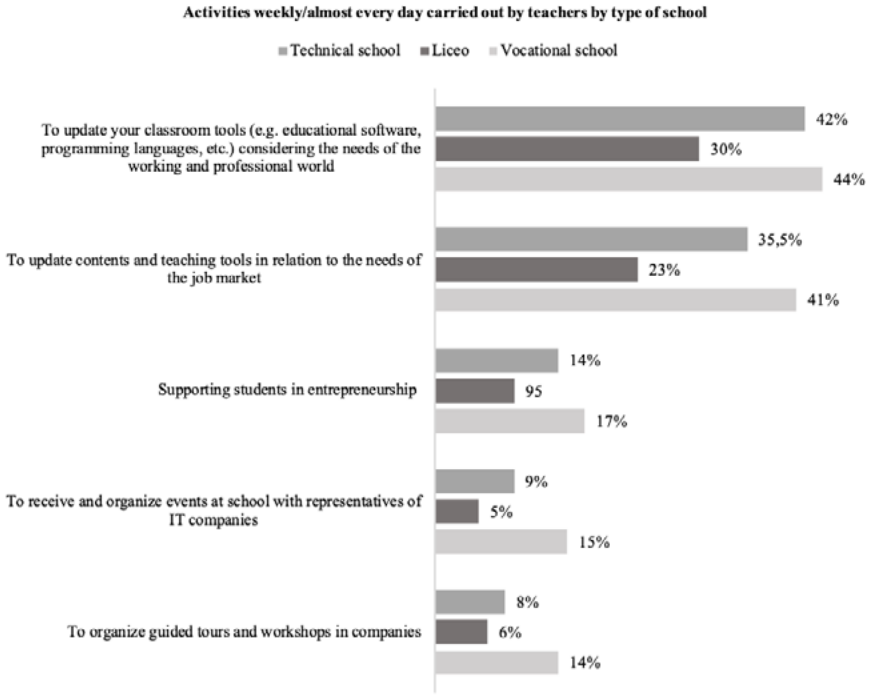
Figure 10 - Activities carried out by the teachers weekly / almost every day (Data base: 447 respondents)



Considering the different types of school, we should note that in general, teachers, in planning the training pathways, do not devote great attention

to activities aimed at supporting entrepreneurship (Figure 10). However, the data record some differences that may depend on the characteristics of the type of dedicated learning path and the specific outgoing professional profiles of each type of school (Figure 11). In particular, vocational schools are the most active in promoting direct contacts with local businesses. The Liceo, on the other hand, proves to be educational institution that is still distant from the world of work and where training, learning contents and teaching tools have not been modified and updated in relation to the needs of the job market.

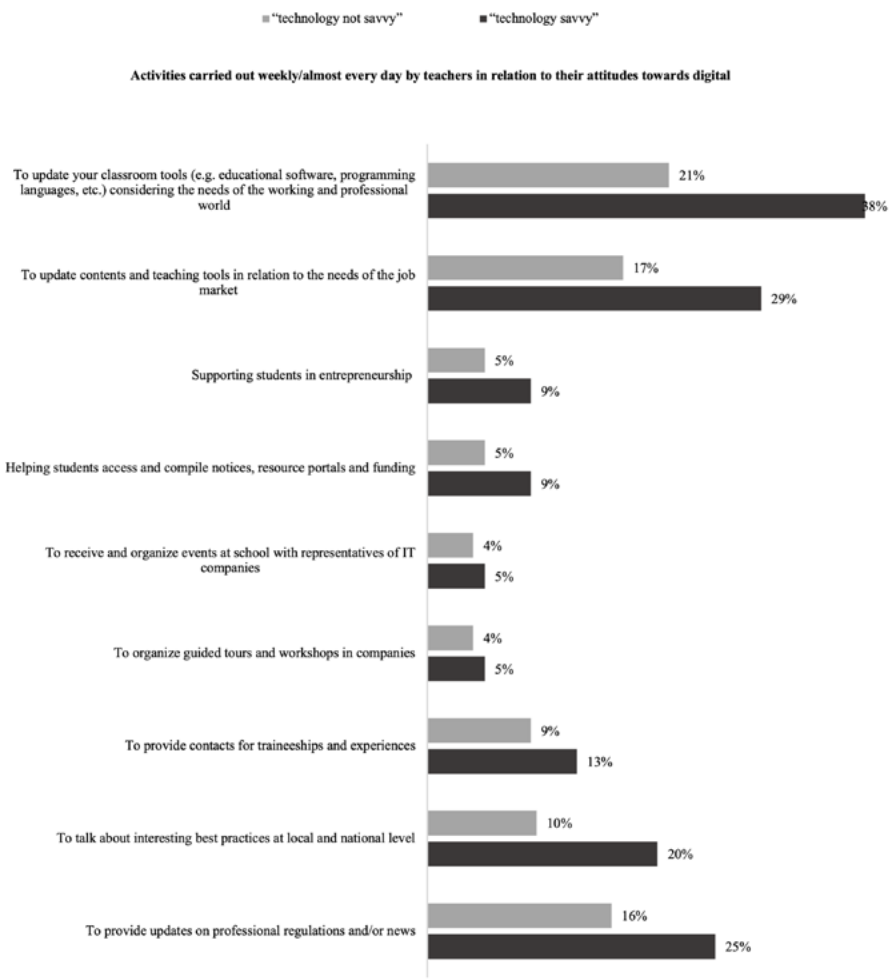
Figure 11 - Activities carried out weekly/almost every day on which there is a greater difference based on the type of school (Data base: 447 respondents)



The analysis also shows that the "technology savvy" teachers are generally more sensitive to carrying out the different activities aimed at developing entrepreneurial skills[6], except for two areas: to organize guided tours and workshops in companies and to host and arrange events with representatives of IT companies in their school (Figure 12).

[6] Pearson's correlation=0,000.

Figure 12 - Activities carried out weekly/almost every day by teachers in relation to their attitudes towards digital (Data base: 1.674 respondents)



The various students' digital practices

This part of the research focuses on the digital practices of students.

The following tables and figures illustrate the composition of the sample of students who participated in the survey.

Figure 13 - Students respondents by age group (Data base: 5331 respondents)

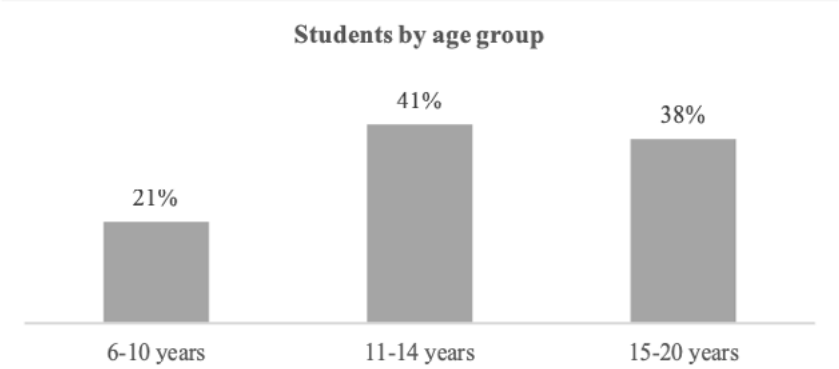
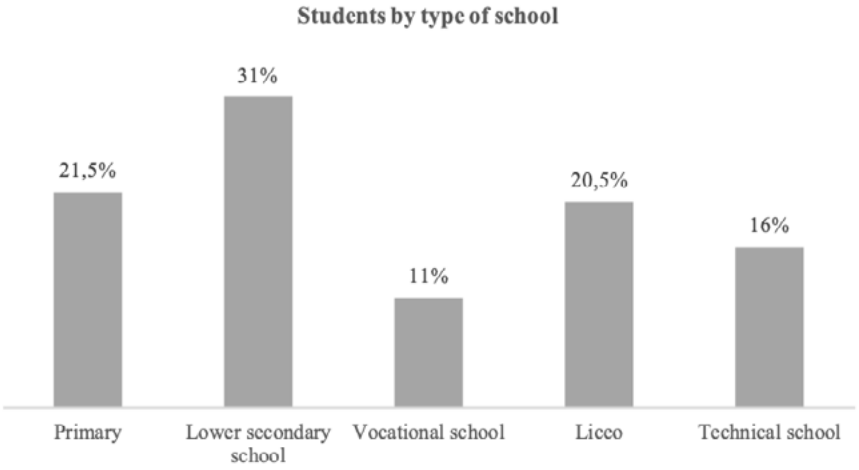


Table 4. Students by Region

Regions	Respondent students
Basilicata	43
Calabria	524
Campania	1.130
Puglia	2.166
Sicilia	564
Tot. Less developed Regions	**4.427**
Abruzzo	5
Molise	7
Sardegna	75
Tot. Transition Regions	**87**
Emilia Romagna	43
Friuli Venezia Giulia	27
Lazio	153
Liguria	1
Lombardia	139
Marche	94
Piemonte	151
Toscana	29
Umbria	168
Veneto	12
Tot. More developed Regions	**817**
Total cases	**5.331**

Figure 14 - Students by type of school (Data base: 5.331 respondents).



Many studies have explored the different uses of the Web for learning and other purposes, showing a gap between a basic or an advanced use of the Internet - a cultural and attitudinal divide which goes beyond mere access -and a wider and more diversified use of the web among the expert users (Hargittai, 2010). Among the plurality of social, economic and technological factors that nourish such differences, the gap emerges "between those who can effectively use new information and communication tools, such as the Internet, and those who cannot" (Wei & Hindmann, 2011, p. 229), in addition to the relevance of the level of education in the differential use of the Internet (ibidem).

Our survey has explored a set of activities that include the use of ICT for practical, relational, entertainment, learning and informational purposes. The general picture confirms the already known strong diffusion of the Internet in the lives of young people, which, as highlighted by the latest Istat surveys, in the 15-17 and 18-19 age groups, respectively for 94 and 93% use the Internet on a daily or weekly basis[7]. However, in the context of general digital availability among young people, the differences in how the Internet is used correspond to the different capacity to fully grasp the opportunities offered by ICT (Wei & Hindman, 2011).

The analysis focused, in particular, on groups of students more frequently engaged in digital learning activities, to explore their characteristics in terms of online practices: do students more active in digital learning activities also make a larger use of the Internet and, if so, in which kind of online practices?

[7] Data: Giovani.Stat 2018: https://www4.istat.it/it/giovani/cultura-tempo-libero-e-uso-dei-m/dati

To reduce the variables considered in the survey, two factorial analyzes were carried out respectively about two blocks of items: digital learning activities at school and digital activities at home for study purposes.

The first analysis (Table 5) highlighted a first component characterized by a complex of activities related to the creation of content and 3D objects, to programming and online collaboration also with other schools. A second component includes "multimedia" activities such as the use of IWB (Interactive Multimedia Witheboard), computer and the Web to watch videos, search for content, and work in groups.

Table 5 - Main components related to digital activities at school*

	1° component	2° component
Working online with students or teachers from other schools	**.671**	.198
To find useful information and materials on the Internet	.217	**.608**
To create content for a blog, a youtube channel or a school website	**.750**	.195
To create objects through 3D printers	**.834**	.115
To use or program apps or robots	**.780**	.141
Using the computer to work in groups	.366	**.660**
Using the computer to make experiments or simulations	.504	.535
To use the IWB to watch movies or content online	- .011	**.853**
To use the IWB for responding to quizzes and other interactive activities	.150	**.794**
*An analysis in the main components rotated with the Varimax method has been applied. Percentage of total variance explained by the first two components: 59%		

The analysis conducted on the variables relating to digital educational activities at home always identifies two main components: the first is related to advanced digital learning practices that include different networking methods, environments and tools for study; the second one is instead related to the activities closely linked to doing homework, and could configure the use of ICT as a support to the study (Table 6).

Table 6 - Main components related to home digital activities *

	1° component	2° component
To do homework using the computer	.249	**.686**
To search for information and online materials for doing homework	.118	**.820**
Developing multimedia products for homework	.505	**.565**
To attend courses online	**.861**	.030
Using tutorials and videos for school topics	**.597**	.402
Participate in online collaborative works for homework	**.807**	.184
To communicate through social networks with other students on school topics	.140	.671
To communicate through social networks with teachers	.449	.436
To use a school web platform for uploading or downloading learning materials	**.627**	.377
*An analysis in the main components rotated with the Varimax method has been applied. Percentage of total variance explained by the first two components: 57%		

The four components are therefore associated with types of activities at different levels of complexity and diversification and describe various ways of using ICT for learning. To investigate the more general differences in Internet use, a cluster analysis was carried out using factor variables, to firstly explore the different profiles, among the interviewed students, in using ICT for learning.

The analysis highlights five groups of students and a predictable different number of clusters, smaller in relation to advanced activities. Group 1, composed by 31% of respondents, expresses a profile of poor digital practice. Group 2 (20.5%), is characterized in particular by a low level of digital didactic activity in a multimedia class. Group 3 (29%) is characterized by digital behaviors associated with multimedia and support components, in the classroom and at home. Group 4 (9%) is determined by digital behaviors associated with advanced components, in class and at home and, from a low "multimedia" type of practice at school. Group 5 (10.5%) expresses an advanced and autonomous type of use. It is characterized by advanced study practices at home and, to a lesser extent, by multimedia activities in the classroom. In this small group, therefore, students carry out little digital activity in the classroom but use ICT independently for study and learning purposes.

Figures 15 and 16 illustrate the composition of the groups by school and gender

Figure 15 - Attended institutes by cluster

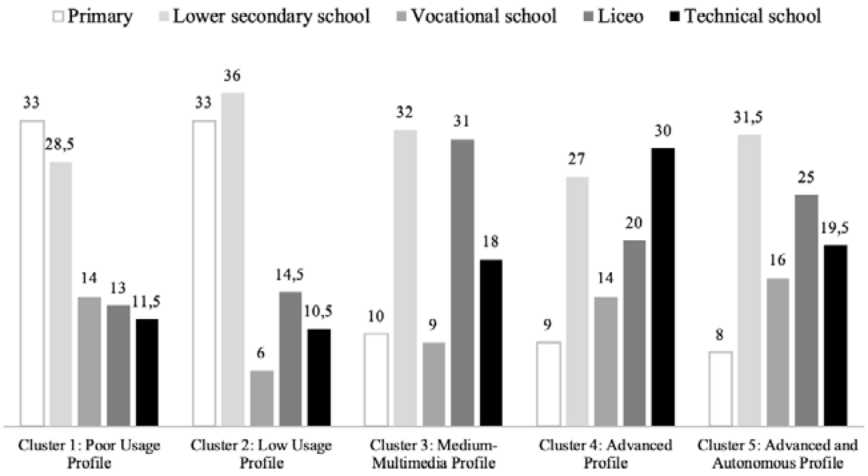
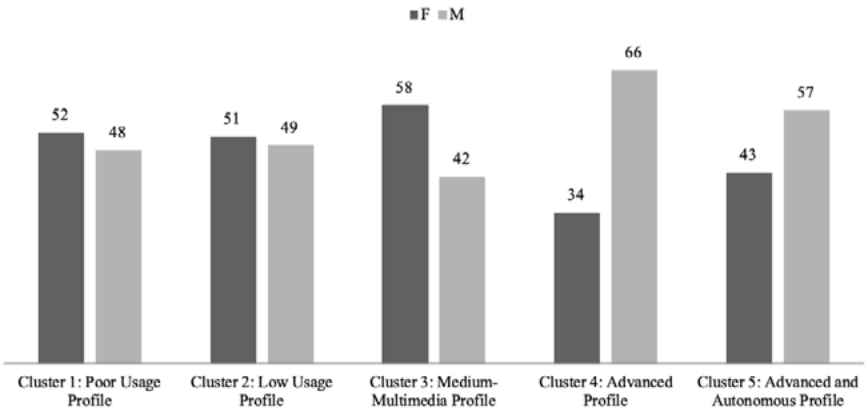
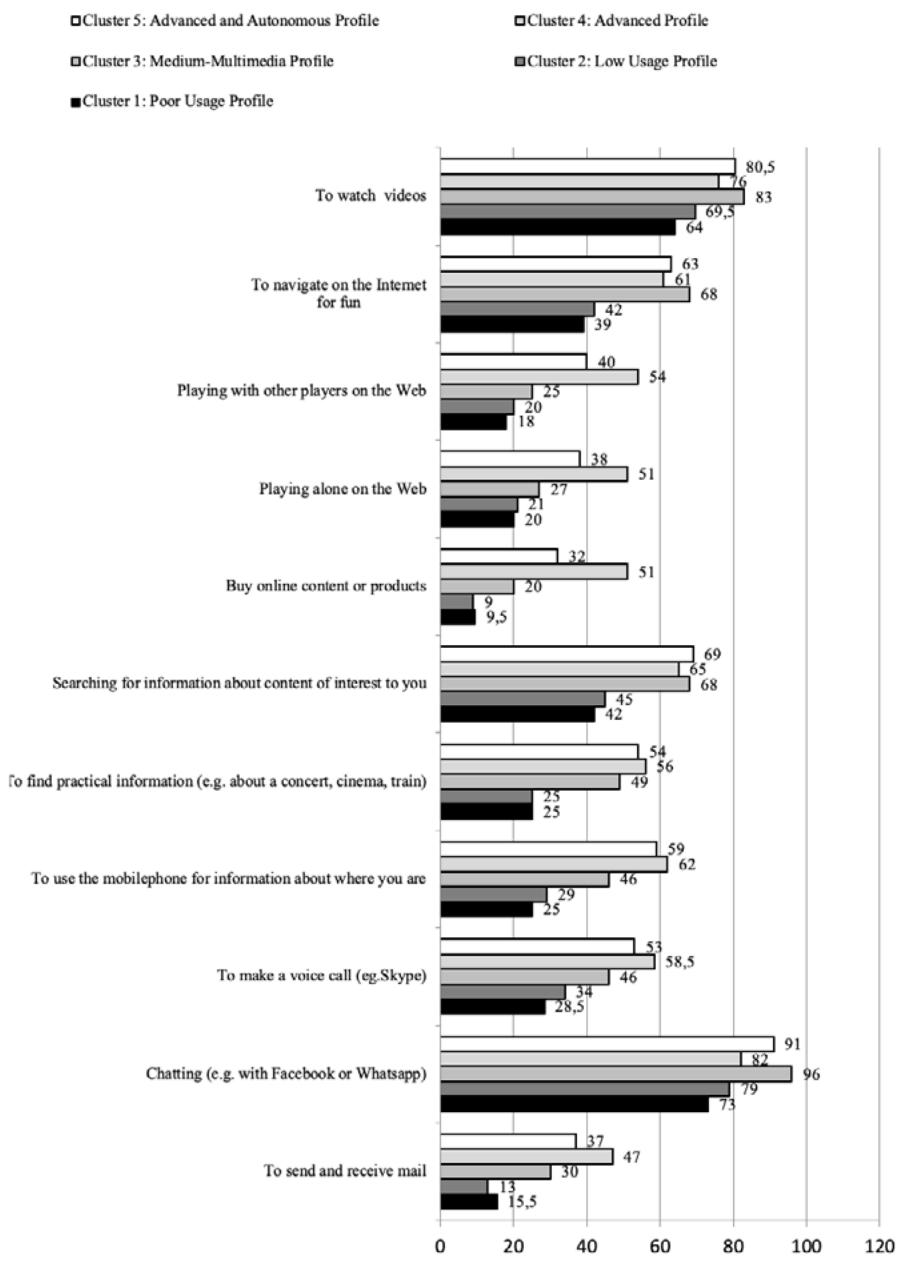


Figure 16 - Gender by cluster



To explore the differences in the use of the Internet among students more or less engaged in digital activities for learning, we cross-correlated the five groups with the complex of online activities, highlighting in the clusters of profile students medium and advanced important waste for all items considered. The differences significantly characterize the advanced profiles (cluster 4 and 5, Figure 17).

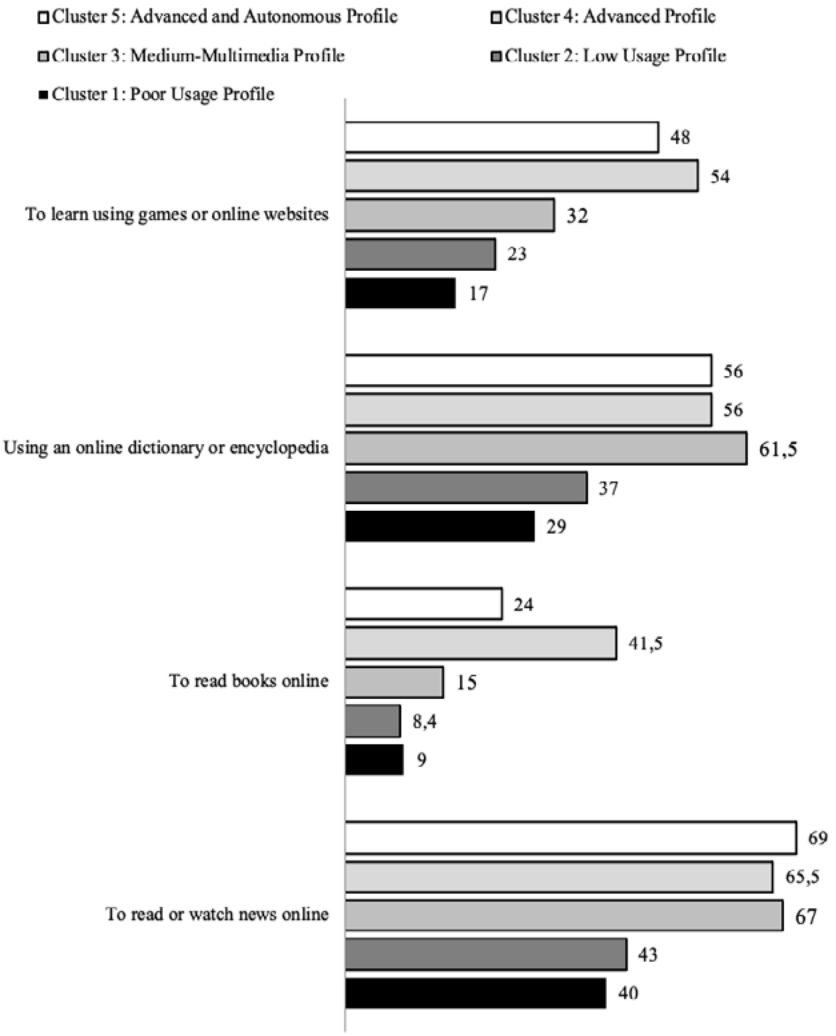
Figure 17 - Online activities by the cluster



Observing the online practices most directly related to the informative-cognitive field (Figure 18) there is an equal trend. The differences are

particularly significant for the advanced profile group (cluster 4) in relation to less common online practices such as learning through games or sites and reading online. Compared to the items described in the table, it is also noted that the medium-multimedia profile group (cluster 3) records the highest percentages in relation to the use of online dictionaries.

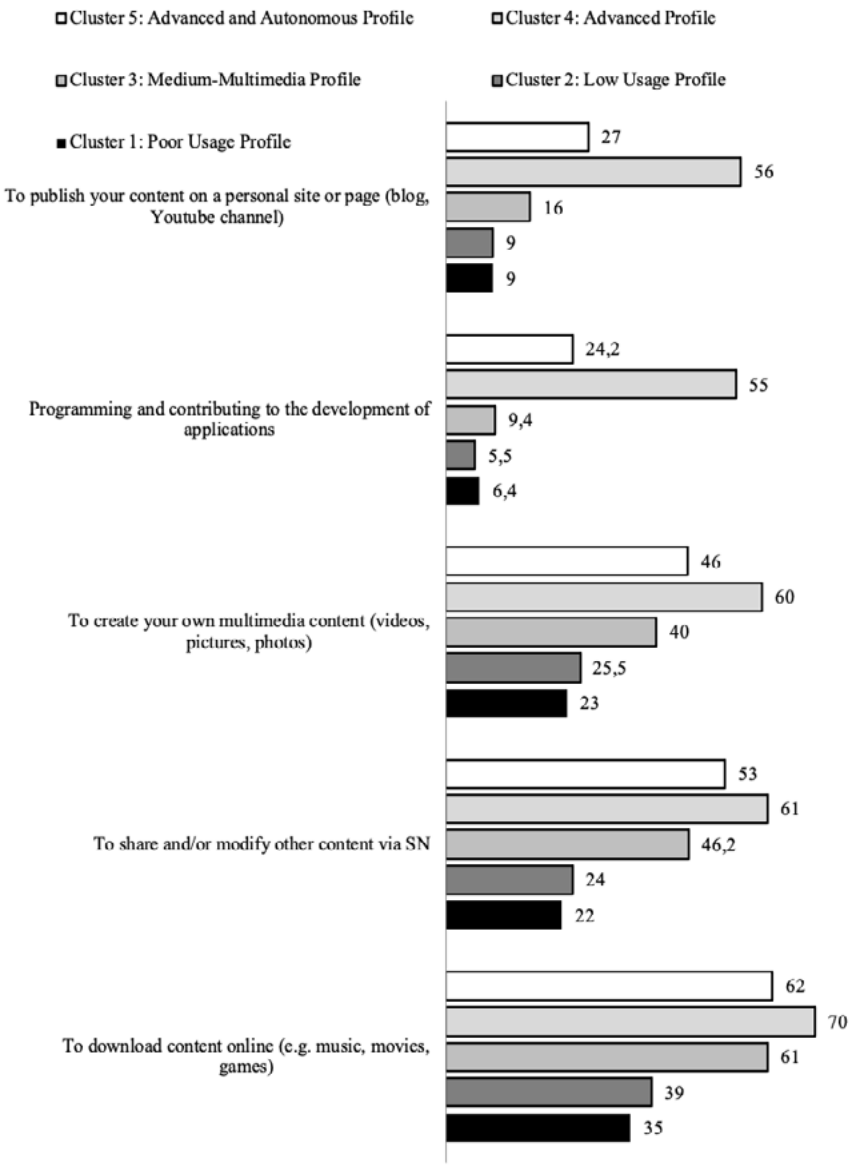
Figure 18 - Online knowledge activities by the cluster



The differences in the use of the Internet appear even more significant in relation to participatory activities (Jenkins et al., 2009; Buckingman, 2007), and even in this case, they are particularly evident in more sophisticated

activities such as programming/developing applications and publishing own content, for which the difference recorded in the advanced group (cluster 4) is clear (Figure 19). The difference between low, medium and advanced usage profiles is less evident in relation to downloading content, which is always the most common practice among the items considered.

Figure 19 - Online participatory activities by cluster



It is interesting to note that the "advanced autonomous" profile (cluster 5) shows values that far exceed those recorded by low or medium user profiles. They frequently carry out various activities, including less widespread practices, but to a lesser extent than those of the Advanced profile, accompanied also in school in the use of ICT. In these two profiles (cluster 4 and 5), however, a diversified use of the Internet can be observed. Students from both groups use the Internet more than others to socialize, communicate, manage information, collaborate, create and share content. They do everything more, online. Appear "all-round users", to use the definition of Livingstone and Helpser (2007), and it is precisely on the side of the less common activities among young people that differences can be significant, opening up to a wide range of dimensions from operational digital competence to informational, creative, communicative, social and professional dimensions.

To understand the differences in the use of the Internet it's crucial to consider the more general social and cultural factors, however, without forgetting the fundamental role played by the school (Argentin et al., 2013; Buffardi & Taddeo, 2017). To explore the relationship between digital educational activities at home and those carried out at school, we conducted a linear OLS regression analysis using the variables presented above. Table 7 shows that the scholastic activities summarized in the two main components are positively correlated with the use of the Internet for study reasons also at home by the students. None of the context factors considered (age, gender, educational level of parents, academic performance), is positively correlated.

Table 7 - 5.331 cases. OLS Regression Predicting Advanced digital learning at home

	UnstandardizedCoefficients		
OLS Regression Predicting Advanced digital learning at home	B	Std.Error	Sig
1 (Constant)	1,262	,350	.000
Gender (F=2)	-254	.096	.008
Age	-,003	.018	.879
Level of education of parents	.078	.057	.168
Performance at school	-,049	.064	.451
Activities at school Producers (1° Component)	,317	.037	**.000**
Activities at school Multimedia (2° Component)	,298	.052	**.000**

5.331 casi. R Square: ,205 - Adjusted R Square: , 196

With respect to the complex relationship between education and technology, our findings suggest that the carrying out of ICT activities at school is correlated with a more specific and advanced use of ICT at home. These findings show only a part of a more complex cultural, social, educational dynamic, and certainly require further and more in-depth analyses. However, the tendency that seems to emerge from our data suggests a more sophisticated use of the Internet in which (also) the school matters.

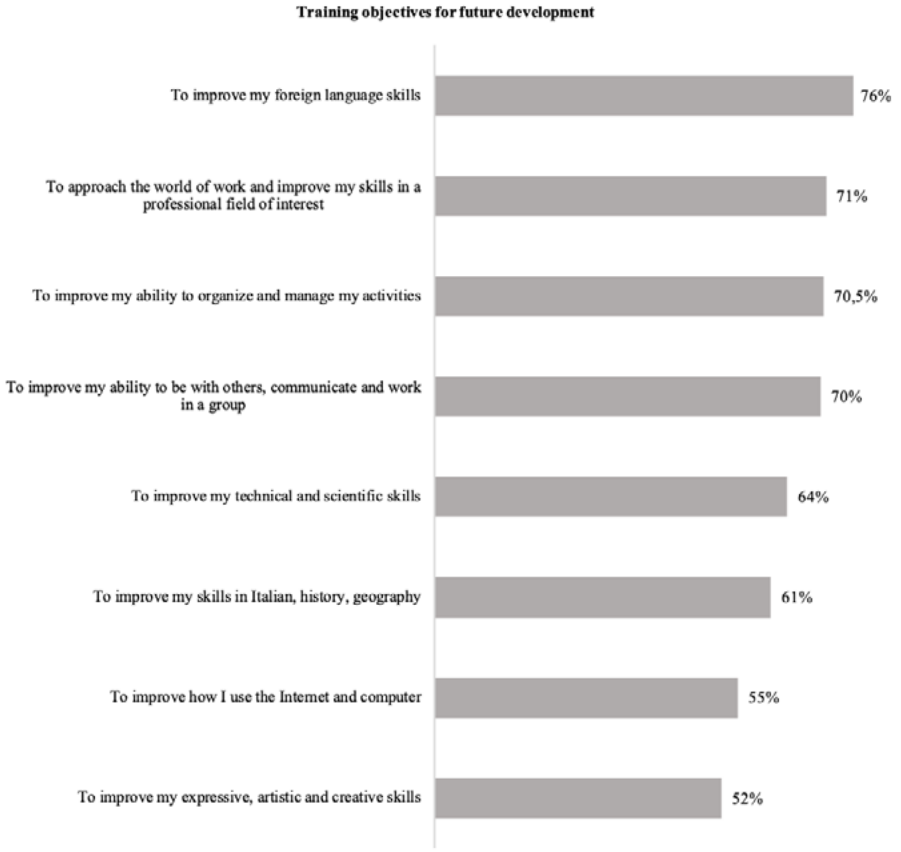
This first presentation of the students' digital behaviors accompanies a further area of interest in the survey, which concerns the perception of training needs, in terms of digital and not only. And it is enriched by the teachers' point of view. Compared to the spread of ICT, what do teachers have to do to accompany students in widening the spectrum of uses, skills and digital opportunities? The next paragraph will focus on these aspects.

What do students and teachers ask about digital skills?

In this paragraph, for responding to the last research question, we analyze the training needs of students and teachers, identifying the elements both of greatest interest to the two targets, and overlap or, on the contrary, of disconnect in relation to the mean of the goals of development.

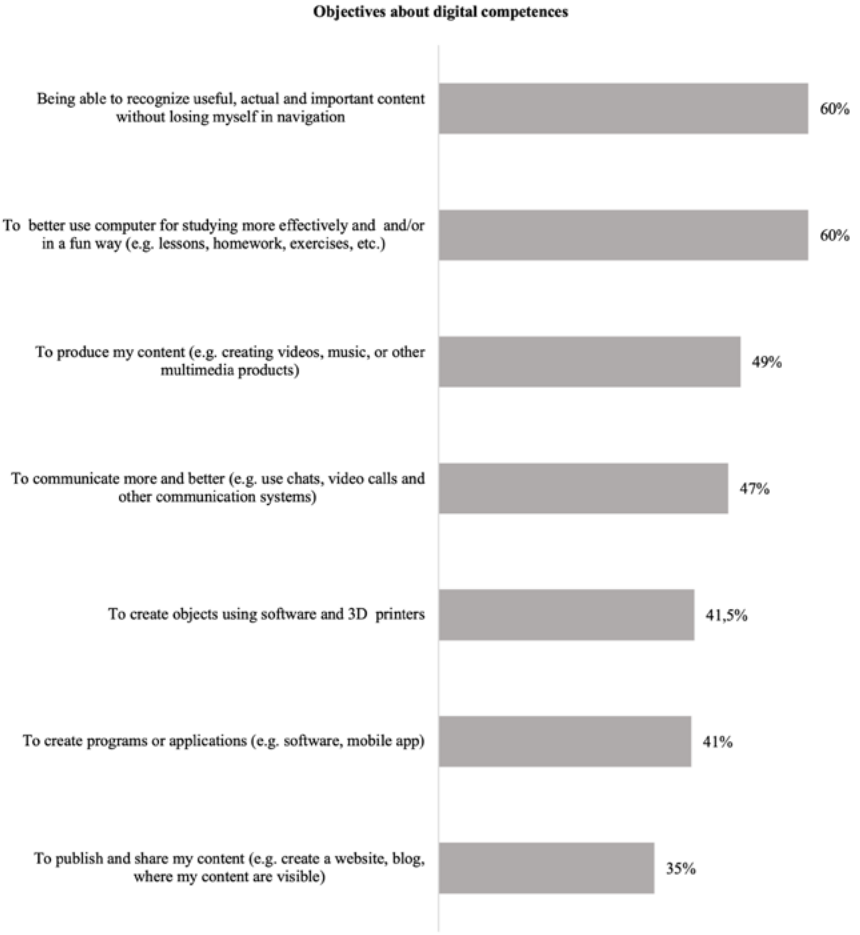
The analysis shows that students consider the issue of digital competences not a priority if compared to the development of other skills: the core of their interest, in fact, is composed by the competences for learning foreign languages, the competences for professional development and approach to the world of work, as well as soft transversal skills such as the ability to organize, manage and finalize their activities, collaborate and relate with others. Digital skills, as well as the competences related to the various fields of the academic curriculum, are less crucial for the interviewed young people (Figure 20).

Figure 20 - Percentages of students who declare to be very interested (values 4 or 5 on a scale of 1-5) (Data base: 5.331 respondents)



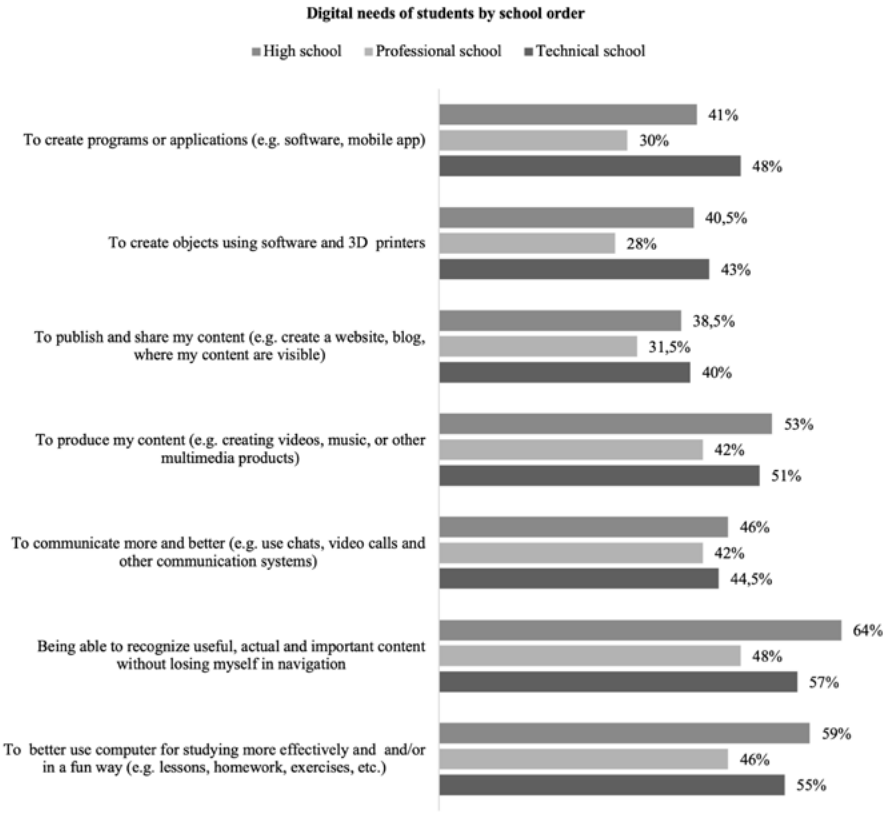
With particular reference to digital needs, the students of our sample have as a priority the following aspects: 1) the ability to more closely connect digital competence to learning at school, using the Internet to make the study more effective, 2) the ability to recognize useful, reliable and effective content through the Web. The students, on the contrary, consider less importance to develop their communication and relational skills online, as well as their ability to become active producers on the Web (Figure 21).

Figure 21 - Percentages of students of all school orders who declare to be very interested (4 or 5 on a scale of 1-5) (Data base: 5.331 respondents)



This priority scale remains basically unchanged if we observe the digital needs of students in relation to their school background (Figure 22).

Figure 22 - Percentages of secondary school students who declare to be very interested (4 or 5 on a scale of 1-5 (Data base: 2.513 correspondents)

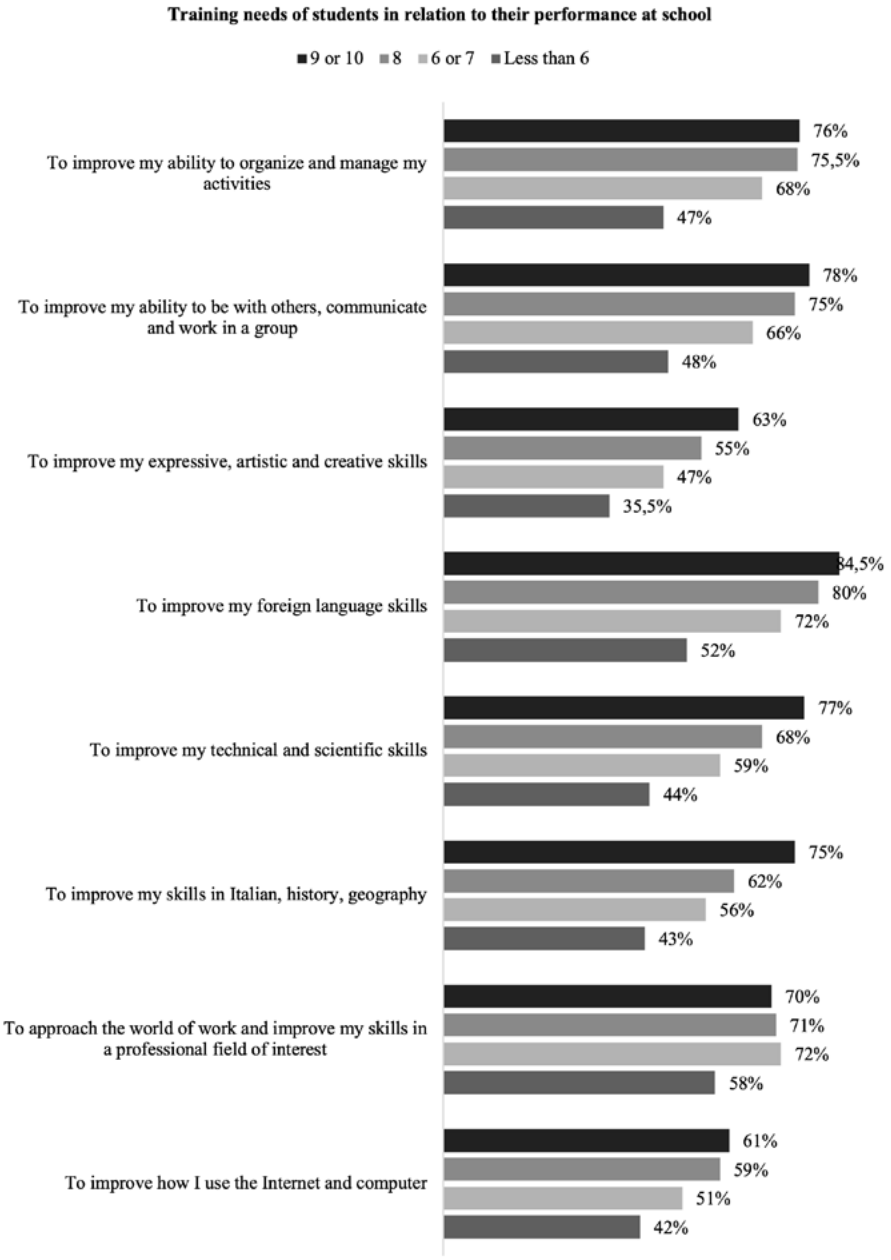


Summarizing, at the core of the students' training needs there is the ability to connect the digital world, and its related informal learning practices, with the adult world and the "formal" (scholastic and professional) recognition of learning and skills acquisition.

It is a pragmatic idea of digital, which also shows how young people feel sufficiently competent in contexts related to private consumption and entertainment while they are interested in enhancing their ability to work with the digital, using it as a cognitive tool.

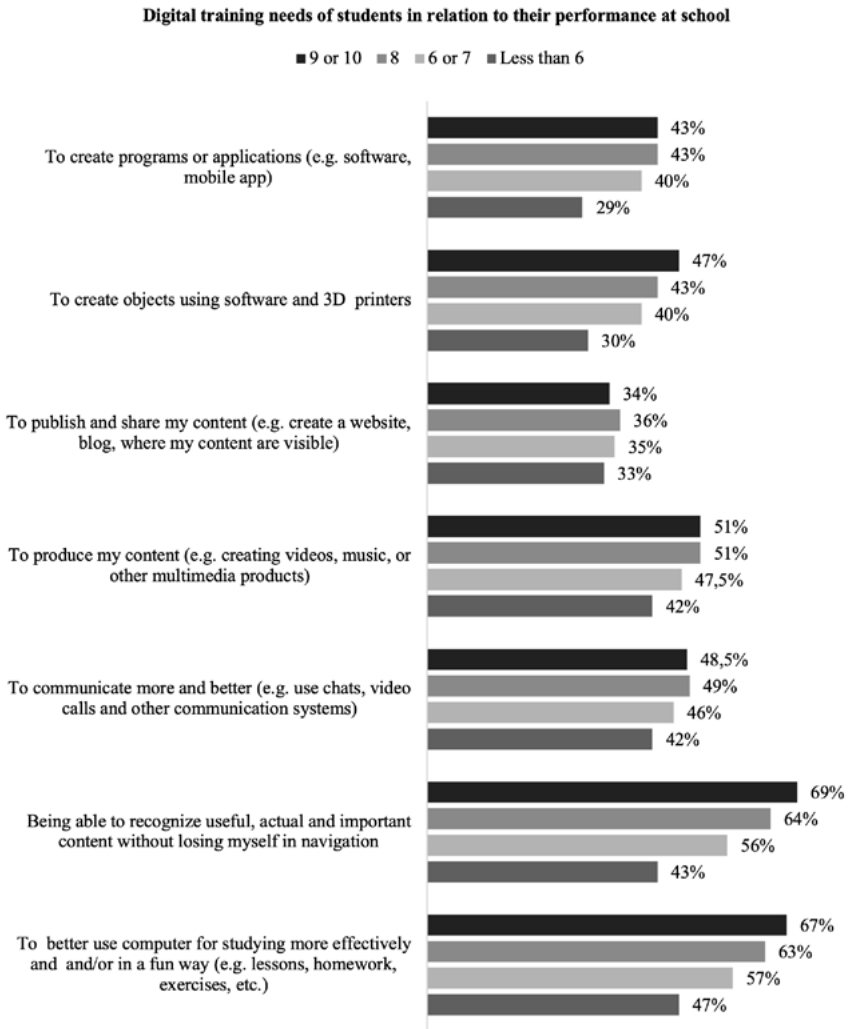
This picture appears interesting also connecting it to their capacity to be successfully "integrated" in the school system (data detected through their declared academic performance in terms of grades). We can see, for example, that students with higher performance at school are more aware of their training needs, in all the investigated fields (Figure 23). On the contrary, the students who declare a low performance at school are less interested to improve their own competences, in all fields.

Figure 23 - Training needs of students in relation to their performance at school, based on their declared averages grades (4 or 5 on a scale of 1-5) (Data base: 5.331 respondents)



Focusing on the specific digital competences, we note once again that the excellent students are those who require an improvement in digital competences aimed at a recognition and connection with the world of "formal" learning: for these students, in fact, knowing how to recognize useful, reliable and effective content through the Web, and using the computer in terms of study are priorities that stand out, compared to other digital skills, more linked to content production activities and online relationships. For students with low performance, instead, the training priorities are less clear (Figure 24).

Figure 24 - Digital training needs of students in relation to their performance at school (Data base: 5.331 respondents)



While the students with higher performance at school focus their interest on digital related to those fields which are more strictly linked to the learning objectives of the school path (such as, to select sources, to study in-depth), the student with low performance are less attracted to an "operational", "informational" and above all "strategic" use (Van Dijk, 2005) of digital.

New divides, therefore, emerge, where digital becomes a factor capable of widening the gap between good and less good students, rather than an element of inclusion and empowerment of the weakest sectors of the population.

The school can act, in this sense, as an element of leveling of these differences: as also observed in the previous paragraph, in fact, the students who carry out more digital activities at school are also those who learn to use the Web in a more advanced way at home and in free time.

This gap, however, can be significantly narrowed only when teachers are able to offer a digital teaching aimed at inclusion, bringing all learners (and not only the best and most motivated students who are already focused on such aim) from a just playful and unstructured use of the ICT, to the capability to use, interpret and rework the potential of digital in a socially functional way.

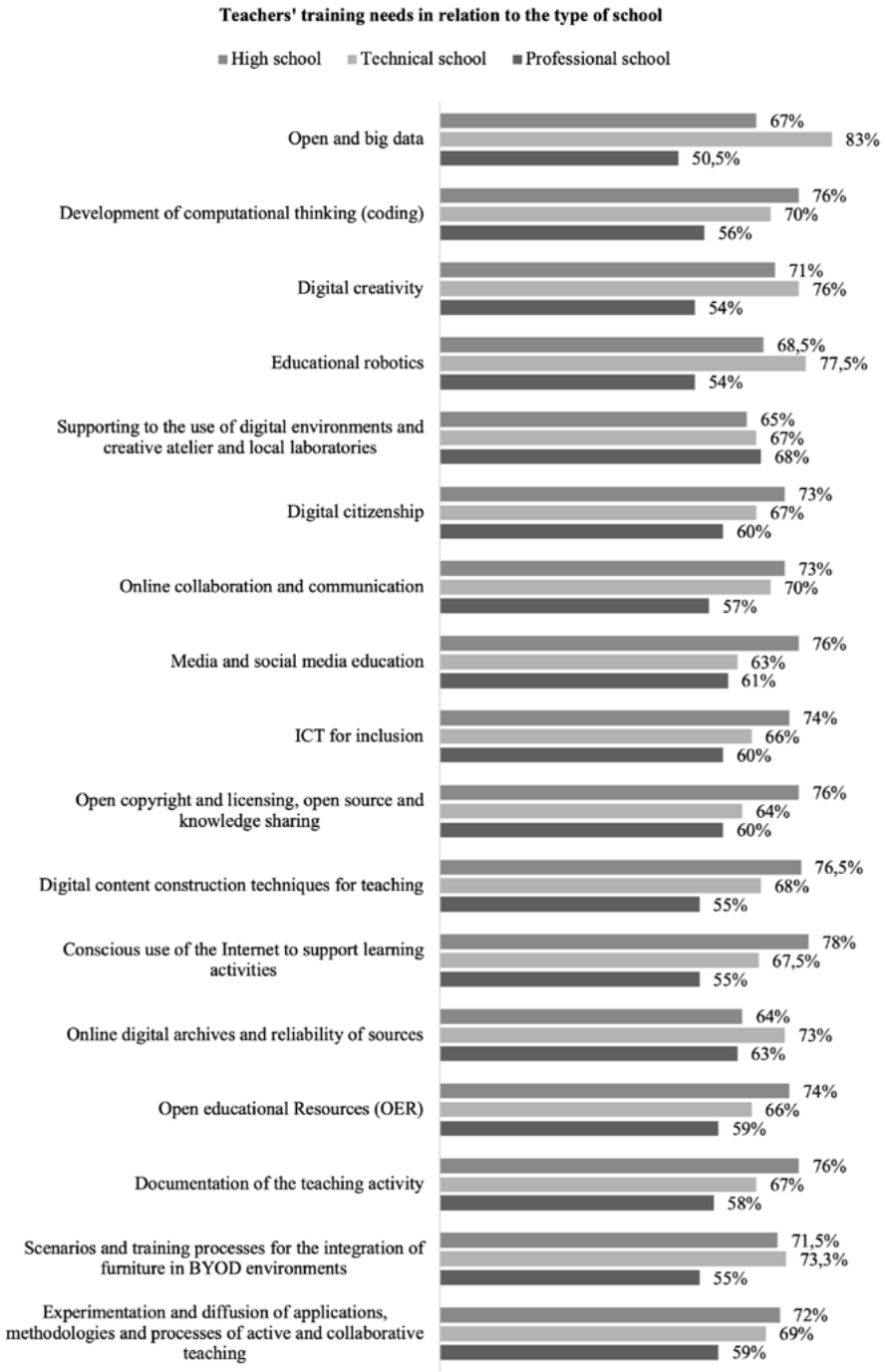
Going back to what we saw in the analysis about teachers, we note that the visions and needs of the students, as presented in this paragraph, are only partially embraced by the teachers.

In fact, the "technology savvy" teachers deal intensively the activity, considered crucial by students, of understanding and interpreting online sources (Figure 4). However, overall, the teachers give priority to the activities of defending privacy and online ethics, favoring a "defensive" and risk-focused vision on the issue (Figure 25), respect to activities related to a proactive capability to exploit the online sources.

With regard to training needs, the use of the Internet in favor of learning activities is at the core of the teachers' interests (70% of teachers are interested), together with the ability to build new digital educational content (70%).

However, returning to the matching with the students' expectations, we note that teachers concentrate in a minority on the development of digital teaching activities for professional development: for example, employment support is a priority only for teachers of vocational institutions.

Figure 25 - Teachers' training needs in relation to the type of school (Data base 447 respondents)



In conclusion, the teachers express a strong need for strengthening in the digital environment; however, the directions of this need only partially meet the students' request to move towards a digital competence more integrated with the world of work and the soft skills crucial for the life.

In particular, the students' need to work on online sources is intensively dealt only by "technology savvy" teachers. However, both teachers and students highlight the need to work on identifying clear links between digital and learning, that help to make the two fields converge.

Finally, an important work should be carried out about the weaker student groups, which, from the research data, seem the least equipped to seize the opportunity to connect digital learning practices at school.

Conclusions

Although in recent years there have been in Italy several material investments and empirical researches for an interpretation of digital practices at school, the issue of the link between digital and learning, and its role for the socio-cultural growth of individuals, remains a largely uncertain matter, controversial and easily subjected to ideologisms.

The present study intended first of all to highlight an approach to the topic: the need of a bottom-up approach, focused on observing the practices, interpretations and desires of the actors involved in the system, in order to frame the topic within a context of sustainable and also desirable development for the actors who live the context. In fact, as seen in the introduction, many studies have focused on what digital skills should be, providing frameworks and indicators (eg.Digcomp), other studies have analyzed Italian users' actual practices (Cortoni, 2016; Capogna et al., 2017; Mascheroni & Ólafsson, 2014; Grion & Bianco, 2016), but researches in which teachers or students are explicitly asked about their vision on skills, and what their perceived training needs are, are rarer (Grion & Cook-Sather, 2013; Benigno et al., 2014;Scarcelli, 2015).

The analysis aimed at identifying from within, and not from above, the directions to be taken and the stimuli for new questions, avoiding to carry out ex-post evaluations on implemented policies. In this perspective, this paper tried to provide the point of view on digital from the protagonists and to highlight some emerging elements.

In relation to the research questions presented in the introduction, we can summarize that only a still minority of teachers is characterized by a "technology savvy" attitude and it works assiduously in developing innovative methodologies and transversal digital skills.

Moreover, the research has shown that there are still few teachers who use digital methodologies useful for the future job. Then, generic uses of digital for professional student empowerment are also rare.

Among students' practices, entertainment attitudes toward technologies are the most widespread. However, when active and participatory approaches to digital are proposed at school, students, from all the types and social background, increasingly use digital technology for learning purposes.

Finally, we have seen that visions of the digital competences by teachers and students only partially match.

In fact, the expressed needs on digital, by students and teachers, highlight a widespread awareness of the extreme importance to take a step forward in the use of technology and learn to utilize it as a cultural interface, able to provide new tools to learn, understand and integrate into the society.

Among the priorities that emerged, the use of digital technology to access and process knowledge represents an important shared point of view, between students and teachers, and an interesting sign of a mature vision in relation to the topic.

It can, therefore, be considered an important starting point for developing shared strategies and participatory educational policies who take into account the point of view of the involved subjects.

Moreover, a great distance between students and teachers on the role of digital technology for the acquisition of skills related to the work is still present: on the one hand, students, coming from all school orders, think that digital technology has a significant importance in helping them in their path toward the future job; on the other hand, teachers appear still fragile, on cultural and operational levels, in proceeding incisively in this regard.

Further research should thus be devoted to explore which are, in the Italian scenario, the digital competences to focus on in order to respond to the labour field, and how to develop them at school.

In particular, it would be useful to carry out cross-sector research, able to match the skills needs coming from the labour field, with those expressed by students and teachers at school. Such type of research could be useful to deeper understand social and cultural factors that actually contribute to feed the mismatch between market and school system we face nowadays in Italy (OECD 2017; Excelsior 2018).

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tion" and "Activities carried out by teachers for supporting students in their path towards the world of work", Taddeo is responsible for the paragraphs "Methodology", "What do students and teachers ask about digital skills?" and "Conclusions".

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