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# The Web 2.0 Skills of Italian Students: An Empirical Study in Southern Italy

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# The Web 2.0 Skills of Italian Students: An Empirical Study in Southern Italy

*Annalisa Buffardi*[*] *and Gabriella Taddeo*[**]

*Abstract:* This paper presents the main results of an empirical research funded by the Italian Ministry of Education and carried out by INDIRE (National Institute of Documentation, Innovation and Research in Education) in 2015 .Starting from a survey based on a sample of 9.508 students, the aim was to out-line and discuss results relating to the youngsters' "participatory" and "Web 2.0" skills. The research coped with issues such as the daily digital practices of students, their different "digital styles" and their relationship with learning outcomes and learning needs. The results highlight several interesting thinking issues such as: 1) the development of different "digital styles" among students in relation to their school achievement: more "generic" and entertainment-based the style of the students with low marks at school, more "practical" and knowledge-based the style of the students with the highest scores; 2) a positive correlation between participation in advanced online activities in the classroom (i.e. involving digital literacy, online teamwork, creative software use) and a more frequent and conscious use of technology by students outside school. Through the analysis of the data, some interpretative directions will be drawn, in order to discuss the pivotal role of schools in improving students' formal and in-formal digital skills.

*Keywords*: digital competence, Web 2.0, education, learning outcomes

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## Introduction

The issue of digital competence has been investigated by various studies in recent years. Many theoretical frameworks have been developed at international level (DIGCOMP 2014; UNESCO 2011; U-TEACHER 2005). There are several different terms and definitions concerning digital competence (Ala-Mutka, 2011; Ferrari, 2012) as well as knowledge, skills, and attitudes about technology and media use, such as digital literacy (Buckingham, 2006; Lankshear & Knobel, 2006), computer literacy (Nawaz & Kundi, 2010), and media literacy (Hobbs & Jensen, 2009; Potter, 2014). These concepts also vary in meaning in different academic, cultural, historical, social and educational contexts.

Many researchers considered it pivotal, in analyzing digital competence, to observe specific, technical skills such as browsing the web, seeking information, and downloading files (Bunz, 2004; Hargittai, 2002; Potosky, 2007).

In addition, in more recent years, researchers have abandoned the appraisal of simple operational tasks to pay more attention to complex socio-technical behaviours that may demonstrate cultural ability to integrate technology into one's daily life and to use it for personal and social development.

In this case, digital competence is largely understood as more than just the ability to use software or operate with digital devices, and it involves "a large variety of complex skills – cognitive, motoric, sociological, and emotional – users need to have to use digital environments effectively." (Eshet-Alkali and Amichai-Hamburger, 2004, p. 421).

Over the years, with the emergence of a strict interconnection between online and offline life, adjunct behaviours have been brought to the public attention, such as the ability to evaluate the accountability of other internet users, to respect ethical norms online, to act in a meta-reflexive way (OECD, 2005; Haythornthwaite, 2007; Knobel & Lankshear, 2008), to efficiently manage identity on the internet (Boyd & Hargittai, 2010) and to use media in a creative and participatory way, and not only as passive "readers" (Jenkins, 2009; Buckingham, 2007).

In these approaches, the only way to analyze users' competence is to match digital behavior to real situations, observing how users are able to integrate the digital dimension with other socio-cultural competences such as the ability to manage relationships, solve problems, or simply obtain help online.

Alongside an increasingly rich concept of "digital competence", different techniques and scientific approaches have also attempted to tackle the idea in order to measure it. A first approach is based on the analysis of specific usages or digital behaviours. In this direction, for example, empirical studies carried out by Livingstone and Helsper (2010) were based on the analysis of digital behaviours which can be considered related to good digital competence, as, for instance, the ability to set privacy policies on social networks, solve problems using the web and protect one's own identity online.

With a similar approach, in the educational field, the research "ICT in Education" (Wastiau et al., 2013) focused on how often students do homework with the help of the computer, search the internet for information for schoolwork or search online for learning opportunities, courses and/or jobs.

A second approach to the analysis of the digital competences is based on the direct measurement of performances which are considered indicative of digital skills: so called "situated tests" have attempted to directly measure specific skills of the students by asking them, for example, to find information online, create contents or select reliable online sources (Gui & Argentin, 2011; Hargittai & Shafer 2006; Calvani, Fini & Ranieri 2010).

According to the first approach to the analysis of the competences, based on the observation of attitudes, usages and behaviours, the present paper proposes an overview of the digital skills of students at school and outside, analyzing both their digital behaviours and consumptions, and their usages of the internet for empowering critical attitudes, participation and social capital.

The aim of the paper is therefore to illustrate how the cultural and social digital attitudes of youngsters, considered pivotal soft skills for their future development, are related to their school achievements: from our data, in fact, we can observe that students who achieve good results at school are more interested in using the web for focused and informative purposes, while low achievers at school are more involved in entertainment and generic web navigation.

A second issue will be to contextualize the relationship between digital behaviours at school and what students do in their informal spaces of socialization, learning and cultural life. We could observe how the school can produce quite a relevant impact on shaping digital behaviours of the youngsters, also out of the classroom.

Furthermore, through the analysis of the results, the paper will provide some reflections about the pivotal role of the school in promoting critical,

creative and collaborative approaches to the digital life and in contrasting possible digital divides.

## Digital competence: soft skills and awareness in the use of technologies

In 2006, the European Commission identified the eight key competences for lifelong learning as a combination of knowledge, skills and attitudes, particularly necessary for personal fulfillment and development, social inclusion, active citizenship and employment. These key competences, in keeping with the European Parliament and Council Recommendation – are essential in a knowledge society and guarantee more flexibility among the labour force, allowing it to adapt more quickly to constant changes in an increasingly interconnected world. They are also a major factor in innovation, productivity and competitiveness. Within the framework of the eight key competences, digital competence involves the confident and critical use of Information Society Technology (IST) for work, leisure and communication. "Individuals should also be able to use IST to support critical thinking, creativity, and innovation (…). Use of IST requires a critical and reflective attitude towards available information and a responsible use of the interactive media" (2006/962/EC).

In the various European documents, different definitions of the concept of digital competence stress certain elements that are worthwhile recalling here. First and foremost, the link between the concepts of "digital competence" and "digital citizenship": at a basic level, the use of digital tools and services is a presupposition for active participation in the social, economic and political dynamics that form in the new digital environments, starting from the acknowledged pervasiveness of technology in our lives. Secondly, digital competence includes "digital literacy" and evokes a further level, defined as "digital transformation", where users can employ digital opportunities for innovation and improvement by using them creatively. Digital transformation has been identified as central in the development of a "culture of innovation and creativity", as we can read in the AgID Guidelines for Digital Competence, as part of the initiatives to develop the Italian Digital Agenda, (LG - AGID, 2014). Moreover, in building digital competence, there has been a drift from ordinary individual usage to a dimension of collaborative learning. "The necessary passage is to go beyond the idea of "critical consumption" of media (including digital varieties) – which nonetheless underlies the entire tradition of media education – to shift the focus from building individual competence to a learning process that implies

social abilities developed through collaboration and networking" (LG - AGID, 2014). Ultimately, it is acknowledged that schools have a role of primary importance. As for Italy, here we should recall, in particular, the already cited AgID Guidelines for Digital Competence (LG - AGID, 2014, p. 25), which underline its "crucial role, for and throughout the country, as a production center of active, informed digital culture and citizenship".

In this context, "digital competence is both a requirement and a right of citizens (…). It is the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment. (Ferrari, 2012). In particular, the DIGCOMP Framework for Developing and Understanding Digital Competence in Europe (Ferrari, 2012; 2013), identifies 21 competences within 7 main areas, defined as follows:

- Information: identify, locate, retrieve, store, organize and analyze digital information, judging its relevance and purpose.
- Communication: communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact with and participate in communities and networks, cross-cultural awareness.
- Content creation: create and edit new content (from word processing to images and video); integrate and re-elaborate prior knowledge and content; produce creative expressions, media output and programming; deal with and apply intellectual property rights and licenses.
- Safety: personal protection, data protection, digital identity protection, security measures, safe and sustainable use.
- Problem-solving: identify digital needs and resources, make informed decisions on the most appropriate digital tools according to purpose or need, solve conceptual problems through digital means, creatively use technologies, solve technical problems, keep updated.

The DIGCOMP therefore highlights various competences such as: interacting through technology (e.g. using chatlines, emails); sharing information and content (e.g. emailing, social networks, collaboration platforms); collaborating through digital channels (e.g. by using e-mails, or several digital collaboration tools to produce and share resources, knowledge and content); creating original personal content (e.g. creating, editing, modifying, refining and mashing up to create new content and knowledge);

using the web's collaborative technologies and channels to identify and solve problems, also by means of original solutions. According to Jenkins (2009), these are competences which describe the "participatory culture" that the young are immersed in. In the daily use of the web, in fact, they experience new forms of relationships and affiliation, and they produce, create, develop, and collectively raise and resolve problems through spontaneous and collaborative problem-solving. These are "new skills that are required in a participatory culture: creating, circulating, connecting, collaborating, new skills for a digital media curriculum that incorporates new literacies for this digital age" (Cupaiolo, 2012).

Exploiting the cultural perspective of the practices of sharing and exchange also means, in the words of Derrick de Kerckhove (Buffardi & de Kerckhove 2011, p. 6), stressing the necessity for "imposing the right connection settings and seizing the opportunities of online communities". For de Kerckhove, the digital interface has become the privileged location to process information and share cognitive processes. For the author, it is all about the exteriorization of human thought: "We are now in a phase in which (…) we manipulate and modify, as in the morphing of individual thoughts, bits and pieces of information that we share on screens in a knowledge-building process that is simultaneously shared and interiorized" (Buffardi & de Kerckhove 2011, p. 34). A construction based on a constant process of combining elements, on the "digital appropriation of content" through mashing up and remixing (Jenkins, 2009), which express "a creative process through which students learn by selecting cultural elements from the past to then reassemble them in an original way" (Jenkins, 2009, pp. 55-58).

In this sense, regarding the DIGCOMP framework described above, digital competence suggests first and foremost awareness in the use of technology, in practices of sharing and exchange, a capacity to seize opportunities and understand the limits of new tools and hence to interact wittingly in new digital environments. "It is crucial to have the competence to engage productively with digital networked situations (…). Which is why it is so important that schools create educational settings to promote pedagogical strategies for critically evaluating online media and for using Web 2.0 tools such as social networks and blogs, for self-expression, and the creating and sharing of content online" (Ferreira et al., 2015).

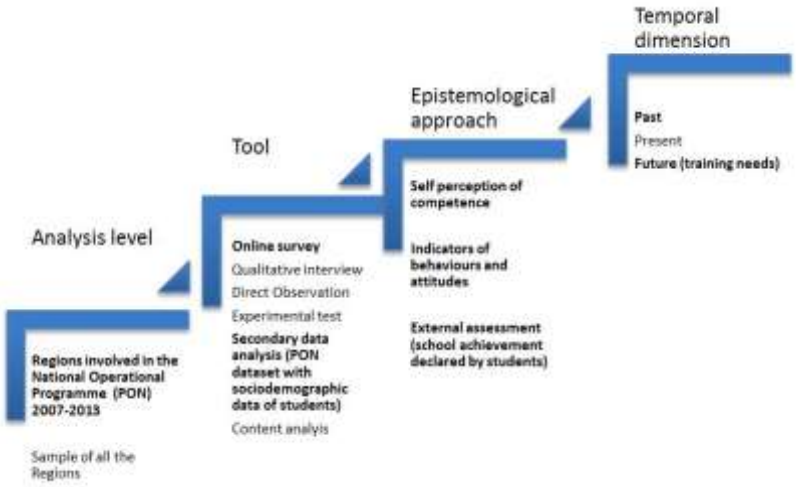
This study of digital competence focuses above all on the way technology is used in students' everyday practice, and particularly on those areas of competence defined as "participatory", as described above, and with reference to use in private and scholastic contexts. The study provides a general overview of students' digital competence, a first definition of

different digital styles, and the relationship between scholastic activities and digital awareness. A first overview which prospectively offers a corpus of data for subsequent investigations into styles of learning using new technologies as well as interactions between school and ICT in the current context where these new technologies are becoming diffuse in the lives of the young.

## The Survey "Digital Competence of Pupils from the Regions of the National Operational Programme 2007-2013": Research Design

In keeping with the theoretical background presented in the previous paragraphs, the research was based on a survey that considered all the aforementioned macro-dimensions of competence, using items relating to the youngsters' self-perception, attitudes and behaviour, and avoiding the "situated test" method, mainly for reasons of sustainability.

*Figure 1. Methodological overview. Methodological choices carried out in the design of the research, with respect to the whole spectrum of possibilities, are underlined in the scheme*




The research was commissioned by the Ministry of Education, in particular the Directorate for European Funds and the PON (National Operational Programme) 2007-2013; the objective was primarily to better understand the digital landscape of schools that benefit from European funds and to analyze the behaviours of students who have grown up in such

schools. In addition, the research aimed to explore their learning needs and expectations.

The population considered for the survey was the whole number of students who attended courses and learning actions provided in the PON FSE 2007-2013, in the four Regions "*Obiettivo Convergenza*" (Campania, Puglia, Sicily and Calabria) which were targeted in the Programme[1]. The number of participants in the four Regions along the five years was 2,983,749.

After a pre-test on 46 students, the research was implemented online using a web survey therein the INDIRE monitoring system GPU; through this platform, which all the PON beneficiary schools used for reporting their activities along the years, the survey was delivered from January to March 2015.

A letter from the National Directorate invited all the schools to participate in the survey. In the letter, school principals were invited to provide students with a space and time, at school, for filling in the online questionnaire. We decided to invite students to fill in the questionnaire at school, in order to try to reduce sample distortions related to different accesses to technologies at home, and also the risk that only the most motivated students would take part in the survey.

Only students already registered on the PON Programme were eligible to log in in the survey platform, filling in their fiscal code and being identified with their socio-demographic features, which were already registered in the GPU dataset.

Despite a general goal to reach all the students involved in the PON Programme over the five years, we were unable to achieve this result for three main reasons:

1) Each school organized itself for the administration of the survey and not all schools were able, in the time provided, to manage the organization and logistic steps for completing the task.
2) During the days of the survey, several students could not be present at school.
3) Several students, respect to the period in which they attended to the PON Programme, had finished or left the school and could no longer be reached.

For the abovementioned reasons, despite the fact that we avoided important biases based on the self-selection of the respondent students, the

[1]For more information about the PON 2007-2013 actions see the website: http://hubmiur.pubblica.istruzione.it/Web/istruzione/pon/2007_2013.

sample must be considered not representative because it was based on voluntary participation by the schools.

Pupil respondents to the survey numbered 9.508[2]; the graphs in the Appendix show the main data on their socio-demographic characteristics.

## What do our students do? An overview of digital behaviour in class and outside

In this paragraph, using the data from the survey, students' usage habits of online tools and environments will be presented, along with the main activities they carry out online, their use of ICT for educational purposes in class and outside, and their use of the web for cognitive, relational and participatory purposes.

Firstly, the data highlight that the older the respondents were, the more they used the web. As we shall see later, a greater time spent online by older students corresponds to a more frequent indulgence in all the activities described in the study. In particular, older students show a more widespread use of the web for "chatting" (93%), "surfing in search of topics that interest me" (90%), "watching videos" (88.5%) or "surfing aimlessly"(81%), which are the students' main online activities.

In addition, students attending upper secondary school more frequently log on from their smartphones.

Among all the respondents, 46% declared that they use ICT to create their own multimedia products. Only 24% disseminate their own products online (e.g., photos, videos….) to show their talent in an artistic field.

A high percentage of students declared that they use the web to keep in touch with distant friends and relatives (91%), to meet new friends (58%) and to organize events (53%).

As a first step, therefore, we can state that, for these students, the web represents above all an environment to nurture their sphere of relationships, and to exchange and share content. In comparisons between school levels and in relation to achievement averages, some peculiarities emerge that will be described in the following paragraphs.

[2] Since it was not possible to estimate how many students who participated in the PON Programme were still at school in March 2015, we can approximately consider a response rate of 1.6% (based on an estimated population in the 2015 of 2,983,749 people/5 years=596,749 students).

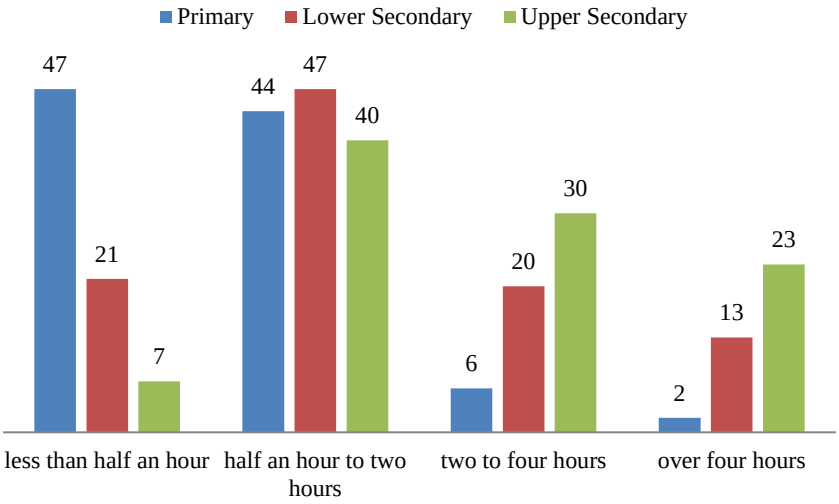
As regards the relationship with content, students at lower secondary school declared a more frequent use of ICT to create their own content, to process multimedia products, plus a more frequent use of technology for studying, with respect to the time they spend online. It should be noted that, at this level, the students also declared repeated use of educational tools at school, plus more frequent classroom activities on topics relating to awareness in the use of the web.

In detail, as highlighted in the graph 5, the time spent daily online increases with the respondents' age. Overall, students spend no more than two hours daily online. Among students at primary schools, 47% declared that they spend less than half an hour online, while 44% do not spend more than two hours[3].

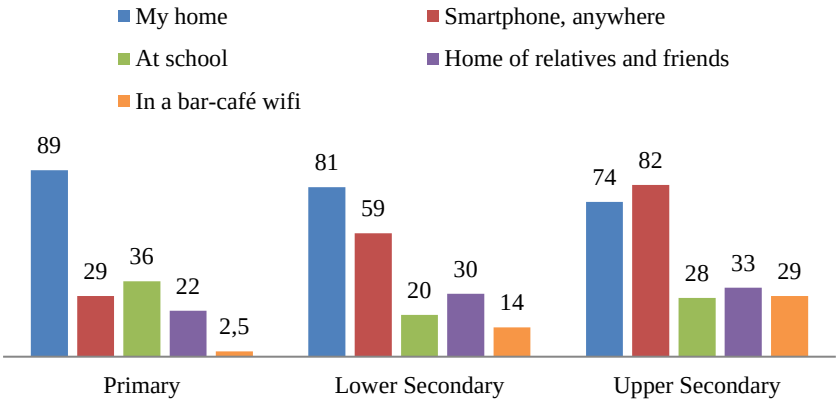
As regards the places where students log on to internet, the following distributions show differences between the three school levels (graph 6). In particular, primary school students declared that they mostly log on at home, while among upper secondary school students the internet is mainly accessed through smartphones, independently from the location. As regards the activities carried out online (from monthly to daily and more), as mentioned above, the data underline an increase in progression with respondents' age (graph 7). In particular, chatting is used frequently by almost 98% of upper secondary school students, who surf in search of topics that interest them in around 96% of cases, watch videos in 94% and surf for entertainment aimlessly for 92.3%.

[3] In 2015, OECD report "Students, computers and learning" underlined same results. Specifically, in average across OECD Countries, students spend over 2 hours online each day. The most common online activities are browsing the Internet for fun (88% at least once a week), participating in social networks (83%), downloading music, movies, games or software from the internet (70%) and chatting online (69%). Only 31% of students use computers at least once a week to upload their content (p.34). The OECD study is based on an analysis of PISA data (15-years old students in 2012), not comparable with our study. Despite the differences, it is interesting to note the similarity of the findings regarding the students' experience of using computers and Internet. The OECD report in fact highlights that students more frequently use the internet for leisure activities and to communicate, i.e. through social network and chat but also – in a lower percentage (38%) - through e-mail with other students about schoolwork. Also, students download content from the Internet very more frequently than they upload their content. In line with these results, the "Survey of Schools: ICT in Education" (European Commission 2013) revealed three profiles concerning "fun", "learning" and "games" online activities, and showed a higher frequency for the "fun" group of activities by students (at all school grades, EU level, 2011-2012).

*Graph 5. Time spent online by students. Percentages per school level (9.410 cases)*




*Graph 6. Popular places for logging on. Percentages per school level (9.410 cases)*




While confirming this order of interest, the data on lower secondary schools reveal a significant decrease in the frequency of use considered. For chatting, the percentage falls to 93%, the search for topics of interest corresponds to 87% of the subjects, watching videos 87%, while surfing aimlessly is a frequent behaviour in 75.5% of the cases. At this school level, there is a similarity in the percentage of students who declared that they consult dictionaries and encyclopedias online.

In primary schools, as well as showing a further decrease in these activities, which nonetheless corresponds to an overall lower use of the web, there is also a different order, and the introduction of a further habitual use among the more frequent online ones. In particular, students at this level watch videos (70%), chat (66%), search for topics of interest (60%) and use online dictionaries or encyclopedias (53%). It should be underlined that 38% of them declared that they use the web to "learn through sites or online games" while 36% use it to read/watch the news online.

Within the overall minor intensity of web use among students at this school level, the data referring to activities of an information/cognitive type, even though overall lower than those for secondary schools, appear to take on a different value also due to two further considerations.

First and foremost, this may be due to greater parental control, that would prompt use of the web for studying and the gathering of information (dictionaries, sites/online games, news).

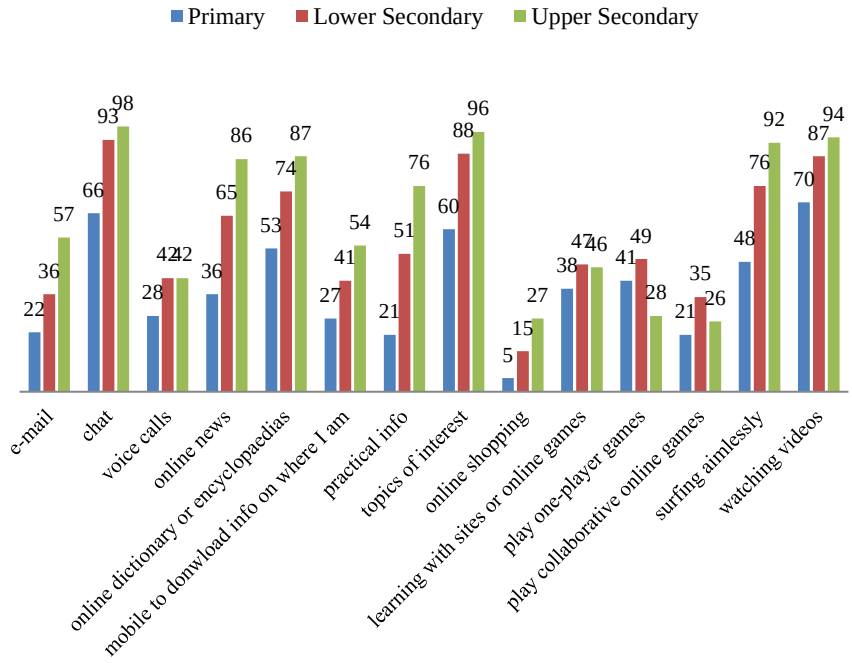
Secondly, it may be assumed that the younger generations, who are growing up in a period when the web is already fairly mature (which has also led to its use in the classroom), are those who tend towards a more aware use of the web. Parental control and a more frequent use at school may determine web use by younger children, outweighing the tendency that seems to emerge from the evidence of less use but focused on specific purposes.

As regards the items relating to the level of students' participation, an analysis by school level confirms this tendency (graph 8). Download of content is the most widespread activity among students of the three levels (respectively, starting from the lowest level, 32%, 59% and 66%).

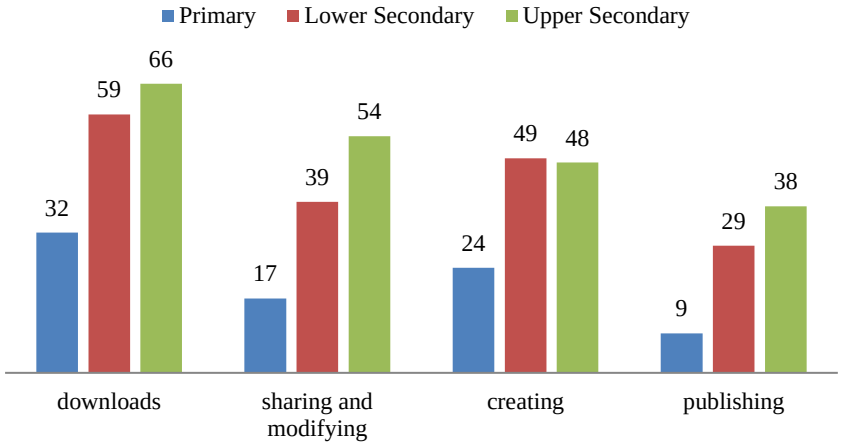
For the primary and lower secondary levels, the second most common activity is "creating personal content", the percentage of distribution among lower secondary school students being one percentage point higher than among their fellows at the upper secondary level. Instead, students at the upper secondary stated that they share and modify content more often than they create it (respectively around 54% against 48%).

This fact may be linked to the greater presence online of upper secondary students, but may also be outlining an interesting tendency, to be further investigated and encouraged, among the younger generations to foster a more active relationship with content, with a further propensity to create their own product.

*Graph 7. Percentage of students who frequently indulge in digital activity (from monthly to everyday or more) (9.410 cases)*

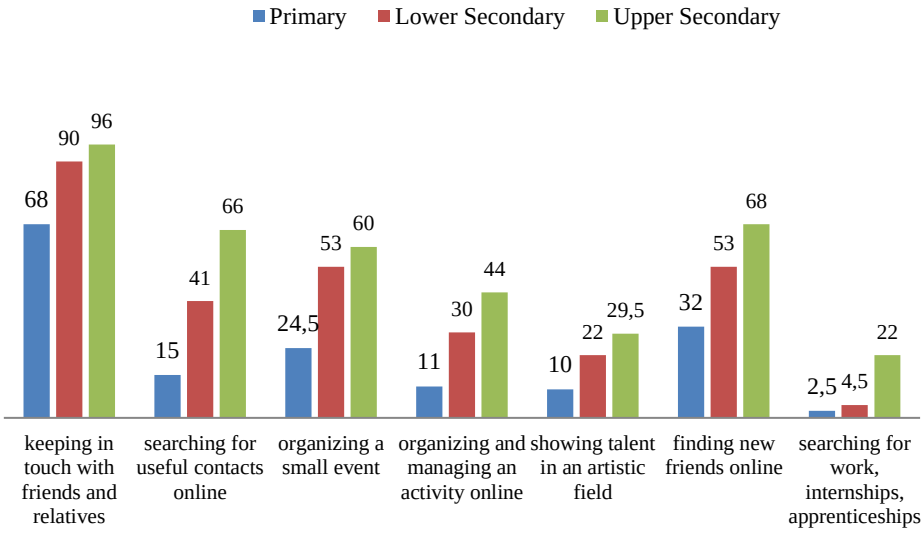



*Graph 8. Pupils who frequently indulge in "participatory" digital activities (from weekly to daily). Percentages per school level (9.410 cases)*



As for activities linked to the management of their social capital online, it is interesting to note that among upper secondary students a higher percentage of them use the web to look for contacts to help solve problems (graph 9). In fact, again at this school level, students use the web extensively to stay in contact with distant friends and relatives (96%) and to meet new friends online (68%). However, even more common is the search for contacts to help solve problems (66%) with respect to the organization of small events online (60%).

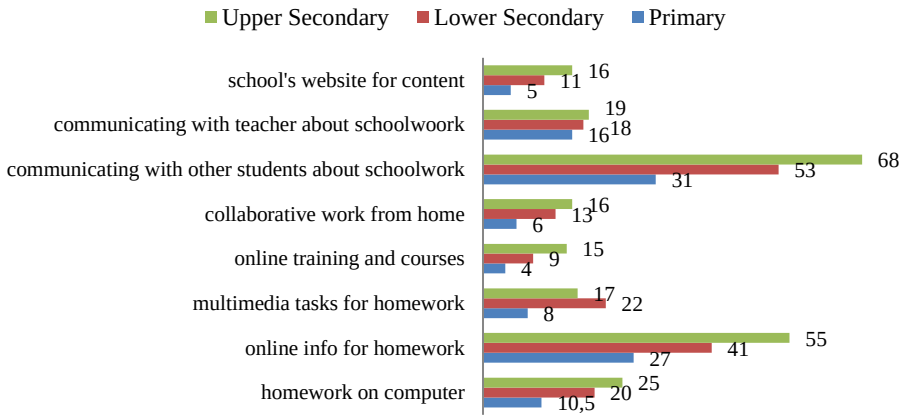
*Graph 9. Pupils who indulge in digital activities that are useful for their social capital. Percentages per school level (9.410 cases)*




When it comes to study activities carried out at home there was also a significant increase the older the respondents were (graph 10). In all the three school levels, these activities, such as "communicating with other students" and "searching for information online to do school homework", are more frequent. There is an exception, however, concerning activities to "process multimedia products (presentations, videos, maps…) for homework". In this case, lower secondary students were those who declared a higher frequency of use (around 22%), with respect to their fellows at upper secondary (17%). In general, among the middling percentages it can also be seen that there were no particular differences between students of the three levels who

"communicate with teachers" from home. Indeed, in this case, 16% of the primary students and around 19% of the lower and upper secondary students said they do so.

*Graph 10. ICT use outside school for learning activities. Percentage per school level (from weekly to daily) (9.410 cases)*




## Digital participation and digital social capital

In this paragraph, we will explore some interesting dimensions related to the use of the internet for improving students' social capital, both developing their online agency and accessing social and functional online resources useful for daily life.

We measured such behaviours in the survey by providing a series of questions related to the youngsters' attitude to using the web for finding specific information, getting practical information to solve real life problems and approaching the web in an informative way. On the other hand, we compared these activities with others related to a generic or "pure entertainment" use of the internet, as surfing just for fun or playing videogames online.

In the following paragraphs, only the students from lower secondary schools are considered (3.671 cases), in order to observe a more homogeneous sample. In fact, in Italy, upper secondary schools can present

very different curricula according to their type. Curricula are instead definitely homogeneous in the lower secondary school.

We use Ordinary Least Squares (OLS) regression to look at predictors of different internet usages we considered significant indicators of different "digital styles" (looking for specific information, looking for practical information, surfing just for fun, playing online and willingness to improve digital skills) while controlling for various social and use context factors.

The factors we considered as predictors, according to the main literature about internet usage (Litt, 2013; Hargittai, 2010) were: gender, age, parental education[4], availability of internet at home and by mobile and experience of internet usage, based on the number of years that respondents have been using it (from more than 6 years to 1 year).

Finally, one of the predictors we wanted to observe, in relation to digital behaviours, was the school achievement of pupils: the hypothesis was, in fact, that students with higher capability to reach good results at school are also more able to approach the net in a "functional" and tightly focused way.

In fact, considering school achievement as a complex construct, depending on many social, psychological, contextual and educational variables, we propose to discard the interpretation that a massive use of a tool or digital environment could result in different levels of school achievement.

Instead, we would affirm that social, psychological and educational backgrounds can steer youngsters to both a high level of achievement at school and to specific positive online behaviours.

To do so, we have considered the level of school efficacy declared by the students as an indicator of school achievement[5]. The idea to use self-declarations (the question in the survey was: "last year, overall, what was your average mark?") as an indicator of students' school efficacy was a specific methodological choice. In fact, we wanted to gather a quite free and informal self-perception from students about their own school efficacy, without referring to numbers, votes and analytical judgements, and to let

[4] For measuring parental education, respondents were asked to report the level of education of both their mother and father; we recoded the responses according to 3 levels: (1) less than low secondary school degree; (2) upper secondary school degree; (3) some college degree (bachelor or master) or upper (Ph. D). Using information from these variables we created a unique variable with "low", "middle" and "high" levels of parental education: 1+1 and the combinations of 1 and 2 gave "low level", 2+2 and combinations of 2 and 3 were recoded as "high level", while both 2 were recoded as "middle level" as well as the 1+3 combinations.

[5] The variable "achievement" was built in this manner: 1 = (last year I achieved) lower than 6 average mark; 2 = between 6 and 7 average mark; 3 = between 8 and 9 average mark; 4 = 9 medium mark.

students be relaxed when compiling the survey, perceiving the experience as an informal room in which to express themselves about real online behaviours and experiences. In table 1, for example, it is possible to observe how school achievement is the most correlated factor in relation to the use of online dictionaries and Wikipedia resources. Another important predictor is the possibility to connect to internet at home. Also gender is a factor of importance: indeed being female is more correlated to such activities, as well as being an older teen.

*Table 1. OLS Regression predicting the use of online dictionaries (2504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std.Error | |
| 1 (Constant) | 1,752 | 0,13 | 0,000 |
| Female (=1) | 0,163 | 0,038 | 0,000 |
| Age | 0,074 | 0,021 | 0,000 |
| Parental Education | 0,040 | 0,027 | 0,143 |
| Years of Internet Usage | 0,074 | 0,022 | 0,000 |
| Connection at home | 0,191 | 0,051 | 0,199 |
| Connection by mobile | 0,120 | 0,041 | 0,003 |
| School achievement | 0,244 | 0,028 | 0,000 |

*R Square: ,069. Adjusted R Square: ,067*

A similar result is noticed also with the use of the web for seeking specific information about one's own interests (music, TV series, books, sport, and so on). Also in this case (table 2) school achievement, together with the possibility of being connected everywhere by mobile, are the most positively correlated factors.

*Table 2. OLS Regression predicting the search in Internet for information about own interests (music, series, books, sport…) (2504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std. Error | |
| 1 (Constant) | 2,406 | 0,117 | 0,000 |
| Female (=1) | 0,096 | 0,035 | 0,006 |
| Age | 0,088 | 0,019 | 0,000 |
| Parental Education | 0,020 | 0,025 | 0,413 |
| Years of Internet Usage | 0,132 | 0,02 | 0,000 |
| Connection at home | -0,002 | 0,046 | 0,960 |
| Connection by mobile | 0,232 | 0,037 | 0,000 |
| School achievement | 0,118 | 0,025 | 0,000 |

*R Square: ,072. Adjusted R Square: ,069*

Also when trying to explain how different pupils use the web for searching for practical information and coping with real-life situations (table 3) we observe how the possibility to be connected by mobile is the most important factor.

However, also gender (females are most active), experience in using the net, as well as age and a better school background of families are positive predictors of such behaviours. A good achievement at school is also significantly correlated with searching the internet for practical information.

*Table 3. OLS Regression Predicting. The search in Internet for practical information (seats at the cinema, schedules of trains, news about a concert) (2504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std. Error | |
| 1 (Constant) | 1,33 | 0,136 | 0,000 |
| Female (=1) | 0,157 | 0,04 | 0,000 |
| Age | 0,123 | 0,022 | 0,000 |
| Parental Education | 0,108 | 0,029 | 0,000 |
| Years of Internet Usage | 0,157 | 0,023 | 0,000 |
| Connection at home | -0,035 | 0,054 | 0,510 |
| Connection by mobile | 0,160 | 0,043 | 0,000 |
| School achievement | 0,086 | 0,029 | 0,003 |

R Square:,072; Adjusted R Square: ,069

Instead, achievement is negatively associated to "generic" and entertainment usages of internet. For example, as showed in table 4, low achievers are more involved in browsing online without specific aims, just for fun (e.g. in Facebook).

Furthermore, if we observe one activity related to entertainment and a ludic approach to the internet, such as playing videogames online (table 5), we notice that it is negatively correlated to school achievement and age, while it is associated with being male.

Also, in this case, the possibility of being connected everywhere (at home and by mobile) has a big influence, as well as gender and the number of years of internet usage.

*Table 4. OLS Regression Predicting the navigation just for fun, without any purpose (2504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std. Error | |
| 1 (Constant) | 1,998 | 0,146 | 0,000 |
| Female (=1) | 0,043 | 0,043 | 0,317 |
| Age | 0,255 | 0,023 | 0,000 |
| Parental Education | -0,034 | 0,031 | 0,271 |
| Years of Internet Usage | 0,173 | 0,025 | 0,000 |
| Connection at home | 0,063 | 0,058 | 0,273 |
| Connection by mobile | 0,436 | 0,046 | 0,000 |
| School achievement | -0,124 | 0,025 | 0,000 |

R Square: ,130. Adjusted R Square: ,127

*Table 5. OLS Regression Predicting play at videogame online alone (2504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std. Error | |
| 1 (Constant) | 1,626 | 0,154 | 0,000 |
| Female (=1) | -0,442 | 0,046 | 0,000 |
| Age | -0,098 | 0,025 | 0,000 |
| Parental Education | -0,002 | 0,032 | 0,94 |
| Years of Internet Usage | 0,171 | 0,026 | 0,000 |
| Connection at home | 0,219 | 0,061 | 0,000 |
| Connection by mobile | 0,137 | 0,049 | 0,005 |
| School achievement | -0,136 | 0,033 | 0,000 |

Finally, the more students are proficient at school the more they want to further improve their digital skills, as showed in table 6, which highlights also that this need is positively related to being male and to having a connection at home.

In an attempt to summarize these observed dimensions, we can outline some evidence about the use of the internet by youngsters, which should be further investigated, maybe also through qualitative research.

*Table 6. OLS Regression Predicting the willingness to improve the own digital skills (2504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std. Error | |
| 1 (Constant) | 2,649 | 0,168 | 0,000 |
| Female (=1) | -0,166 | 0,05 | 0,001 |
| Age | 0,045 | 0,027 | 0,093 |
| Parental Education | 0,043 | 0,035 | 0,221 |
| Years of Internet Usage | -0,014 | 0,028 | 0,616 |
| Connection at home | 0,287 | 0,066 | 0,000 |
| Connection by mobile | 0,076 | 0,053 | 0,154 |
| School achievement | 0,156 | 0,036 | 0,000 |

R Square: ,024; Adjusted R Square: ,022

According to several scholars (Jenkins, 2010; Boyd, 2014; Ito et al., 2013), in fact, the internet can be helpful and make people improve their daily life when it is used to augment social relationships, empower citizenship and participation and gain access to services, learning and work opportunities.

However, in our findings, these opportunities are not equally distributed or exploited by the pupils.

As showed through the regression models, in fact, while good connectivity is a common background for all types of digital usages (and is positively correlated both to focused and supportive internet activities and to generic activities for fun), good achievement at school is a distinctive variable which is associated only to specific, positive internet behaviours.

In fact, youngsters who already achieve good results at school are also more interested in using the web in a focused way, looking for specific information, consulting the web for school-related aims and finding practical information. Low achievers are instead more attracted to generic and entertainment tasks as navigating just for fun and playing online. They are also less interested in improving their digital skills.

The risk is that within the web existing gaps among youngsters are replicated and maybe amplified. In particular, according to our findings, those who are already able to take advantage of the school system and grow therein are also more able to shape their digital behaviours in a way which we can define as "functional" and "practically oriented". On the contrary, lower achievers at school seem to interpret the internet more as a recreational

place, without fully exploiting its opportunities for enriching their social and cultural capital.

Following this interpretation, it is useful to take into consideration the scientific literature which addressed the issues of the digital divide and debated the role of ICT in levelling or, on the contrary, widening the gap between people.

According to Sartori (2006), for example, there is a wide range of empirical and theoretical studies on the issue, which can be clustered around two big positions: the hypotheses of "normalization" and "stratification".

The approach defined as "normalization" (Moschella & Atkinsos, 1998) claims the role of the web and ICT in improving the social and cultural conditions. The second position, labeled as "stratification" (Norris, 2001) and grounded in the "knowledge gap" theory (Tichenor et al., 1970), argues that digital technologies are tools which are exploited by people depending on their social and cultural background: individuals who are already advantaged in this field will be more able to capture and exploit the opportunities of innovation and, consequently, will increase their advantage.

From the evidence presented, some internet soft skills seem to be distributed in a way which increases, instead of blurring, the gaps among youngsters.

The reasons may be different and cannot be exhaustively explored into this paper, although we can discuss two main interpretations.

The first is that different approaches depend on the personal skills of students, which lead them to have an effective attitude both at school and in exploiting the internet.

In fact, several studies (Heckman & Kautz, 2012) show that personality traits – such as openness to experience, conscientiousness, extroversion, agreeableness and neuroticism - have a pivotal impact in predicting success at school and in people's life outcomes: these same attitudes could lie behind motivations and attitudes to use the web in a more specific and directed way.

So, according to such hypotheses, the individual character skills are among the main causes of positive behaviours both at school and in internet usage.

The second interpretation is that specific educational approaches which youngsters experience at school have a positive impact on their ability to live and grow up online: so a good school is able to produce good students as well as good "internet citizens".

The latter hypothesis doesn't exclude the first one: in fact, according to Heckman et al. (2010), good school programmes can affect personality traits, enhancing socio-emotional skills.

In the following paragraph, some interesting data will be presented to support this interpretation.

## The relationship between life inside and outside of school, a strategic link

This part of the study took a closer look at the relationship between school and technology in relation to those competences defined as "participatory", and, in particular, with reference to certain creative, collaborative and cognitive usages of the web.

Firstly, through bivariate analyses of the data we observed the relationship between classroom activities and a specific uses of the web by students in their leisure time.

Then, we used ordinary least square (OLS) regression to look at predictors of different internet usages while controlling for different social and use context factors.

As specified above, these factors were: gender, age, parental education, connection at home and by mobile and number of years of internet usage. To look at the above-mentioned relationship, we observed predictors such as the teaching activities at school on "how to use" the web and digital technology[6].

According to the findings from the bivariate statistics, the hypothesis was, in fact, that carrying out teaching activities at school on how to use the web and digital technology is correlated with a more frequent specific use of ICT also at home.

For example, it is interesting to observe activities at school on "how to use software and digital apps for creative uses (e.g. software to produce and edit photos, videos or audio, web and programming languages, etc.)" as well as those for "creating personal multimedia content (videos, images, photos)".

In particular, the study of the relationships between these variables through bivariate analysis shows that among students who do such activities every day or almost, around 69% declared that they create personal multimedia content daily or weekly in their free time, as opposed to approximately 45% of those who have never done such activities in the classroom.

[6] The variables "Classroom activities 1) on creative software programmes, 2) on how to find source online, and 3) on how to work in a collaborative way online", were composed in this manner: 1= never; 2= a few times per year; 3= a few times per month; 4= weekly; 5= every day or almost.

The corresponding regression model (table 7) shows that connection by mobile and classroom activities are the most positively correlated factors. Also the number of use years and gender matter: specifically, being female is positively associated with the frequency of personal multimedia creation.

*Table 7. OLS Regression Predicting Creating personal multimedia content (2.504 cases)*

| | Unstandardized Coefficients | | Sig. |
|---|---|---|---|
| | B | Std. Error | |
| 1 (Constant) | 2,472 | 0,195 | 0,000 |
| Female (=1) | 0,255 | 0,057 | 0,000 |
| Age | 0,034 | 0,03 | 0,264 |
| Parentaleducation | 0,050 | 0,04 | 0,211 |
| Years of Internet usage | 0,173 | 0,032 | 0,000 |
| Connection at home | -0,097 | 0,075 | 0,199 |
| Connection by mobile | 0,374 | 0,06 | 0,000 |
| School achievement | -0,059 | 0,041 | 0,144 |
| Classroom activities on how to use creative software | 0,248 | 0,024 | 0,000 |

R Square: ,084 Adjusted R Square: ,081

Analogously, the publication of personal creative content on the web positively correlates with classroom activities on the use of software and digital apps for creative uses. Study of the relationships between the variables of interest through bivariate analysis shows that, among those who carried out such classroom activities every day or almost, the percentage of students who upload their own created contents for sharing is around 37%, against 19.5% of those who have never done such activities at school.

The findings of the OLS regression (table 8) show that the number of years of use and classroom activity on creative software programmes are positively correlated factors in relation to the publication "of personal creative content to show talent". Other independent factors investigated seem not be related to this activity.

As for activities carried out at school on "how to find reliable sources online", it can be seen that among the students who did these activities at least weekly, the frequency with which they use the web to search at home for "information online to do school homework" is greater than among students who have never or rarely done such activities.

*Table 8. OLS Regression Predicting Publication of personal creative content to show talent (2505 cases*)

| | Unstandardized Coefficients | | |
|---|---|---|---|
| | B | Std. Error | Sig. |
| 1 (Constant) | 1,076 | 0,057 | 0,000 |
| Female (=1) | -0,011 | 0,016 | 0,497 |
| Age | 0,019 | 0,009 | 0,028 |
| Parental education | -0,015 | 0,012 | 0,211 |
| Years of Internet usage | 0,037 | 0,009 | 0,000 |
| Connection at home | -0,045 | 0,022 | 0,038 |
| Connection by mobile | 0,034 | 0,017 | 0,051 |
| School achievement | -0,02 | 0,012 | 0,084 |
| Classroom activities on how to use creative software | 0,033 | 0,007 | 0,000 |

R Square: ,027 Adjusted R Square: ,024

In particular, the findings of the bivariate analysis highlight that among those who have never done such activities, 36% use the web to search for information linked to homework, while 63% of those who experience such classroom activities every day or almost do so. In table 9, we observe that classroom activities "on how to find sources online" is the most significant factor related to such activity by students, as well as connection by mobile, school achievement and age. Also, it is correlated to gender, specifically it is positively correlated with being female.

A similar trend is outlined in activities of a collaborative type: among the students who carried out activities at school on "how to work collaboratively with classmates using online environments (e.g. emailing, forums, social networks, wikis, etc.)", a significantly higher percentage of pupils who take part in collaborative online work at home for school purposes (use of wikis, blogs, documents shared via Google Drive for homework given by teachers).

The study of the relationships between the variables of interest through bivariate analysis shows that, among those who carry out such activity in the classroom every day or almost, 55% of the students declared that they take part in collaborative work online daily or weekly. The same frequency is found among only 8% of those who have never done such classroom activities.

The data is confirmed also by the regression analysis: in fact, among the variables taken in consideration, classroom activities on "how to work in a

collaborative way" (table 10) is the only important factor correlated to the participation in collaborative work by students in their free time.

*Table 9. OLS Regression Predicting Look for information online from home for schoolwork (2505 cases)*

| | Unstandardized Coefficients | | |
|---|---|---|---|
| | B | Std. Error | Sig. |
| 1 (Constant) | 1,659 | 0,188 | 0,000 |
| Female (=1) | 0,249 | 0,055 | 0,000 |
| Age | 0,136 | 0,029 | 0,000 |
| Parental education | -0,025 | 0,039 | 0,516 |
| Years of Internet usage | 0,050 | 0,031 | 0,110 |
| Connection at home | 0,178 | 0,073 | 0,015 |
| Connection by mobile | 0,230 | 0,058 | 0,000 |
| School achievement | 0,156 | 0,039 | 0,000 |
| Classroom activities on how to find sources online | 0,258 | 0,025 | 0,000 |

R Square: ,072 Adjusted R Square: ,069

*Table 10. OLS Regression Predicting Participation in collaborative work at home (2.505 cases)*

| | Unstandardized Coefficients | | |
|---|---|---|---|
| | B | Std. Error | Sig. |
| 1 (Constant) | 0,930 | 0,159 | 0,000 |
| Female (=1) | 0,124 | 0,046 | 0,007 |
| Age | 0,041 | 0,025 | 0,094 |
| Parental education | 0,062 | 0,033 | 0,057 |
| Years of Internet usage | 0,061 | 0,026 | 0,02 |
| Connection at home | -0,023 | 0,061 | 0,702 |
| Connection by mobile | 0,012 | 0,049 | 0,813 |
| School achievement | -0,009 | 0,033 | 0,794 |
| Classroom activities (work in a collaborative way online) | 0,391 | 0,020 | 0,000 |

R Square: ,145 Adjusted R Square: ,142

Furthermore, the findings of the bivariate analysis highlight that, among the students who did such classroom activities every day or almost, the organization and management of online group activities was also more

frequent. In particular, 50% declared that they organize/manage group work, against 25.5% of those who have never done such activities in the classroom.

In this case, by OLS regression (table 11), "teaching activities on how to work in a collaborative way online" and gender are the most important correlated factors: particularly, being female is positively associated to the organization/management of online group activities.

*Table 11. OLS Regression Predicting Organization/management of online group activities (2.505 cases)*

| | Unstandardized Coefficients | | |
|---|---|---|---|
| | B | Std. Error | Sig. |
| 1 (Constant) | 1,020 | 0,063 | 0,000 |
| Female (=1) | 0,057 | 0,018 | 0,002 |
| Age | 0,022 | 0,01 | 0,023 |
| Parental education | 0,024 | 0,013 | 0,060 |
| Years of Internet usage | 0,031 | 0,01 | 0,003 |
| Connection at home | 0,017 | 0,024 | 0,471 |
| Connection by mobile | 0,030 | 0,019 | 0,125 |
| School achievement | 0,021 | 0,013 | 0,101 |
| Classroom activities (work in a collaborative way online) | 0,047 | 0,008 | 0 |

R Square: ,031 Adjusted R Square: ,028

Regarding the complex relationship between education and technology, the findings suggest that the carrying out of teaching activities at school, linked to specific detailed studies on how to use the web, is correlated with a more frequent specific use of ICT. As we showed through the regression models, classroom activities are significantly and positively correlated to the frequency of such web usages.

Of course, these findings show only a part of a more complex cultural, social, educational dynamic, and certainly require further and more in-depth analyses.

In 2013, a European Commission Report entitled "Survey of Schools: ICT in Education", underlines that students "are more confident in their digital competences when they have high access to/use of ICT at home AND at school compared to students having low access/use at school and high access/use at home. Students' ICT use during lessons still lags far behind their use of ICT out of school, affecting their confidence in their digital competences (European Commission, 2013, p. 15): "the low use of digital

resources is a concern" (European Commission, 2013, p. 18) and the OECD findings make the case for developing concrete policies and actions substantially to increase ICT based learning activities during lessons, exploiting the full potential of ICT to support students' in-depth learning and construction of knowledge.

The findings presented above show an interesting tendency towards a more frequent specific use of digital tools correlated with classroom activities on "how to use ICT", that would seem to confirm the necessity (also frequently underlined in the scientific literature), for schools to take a deeper look at ways of using the web and digital tools. According to Schleicher (2015), "the impact of technology on education delivery remains sub-optimal, because we may overestimate the digital skills of both teacher and students (…).The connection among students, computer and learning are neither simple nor hard-wired, and the real contributions ICT can make to teaching and learning have yet to be fully realized and exploited" (Schleicher, 2015, p. 6). As Sonia Livingstone already wrote in 2009 (Livingstone, 2009, p. 68), "notwithstanding popular rhetoric regarding 'youthful cyberkids' or 'the digital generation' (…), although young people's newfound online skills are justifiably trumpeted by both generations (young people and their parents, *ed.*), it would be unfortunate if this blinded us to the real challenge of using digital media to realize their potential for engagement with information and education content and for participation in online activities, network and communities".

## Conclusions

In the present research important differences in the usage of the web depending on age and school level, school achievement, as well as the frequency of digital educational activities which youngsters experience at school have been highlighted.

By means of the above-mentioned data, it emerges that training in digital competence, especially the kinds known as "transverse" and "soft", requires a direct and constant commitment by schools not only and not so much in the support and control of the youngsters, but above all in steering them towards an aware, critical and participatory approach to digital media.

The evidence on the relationships between school performance and the ability to manage the internet in an informative and useful way have outlined the risk that digital consumption could broaden the socio-cultural gaps among youngsters, in particular among high and low achievers at school.

However, school can have a huge impact on promoting a positive usage of the web among all types of students, also the low achievers: this is an encouraging confirmation about its role as a driver of equality and development also in the digital sphere.

Otherwise, the variables at stake are many, and would require a deeper investigation, also of a qualitative type, for a better understanding of the impact of digital experiences on youngsters' daily life, and about how digital competences are implemented in school curricula. The pervasiveness of new technologies in our daily routine is a recent phenomenon that we are still involved in, and its constant acceleration imposes continual reflections in the light of the cultural and social impact that characterizes it. What seems to clearly emerge however, is a proven fact: we are a long way from the legend of "digital natives". The fact that youngsters have been born and are growing up in a context where technology is widespread does not mean that they are experts in the best way to use it. It is necessary to help them to understand the best way to interact with the new environments and use digital media. In this, educational institutions have a decisive role to play, and a clear necessity to be supported in interpreting the ongoing changes and in guiding youngsters to seize the opportunities that new technology offers.

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## *Appendix*

*Graphs 1-4. Distribution of the sample by socio-demographic dimensions (9.508 cases)*