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Geomedia in The Primary School

An explorative study of European primary geography teachers' experience

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SUMMARY

Researchers, educators and teachers from all areas of knowledge are studying the benefits related to the use of Informational and Communicational Technologies (ICTs) in teaching and learning processes. Because of the national differences and the difficulties in reaching and investigating teachers from different countries, today scientific literature on geography education mainly consists of national studies that have investigated trainee primary or secondary school teachers. The few studies considering geography teachers' perceptions and use of ICT are based on secondary schools and report teachers' positive consideration about the uptake and use of digital tools (geomedia) in class. These tools provide an easy and low-cost access to geographical materials and resources, as well as they offer strategic enhancement for engaging students in the geographical discipline. Notwithstanding, at European level scale there is a clear lack of understanding regarding in-service primary geography teachers' perception and use of ICT as support of the geography teaching.

This study's aim is to provide further understanding on European primary geography teachers' conceptual and factual standpoint on the use of digital technologies in primary geography lessons by researching their perceptions on technological, pedagogical and content knowledge (TPACK), their teaching praxis and their familiarity with technology.

The theoretical base to which this study refers to, consists of three main pillars. The first pillar refers to teaching, and it includes the main references to social-constructivist, student-based learning theories and motivational theories for learning. The second considers the literature related to the study of technology, educational technologies and teaching with technology. The third consists of many relevant studies on both geography and primary geography education as well as those that investigate the use of geomedia in geography teaching and learning.

According to the guidelines provided by the international literature on the investigation on teachers' perceptions of knowledge, the study included both qualitative and quantitative methodology, generating two different inner sub-research modules.

The first module, called 'Geomedia@School', consists of a large-scale survey (N = 200) administered online to a non-probability sample of primary geography teachers coming from a selection of seven different European countries: United Kingdom, Italy, Germany, Spain, Finland, Romania and Turkey. Translated into each of the national languages, the survey investigates primary geography teachers' perceptions on technological, pedagogical and geographical knowledge, as well as the teaching strategies they employ and the type of professional support they consider more useful. The second module, called 'Geografi@Scuola', consisted of a national case-study (N = 21) and reported the experience of a continuing professional development workshop

attended by a group of Italian primary geography teachers. This was designed on the one hand to let primary geography teachers experiment the use of several geographical devices and resources, and on the other hand to practice and reflect on the inclusion of technologies in their primary geography teaching strategies.

The results provide interesting insights on European primary geography teachers' perceived pedagogical, geographical and technological knowledge, as well as meaningful information about the use of ICT as support to primary geography teaching in Europe. The results show that primary geography teachers share a positive perception on the use of technology in their daily life (they confidently surf the web and use emails) and highlight a significant correlation between the teaching experience and their positive pedagogical knowledge (the longer their experience in teaching is, the higher their perception of competence results). Not without surprise, the domain where teachers show the most fragile perception of knowledge is the geographical content. This identifies the main problem of teaching geography with technology in the teachers own geographical education. This lack of confidence, however, co-exist with other factors already studied in literature, as for example the presence of ICT at school and the teachers' system of beliefs concerning the efficacy of implementing ICT in their lessons.

From the results of the study, the crucial role of the teacher is confirmed, while the impact of their gender, age and access to ICT was brought to light. From the analysis, in fact, a significant correlation was found between having a positive perception of confidence in using ICT for teaching geography and being male, aged between 31 and 40, and having an Interactive Whiteboard in class. In addition, both large and small-scale studies reported a strong teacher-oriented use of ICT. Primary school teachers who include digital technologies in their teaching, also tend to report a confident use of geomedia as support for teaching, more than for students' learning process. From the first research module strong indications were collected regarding the type of support primary school teachers might prefer. A list of trustworthy geographical resources and a job training/workshop focused on geographical technologies and teaching strategies obtained a vast approval (online forum and platform were considered the less appreciated). The second module of the study completed the information by providing clear evidence of the long-term benefits primary geography teachers might gain from attending a professional development workshop focused on the inclusion of technologies in primary geography teaching.

Ultimately, this study confirms that the simple implementation of ICT does not represent a valid solution to ameliorate geographical learning at primary level, and supports continuing professional development as a valid, appreciated, and efficient way to support teachers that want to improve their teaching of geography, also thanks to the uptake and use of ICT.

SOMMARIO

L'utilizzo delle Tecnologie dell'Informazione e della Comunicazione (TIC) a supporto dell'azione didattica è studiato da ricercatori, educatori ed insegnanti in ogni ambito disciplinare. A livello Europeo, nell'ambito degli studi scientifici sull'educazione geografica, le differenze nazionali sui curricula e le difficoltà di raggiungere insegnanti provenienti da nazioni diverse hanno favorito la realizzazione di studi a carattere nazionale basati principalmente su insegnanti di scuola primaria e secondaria in formazione. I pochi studi internazionali che approfondiscono le percezioni degli insegnanti di geografia rispetto all'uso delle TIC hanno coinvolto insegnanti delle scuole secondarie, in singoli paesi, riportando una loro positiva considerazione verso gli strumenti digitali (geomedia), quali strumenti utili sia per accedere in modo semplice ed economico a materiali e risorse geografiche, sia per stimolare il coinvolgimento degli studenti rispetto alla disciplina geografica. A livello europeo, ad ogni modo, tutt'ora manca uno studio che approfondisca le percezioni degli insegnanti di scuola primaria rispetto alla loro conoscenza e al loro utilizzo delle tecnologie a supporto dell'insegnamento della geografia.

Questa ricerca si pone l'obiettivo di contribuire a colmare questo iato approfondendo l'utilizzo delle tecnologie per l'insegnamento della geografia nella scuola primaria attraverso lo studio delle loro percezioni di conoscenza in ambito tecnologico, pedagogico e di contenuto (TPACK), delle loro prassi didattiche e della loro familiarità nell'utilizzo delle tecnologie in generale.

La base teorica su cui si sviluppa questo studio include tre componenti principali. La prima si riferisce all'insegnamento e fa riferimento alle teorie socio-costruttiviste di apprendimento centrato sugli studenti e sulla motivazione. La seconda componente considera gli studi riferiti alle tecnologie, al loro potenziale educativo e al loro utilizzo nell'insegnamento. La terza componente, invece, considera gli studi sull'educazione geografica, sull'insegnamento della geografia nella scuola primaria e sull'uso dei geomedia per l'insegnamento e l'apprendimento della geografia.

In accordo con le indicazioni fornite in letteratura rispetto allo studio delle percezioni di conoscenza degli insegnanti, lo studio ha utilizzato metodologie sia di tipo quantitativo che qualitativo dando vita a due diversi moduli di ricerca. Il primo modulo, chiamato 'Geomedia@School', consiste in un'indagine condotta su larga scala (N = 200) attraverso la somministrazione di un questionario in modalità online ad un campione non probabilistico di insegnanti di geografia della scuola primaria provenienti dai seguenti paesi europei: Regno Unito, Italia, Germania, Spagna, Finlandia, Romania e Turchia. Tradotto in ciascuna delle diverse lingue nazionali, il questionario indaga le percezioni di conoscenza nell'ambito tecnologico, didattico e geografico degli insegnanti, le strategie d'insegnamento messe in atto e le modalità ritenute maggiormente efficaci per lo svolgimento di percorsi di formazione professionale continua. Il secondo modulo, chiamato

'Geografi@Scuola', consiste in uno studio di caso nazionale (N = 21) che riporta gli esiti di un'esperienza laboratoriale di formazione professionale, rivolta ad insegnanti della scuola primaria italiana, finalizzata a stimolare l'efficace integrazione delle TIC nell'insegnamento della geografia. Il caso studio nasce con la duplice finalità di offrire agli insegnanti l'occasione di conoscere e fare pratica con vari dispositivi e applicazioni geografiche e, allo stesso tempo, di sperimentare e riflettere sull'inclusione delle tecnologie nelle proprie lezione di geografia.

I risultati dello studio forniscono importanti elementi per la comprensione delle percezioni degli insegnanti di scuola primaria rispetto alle proprie conoscenze pedagogiche, geografiche e tecnologiche e contribuiscono in maniera significativa ad approfondire le modalità attraverso le quali le TIC vengono utilizzate per l'insegnamento della geografia nelle scuola primarie europee. I risultati, in particolare, restituiscono una percezione positiva degli insegnanti di scuola primaria rispetto all'utilizzo delle TIC nella loro vita quotidiana (navigano in internet e utilizzano la posta elettronica con disinvoltura) e confermano la presenza di una correlazione significativa tra gli anni d'esperienza d'insegnamento e la percezione positiva di sé nell'ambito pedagogico-didattico. Non senza sorpresa, inoltre, lo studio riporta che l'ambito della conoscenza geografica è quello nel quale gli insegnanti coinvolti riferiscono una percezione di conoscenza meno solida. I dati suggeriscono, infatti, che il problema principale nell'insegnamento della geografia nella scuola primaria attraverso l'uso delle tecnologie risieda principalmente nella scarsa conoscenza geografica degli stessi insegnanti. Questa mancanza di confidenza, ad ogni modo, risulta allo stesso tempo accompagnata da altri fattori già noti in letteratura, come la disponibilità delle TIC a scuola e la rigidità dei sistemi di credenze di alcuni insegnanti rispetto all'efficacia stessa delle TIC a supporto dell'azione didattica.

I risultati dello studio, oltre a confermare la centralità delle competenze del singolo insegnante, evidenziano come fattori d'interesse la loro età, il genere e la presenza delle tecnologie a scuola. Dall'analisi delle risposte degli insegnanti coinvolti nello studio, infatti, risulta esserci una correlazione significativa tra l'avere una percezione positiva rispetto all'uso delle TIC per insegnare geografia con l'essere maschio, di età compresa tra i 31 e i 40 anni e con l'avere a disposizione nella propria classe una lavagna interattiva multimediale. Inoltre, sia lo studio su ampia scala che il caso studio nazionale, riportano un utilizzo delle TIC principalmente *teacher-oriented*. Gli insegnanti coinvolti nello studio, infatti, riferiscono di utilizzare con più facilità i geomedia per favorire l'efficacia del proprio insegnamento piuttosto che a supporto dei processi di apprendimento dei loro studenti. Dal primo modulo di ricerca sono ricavate anche chiare indicazioni rispetto al tipo di supporto che gli insegnanti preferirebbero ricevere per migliorare le proprie conoscenze rispetto all'uso delle tecnologie nella didattica della geografia. Le modalità che hanno ricevuto la più ampia approvazione sono la condivisione di una lista di risorse geografiche affidabili e la partecipazione a laboratori di formazione in presenza focalizzati sulle tecnologie geografiche e sulle strategie didattiche. I meno apprezzati risultano invece i forum e le piattaforme di discussione online. Il secondo modulo di ricerca completa queste informazioni fornendo

l'evidenza di possibili benefici a lungo termine favoriti dalla partecipazione ad un laboratori di formazione professionale finalizzato a favorire l'inclusione delle TIC nell'insegnamento della geografia nella scuola primaria.

In conclusione, questo studio conferma che il semplice inserimento delle TIC a scuola non rappresenta una soluzione efficace per il miglioramento dell'insegnamento della geografia sostenendo, allo stesso tempo, che la formazione professionale continua rappresenti una modalità valida ed efficace per sostenere gli insegnanti intenzionati ad utilizzare con maggiore efficacia le tecnologie a supporto dell'insegnamento e dell'apprendimento della geografia nella scuola primaria.

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INTRODUCTION

In a rapidly changing world, education plays a strategic role in preparing future generations to understand such changes and inspire better ones. Geographical education, in particular, is indispensable to the development of responsible and active citizens in the present and future world (IGU-CGE, 1992). It provides students with essentials capabilities and competences needed to analyse and address both global and local problems, adopting critical perspectives informed by the problematics of space. Despite all efforts spent by the geographical community in the last 25 years promoting the key role of teaching geography in topics as Cultural Diversity and Sustainable Development (IGU-CGE, 2000, 2007), the vital role of geographical education remains neglected in some parts of the world, and lacks structure and coherence in others (IGU-CGE, 1992; 2016). In Europe the recent threats to reduce or even abolish geography as content from school curricula has pushed the geographical community to address governments and educational institutions in the European countries through a joint declaration on Geographical Education (AIIG, EUGEO, EUROGEO, IGU-CGE, 2013). This declaration, as analysed by Cristiano Giorda (2013), has both explicit and implicit intents. While it explicitly asks for those responsible in European governments and educational systems to recognise the educational value of geographical knowledge, skills and understanding, it is implicitly highlighting how the future of geography passes through its social legitimation (p. 156). At the same time, while the declaration explicitly demands for well-qualified teachers and sufficient time for teaching geography in schools, it implicitly recognizes the key role played by the teachers in geography education.

Teachers' understanding of the learning and teaching processes have a strong influence on how the subject is tackled in daily practice (Ottens, 2013, p. 98). Teachers have the power to make geographical knowledge relevant for the students and to engage them in developing and applying a geographical perspective to their own reality. This suggests that the better geography is taught in school, the more consideration geographical thinking and acting will receive in people's daily life, which leads to think that how geography is taught in school is strongly connected to its social legitimation as discipline.

If we consider that the most recent IGU document reports a general lack for geography in social legitimation (AIIG, EUGEO, EUROGEO, IGU-CGE, 2013), it becomes clear that today students' interests and expectations are not always matched by the teaching strategies proposed in today's geography classes.

The way geography is taught in schools is therefore connected not only to what Taggart calls "the public face of geography" (2011) but also to the students' personal perception on geography, which is even more delicate because it defines what geography is today and what it will be in the next future. It is therefore important to mind any discrepancy between the nature of contemporary geography and the different types (and methods)

of geography that prevail in schools in order to inspire students to learn the subject (Rocca, 2007a; Prykett and Smith, 2009; De Vecchis, 2011; Butt and Collins, 2013; Tate and Swords, 2013).

In a highly interconnected world, an interdisciplinary and applied knowledge based on spatial interrelationships as geography is it continues to represent one of humanity's big ideas (Bonnet, 2008; 2012). The expression coined by Bonnet, in fact, reminds us that the kind of knowledge geography provides is a necessary one, and in order to thrive and survive we still need it (2012, p. 39). The combination of the pervasive diffusion of Information and Communication Technology (ICT) and ubiquitous Internet access in almost any activity we (and our students) do or place we visit, has in the last decades inspired a diffuse optimistic perception regarding the positive impact that ICTs and the Internet might had on geography and geographical education. This feeling can be traced and confirmed within the stream of articles published in the pages of professional journals (e.g. *Geography Teacher* or *Ambiente, Società e Territorio*) and international research journals (e.g. *International Research in Geographical and Environmental Education or Journal of Research and Didactics in Geography)* and might be summarized as the possibility for teachers and students to have not only a lot of geographical facts and concepts but also the possibilities to manipulate data and to handle information in an interactive way (Schee, 2003, p. 205).

However, ICTs are not implemented in all geography classes (especially in primary education) and where they are implemented it does not lead automatically to a positive impact on the teachers' teaching or students' learning. It is in fact assumed that, if on one side ICT inspires many teachers to improve their teaching and to lead for an evolution (often addressed as a "r-evolution") in education, on the other side ICT has also contributed to complicate the teaching and learning process, introducing several new aspects to take into consideration (Olofsson, Lindberg, Fransson, Hauge, 2011).

In light of the complexity of the reference context, this research contributes to the deepening of the impact that technologies have in geography classes. The method is based mainly on the collection of perceptions of efficacy expressed by primary school geography teachers. Teachers' perceptions of efficacy are closely linked to the teacher's beliefs, but unlike them, perceptions can be expressed with awareness by the teacher. As discussed in the first chapter, beliefs are a complex and basically unaware system able to influence a man's thoughts and actions. The perceptions of efficacy on the other hand, as fragile and changing as they may be, represent a tangible item and therefore somehow measurable and important for the understanding of certain characteristics of the belief system (as well as of experiences) of the teacher.

The study is aimed in particular at investigating the perception of teachers related to the use of technology to support teaching of geography. According to the TPACK model devised by Koehler and Mishra (2005), teachers' perception of efficacy have been researched in the pedagogical, technological and geographical field. Simultaneously to the investigation of the perception of efficacy of primary school teachers in relation to these

three areas, research has also put an emphasis on practices implemented by teachers in the teaching of geography and on the technological equipment that each of them has to their disposal. This information, combined with those related to age and gender, has made possible to link the teacher's statements with a number of personal (gender, age) and external factors (size of the city where they teach, school's technological equipment, the presence of IWB, etc.) that lead to the finding of some interesting correlations. Furthermore, also within sphere of the teaching of geography, the research was directed to the collection of teachers' personal opinions about the effectiveness of different ways of education specific to the subject.

The questions on which this research is based are the following:

- What are the teacher's perceptions of efficacy related to the use of technologies in supporting the processes of teaching geography in primary school?
- Which teaching strategies are put in place by teachers to teach geography in primary school?
- Which technologies do they have available in the classroom and at school?
- What kind of aid is considered the most useful by the teachers to deepen the use of technologies to support the teaching of geography?

From the interpretation and combination of the answers collected, the present research offers the opportunity to better understand what perceptions European primary school teachers have regarding their own knowledge on using ICT to support their geographical teaching. In addition, the results can help the international community of geographers to understand what is the level of primary teachers' familiarity with ICT and to produce a better understanding on the role ICT have today in European primary geography.

This dissertation is organized into three parts. The first part is composed of two chapters and presents the theoretical background of the research. Chapter one looks into the use of technology in school and presents the central role of teachers in the process of adopting technology in the classroom. This chapter also introduces the TPACK model and provides an analytical description of European primary schools' equipment. In the second chapter, the attention is centred on the value of geography in education and on the teaching of geography in primary school, offering some review of the teaching strategies. This chapter also includes a detailed look to what geomedia means and what might be their role in teaching primary geography.

The second part of this dissertation discusses the practical stage of the research study, which aimed to offer both a large-scale survey and small information-rich case. Specifically, chapter three explains the research design while the following two chapters describe the two research cores that make up the dissertation: the 'Geomedia@School' research (chapter 4) and the initiative called 'Geografi@Scuola' (chapter 5). Both these two chapters are organized following the same structure, which includes five sections: research questions, research context, research method, analysis and results, and finally, a brief discussion.

Finally, the third and conclusive part of this dissertation is made of two more chapters. The sixth tries to deduce some conclusions from what was learned from the practical part of the study and the seventh discusses both the research method and the implications of the outcomes.

FIRST PART

1 ICT AND EDUCATION

1.1 From technology to hard and soft ICT

The term technology has evolved significantly over the last two centuries (Dron, 2013). Before the 20th century the word 'technology' addressed all those tools helpful in solving a problem or improving a pre-existing solution to a problem and the word 'technology' and 'tool' were used interchangeably. With the industrial revolution the use of the term 'technology' increased in complexity and by the 1930s not only it referred to the study of industrial arts, but also to the industrial arts themselves and to the skills by which we produce and use them (Schatzberg, 2006). With the advent of electronics and computers the term 'technology' began to include both 'hardware' and 'software' components leading to the expression "Information Technology". It was in the 1970s when IT became frequently used (Loveless, Dore, 2002) to describe technology that enables user direct access to a wide range of diverse types of information (Ertmer, Addison, Lane, Ross, Woods, 1999).

From 'Information Technology' to 'Information and Communication Technology' the step was close and as rapid as the development of electronic communication was (Tondeur, 2007; Kennewell, Parkinson, Tanner, 2000; Plomp, Anderson, Law, Quale, 2003). Today ICT is defined a wide set of technological tools and resources used to transmit, store, create, share or exchange information (UNESCO, 2013). These technologies includes computers, electronic devices such as tablets and smartphones, the Internet (websites, blogs, email, …), Learning Management System (Moodle, ELIAS, etc.) live broadcasting technologies (radio, television and webcasting), recorded broadcasting technologies (podcasting, audio and video players, and storage devices), telephone (fixed or mobile), and positioning systems (GPS).

Today, the word 'technology' cannot be used as synonymous of 'tool' anymore. A tool is an object. Technology is not just a tool; it is also the 'how' you use it and 'for what' it is used. It is not a thing, but a verb (Kelly, 2010). A tool "*is something we use, generally with other tools and processes, in order to enact a technology*" (Dron, 2012, p.33). In other words, we could compare the mean of technology to the idea of affordance of a tool (Gibson, 1979; Norman, 2002). This idea of affordance cannot be separated from the context of use and the person's perception of what a particular tool can be used for (Sutherland, 2004, p. 7). At the same time, this idea would involve knowing when to use what tool. Technology in conclusion can be described as the combination of both the product and the process or, using Arthur's words, as "*the orchestration of phenomena to our use*" (Arthur, 2009, p. 53), which gives a precise idea of how important is to organize and combine things together in order to achieve our goal. Arthur's idea of describing technology as an 'orchestration' (2009) was inspirational to Dron in order to present his idea of soft and hard technologies:

"*In hard technologies, the orchestration is determined in advance. It may be embodied in hardware or software, or it may be embodied in inflexible human processes, rules and procedures needed for the technology's operation, or both. The human role, if any, in a hard technology is to follow someone else's orchestration, while in a soft technology it is to perform that orchestration"* (Dron, 2012, p. 35).

Soft and hard technologies have been intended in different ways by different authors (McDonough, Kahn, 1996; Norman, 1993; Jin, 2005). What is intriguing in Dron's explanation is its ability to include all of them. In Dron's view, hard and soft technologies offer different benefits. Efficiency, speed, accuracy and consistency are provided by hard technologies; flexibility, creativity, malleability and adaptability by soft technologies. However, he believes there are no pure hard or soft technologies, what is hard for one person can be soft for another, because what defines the degree of softness or hardness is given by both the context and the 'orchestration' (Dron, 2012).

The point Dron makes in his article (2012) is that what defines the 'consistence' of technologies is the teacher/student expertise, which can soften any technology just by practicing and applying it creatively and flexibly. The less choices are requested, the harder the technology gets. Even the softest technologies are collections of hard technologies. The orchestration of each small piece of technology together gives back the control to both learners and teachers, confirming the need for everyone to find the best balance based on the activity, the technologies, the aims and the context where they use it.

1.2 Justifications for ICT implementation in schools

Why has ICT been so popular within the education field for the last twenty years? And why do we keep promoting the purchase and use of ICT as support for teaching and learning? These are the fundamental questions we need to ask ourselves if we want to begin studying the use of ICT in class.

The presence of ICT in schools is not, in fact, the result of the decision of a single teacher, nor of a school, or the pupil's parents. It is the answer that our society found the need to adapt to a world that is continuously evolving. A great faith in technological innovation characterizes the current digital revolution that is taking place today, as it was for the industrial revolution at the end of the 1800s. Technology is becoming increasingly reliable and economical, and its application range is broadening significantly. It is in this context that education has been considered to be one of the possible areas where technologies are open to making newer experimentations and innovations. To understand both the sense and value of the use of ICT in school today, it is vital that we examine the fundamental principles that would guide the introduction process from today (Aviram e Talmi, 2006, p. 48).

In his studies, Calvani distinguishes three levels of justifications for implementing ICT in school: macro-ecological, strategic, and micro-ecological (Calvani, 2006; 2009a; 2009b).

The first justification refers to the fact that ICT should represent an innovation factor that is able to question the role of schools as part of an information-based society. As briefly introduced above, there are several arguments which support this macro-ecological justification (see also Albirini, 2006; Loveless, 2003; Maddux, 2003; Watson, 2006) including ICT pervasiveness, ICT appeal, and new skills and alphabets (*Table 1*).

Table 1 - Macro-ecological justifications for implementing ICT in school (Source: Calvani, 2009)

Justification	Argumentation
Pervasive	ICT is a part of society. School reflects what happens in the society, therefore, it has to include ICT.
Appealing	ICT attracts the new generation of students, so, it might be of help while providing a more engaging environment to the class.
Social mission	To bridge the 'digital divide' is one of the most important social objectives today. The school should contribute to it.
New skills	The world is asking for new skills (group work, creativity, problem solving, etc). It is assumed that ICT can contribute to their development.
New alphabets	The information society is asking for new competences, such as searching and evaluating information. Technology should also be learnt as a subject (learning about technology).

The second level of justification is based on the idea that ICTs are innovative and they produce innovation. At this level, two concepts are to be stressed overall: flexibility and networking. Flexibility is linked to the ability that ICT has to create, edit, adapt, and individualize the contents. Networking refers to the huge enlargement of the possibilities to socialize with others and access information through the net.

The third level is the micro-ecologic, and this is based on the evaluation of ICT's impact on school learning. This level represents a dimension where the ethical and the social principles are subordinated to the educational ones.

Calvani's proposed classification is interesting, as it highlights how, in the first two levels, once the justifications are accepted, the introduction of ICT in schools follows as a consequence, without the need for any further rethinking process. This is not the case for the third level: here, ICT implementation always depends on the evidences for its efficacy, by the case, context, and teacher.

Being aware of the different justifications for the implementation of ICT in class is very important for this research, because not only does it explain the way society thinks, but, it also gives interesting insights on how teachers might do that.

Literature refers to the justification of ICT's implementation in Europe, where it is mainly supported by ethical and social motivations, and still not certified by the evidences, in terms of learning (Trucano, 2009; Jones, Paolucci, 1997; Johnson, Daugherty, 2008). This is thought-provoking, because if one side highlights that both national and international policies are considering the use of ICT in the classroom which is inevitable for the knowledge society (Anderson, 2008), the other, by contrast, highlights the need for intentionality in education.

1.3 ICT's impact on education

In *The Use and Misuse of Computers in Education* (1974), Ellis affirmed that thinking about the computer's role in education does not mean thinking about computer, but rather, about education. In the last three decades, a good deal of thinking and research have been done about education and technology's role in it (for a deeper presentation of the research topic from a broad international perspective, see Voogt and Knezek, 2008). The objective of this paragraph is to shed light on some of the fundamental points of the didactical efficacy, and on the impact of technologies in class. Throughout this paper, we refer to impact as the overall achievement of an intervention on the educational system, which can be described through a variety of qualitative and quantitative indicators, and can be considered the end-point of an intervention involving input, process, output and outcome (Balanskat, Blamire et al., 2007).

In light of the great interest shown upon the question of didactical efficacy in the last two decades, an evidence-based approach to the study of both didactical strategies' affidability and efficacy has been developed within the education field/sector, and it is carried out through the application of rigorous methodologies which are able to systematically compare and integrate the results. This approach is also marked by a substantial critical attitude towards traditional educational research (Slavin, 2004; Hargreaves, 2007), and is oriented towards gathering, elaborating, and providing recommendations that will offer concrete answers to the relevant questions about every day's didactics (Calvani, Vivanet, 2013).

Internationally, the most systematic work on the efficacy of didactical methodologies has been done by Hattie (2009), who offers the synthesis of a total of about 800 meta-analyses, which encompassed 52,637 studies, covering more than 80 million pupils. In his study, Hattie used the statistical measure effect size (ES, significant when higher than 0,4) to compare the impact of the many influences on students' achievement. From his study, we can extrapolate that in the efficacy of education, what plays a significant role are contextual factors that are linked to the intention of learning, relationship with criteria of success, and the availability of an environment that not only allows but positively welcomes errors/mistakes, but also pays attention to the feedback and value involvement and one's perseverance in achieving success.

The extent of both the atmosphere and the personality of the teachers can be quite high. The study shows that the teachers pay particular attention to the effects (of) on those students (ES = 0,9-1) who have strong self-control (ES = 0,9), have passion for both teaching and learning, or those who fully comprehend the subject. A strong respect towards the pupils (ES = 0,8) and their clarity of information (ES = 0,7) are equally significant to the efficacy of teaching.

A key finding of the study is that the most powerful single influence enhancing achievement is quality feedback. In Hattie's words: "It was only when I discovered that feedback was most powerful when it is from the student to the teacher that I started to understand it better. When teachers seek, or at least are open to, feedback from students as to what students know, what they understand, where they make errors, when they have misconceptions, when they are not engaged, then teaching and learning can be synchronized and powerful. Feedback to teachers helps make learning visible" (p. 173).

In addition to the understanding of the importance of visible teaching/learning, Evidence Based Education provides a critical contribution in refuting certain clichés, where the evidence shows are recognized as groundless or even counterproductive (Calvani, 2012b, p. 33-34). Among them, the fact that both the introduction of multimedia technology and the familiarization with the new technologies would in itself, be capable of generating significant improvements in learnings and new cognitive processes, is important to note. Research has now demonstrated that the use of technologies for learning does not tendentially entail any significant difference for learning (no significant difference, Russell, 1999; Bernard et al. 2004; Calvani, 2012a; 2012b; 2013).

Therefore, in line with Hattie's data are the conclusions drawn from Tamim and colleagues (2011), who carried out a second order meta-analysis on the impact that technology has on learning outcomes in primary, secondary and postsecondary education groups. Published between 1988 and 2007, and inclusive of 25 meta-analysis (for a total of 1.055 primary studies and more than 100.000 pupils), this analysis compared didactical experiences which were supported by technologies carried out in class without any technological assistance. The average value of ES that resulted from this synthesis is 0.35 ($p < .01$). Furthermore, the influence of two

moderating variables are quite significant: the way technologies are used (as direct education or as didactical support) and the level of education. Furthermore, ES results equal to 0.42 when technologies are used as didactical support (versus the 0.31 of direct education), while it is 0.40 for the K-12 sample (versus a 0.29 of the secondary education sample). A further synthesis of the knowledge we have on technologies' didactical efficiency in educational contexts has been made by Higgins, Xiao e Katsipataki (2012), upon the Education Endowment Foundation (EEF)'s request.

The authors have analysed 48 meta-analyses which have summarized experimental and semi-experimental primary studies (conducted between 1990 and 2012), involving students aged between 5 to 18. This study states that the impact that digital technologies have on the learning processes should be between 0.30 and 0.40 ES, with quite a large amount of changeability. The Education Endowment Foundation (EEF) has picked up Higgins and his colleagues' work, and has integrated the available data with further studies, in accordance to which, there should be a wide range of evidence with regards to the medium's moderate efficacy (0.28 ES, Higgins et al., 2014) of digital technologies in both primary and secondary education.

However, as also stated by Hattie (2009), Evidence Based Education accept exceptions, and it is not surprising to know that a number of studies have provided convincing evidence of ICT's positive impact with regards to learning gains (Cox and Abbott, 2004; Bliss, 1994; Liao, 1999; Watson, 1993) and the students' motivation (Cox, 1997; Gardner et al., 1993; Sakamoto et al., 1993). The explanation might be found within the different research methods applied and the different learning contexts, which limit the generalisability of the results of such studies for the wider IT-using community (Cox, 2008, p. 972).

Moreover, these figures are consistent with the statement, that the difference is made by the methodologies and teachers who use them, and not really by technologies (Calvani, 2012a; Clark et al., 2006; Cox et al., 2004; Hattie 2009; Sutherland, 2004; Rhine, 2011; Voogt, Knezek, 2008).

There are more situations for which the logic of experimental comparison does not make sense, and where evidence-based education approach is not always effective. This is the case of special education, where technologies are more often crucial to the access and upholding of learning (for example, touchscreen devices, interactive digital tables, etc.), or of education with access to "incomparable" technologies, as augmented or expanded reality (a virtual exploration of a physically inaccessible context, an archaeological site, exploration of the human body or space). In all these cases, technologies can add new opportunities and conditions, to allow learning to take place (Calvani, 2012b, p. 37). Furthermore, there are situations where no significant difference can be a positive sign, like in the case of e-learning, where, if a long-distance activity can be realized with the same learning results as if it would be done in person, it would be reasonable to consider it to be the most effective solution.

Therefore, when we steer towards new learning models and new views of school or the society itself, is the evidence-based logic that loses its effectiveness to the value-based logic, where assessments are of primarily ethical and social character (Ax and Ponte, 2010; Biesta, 2010). This approach highlights that evidence role is subordinate to the values that establish practices as educational (Biesta, 2010, p. 493), and supports the idea that decisions about educational actions and arrangements should always have to be taken with an eye on the desirability of what such actions and arrangements are supposed to bring about (p. 500).

Summarizing, the debate on ICT's impact on education provides a few very important indications:

- the presence of ICT in schools have contributed to improve the complexity of both teaching and learning processes (Sutherland et al., 2004; Farinelli, 2010; Berry et al., 2012; Olofsson et al., 2011).
- evidence-based approach in education shows that the sole implementation of ICT is not sufficient to generate significant improvements to an individual's cognitive process (Calvani, 2012a; Hattie, 2009).
- evidence-based approach in education both identifies the key role of quality feedback and confirms the crucial role of the teachers (Hattie, 2009)
- there is evidence showing that ICT can impact upon the learners' gain and motivation (Cox, 2008), but there is none to support the use of ICT in every learning context, area, or for every learner (Lai, 2008)
- value-based approach highlights that evidence role is subordinate to the values (Ax and Ponte, 2010; Biesta, 2010).

1.4 ICT's impact on primary school

Talking about education, specifically, primary school education, makes a big difference. Primary school represents a crucial time for the children, because, during this period, most of them formally learn how to read and write, express themselves, and behave according to different situations. During this time, pupils formally start to organize their experiences and acquire knowledge and skills that will be decisive for their further understanding of the world. Primary school is a privileged opportunity for cultural, social, and relationship growth, and, thanks to its great power of changing people's life conditions and perspectives, it is considered as one of the most formative stages of education (Kalaš et al., 2012, p.9).

As mentioned before, ICTs have entered primary schools, as well as all the other levels of education. In order to understand what was the impact of technology in the European primary schools, the European Commission specifically undertook an international study called STEPS (Study of the Impact of Technology in Primary Schools), which is, even today, the most detailed picture of national ICT strategies and their impact on primary schools of the European Union. The study involved 209,000 primary schools in Europe, and includes an analysis

of the interviews with 18,000 primary school teachers and head teachers (Korte, Hüsing, 2008), a quantitative survey of 257 teachers across Europe on the impact of the national strategies in schools (Blamire, Sali, 2009), a review of 60 relevant researches published in 22 European countries (Balanskat, 2008), a survey of the policymakers in 30 Ministries of Education on national ICT policies (Blamire, 2008), 25 case studies of good practice, and 30 country briefs (Van Oel, 2009).

The findings from STEPS relate to the education system, research, and the impact of ICT on learners, teachers, and schools. Some brief extracts of the executive summary of the project are reported here, in order to present the European situation in each of these areas of interest.

Education system

- The survey among the Ministries of Education revealed that the national ICT policies usually aim to improve the infrastructure and the teachers' digital competences, but, they are less frequently focused on the supply of digital learning resources, pedagogical reform, or leadership.
- Digital competence features in the primary school curriculum in 22 countries, either integrated across subjects or taught as a separate subject.
- In most countries, ICT is a part of general education policy, and there is a specific ICT policy for all schools, but not a specific policy for ICT in the primary schools.

Research on the impact of ICT

- Most of the countries surveyed carry out research on the impact of ICT. The evidence on the impact of ICT differs, in terms of impact areas addressed and the research methods used.
- Studies on the impact of ICT on learning mostly concentrate on the perception of the learners and teachers, in how far ICT supports the learning process and the wider educational goals.
- Evidence on the impact of ICT on the teachers focuses on teacher training programmes, including the skills, competencies, and perceptions of the teachers, and their use of ICT as a tool for both preparation and planning.
- There is no clear evidence about the impact of ICT on schools.
- Assessing the impact of ICT, based on teachers´ perceptions, is the prevailing approach that is taken in national studies, as opposed to its assessment based on student outcomes in tests.

The impact of ICT on learners

- For children, a range of knowledge, skills and competencies – both traditional and from the '21st century', e.g., creativity, learning to learn– are acquired through the use of ICT.
- Teachers note a positive impact on learners' basic skill acquisition (reading, writing, calculation)
- ICT has a positive impact on wider educational goals such as students´ attendance, behaviour, motivation, attitudes, confidence and engagement.
- Technology enables finer differentiation and personalisation as shown by the research and it can support improved learning outcomes for disadvantaged learners.
- There is a discrepancy between children's use of ICT outside school and their use of ICT at school.
- Active and enquiry-based tasks with ICT are highly motivating for children, but are not sufficiently offered in the schools.
- Analysis of the case studies reveal that ICT-based assessment systems used in the primary schools give more sophisticated feedback on learning to the teachers, parents, and the pupils than the traditional methods.

The impact of ICT on teachers

- A remarkable 75% of Europe's primary teachers use computers in class, and are positive about their benefits.
- Teachers find that ICT supports, in equal measure, a range of learning and teaching styles: from passive activities (exercises, practice) to more active constructivist learning (self-directed learning, collaborative work).
- There is evidence from the research that ICT is pedagogically under-used.
- Teachers generally use ICT less inside and more outside the classroom, e.g., for administration, organisation, and planning.
- In order to promote new pedagogical approaches, ICT have to be fully integrated into the subject lessons.
- Teachers tend to lack the pedagogical vision to integrate ICT effectively in the course of teaching.
- All countries investigated are investing in the teachers' digital competence development, but many who enter the profession have little formal training in using ICT.
- A considerable amount of continuing professional development lacks a pedagogical dimension, and is not matched to the needs.
- Reliable technical and inspiring pedagogical support for the teachers is often missing.

The impact of ICT on schools

- Almost all primary schools have computers, with an average of eight internet computers per 100 pupils, and at least 88 percent in each country with internet access. Smaller primary schools can be at a disadvantage.
- Research indicates that ICT integration into subjects, teaching, and classrooms is the key to changing teaching practices, and the school leader's support is crucial.
- School ICT plans tend to concentrate on the infrastructure, rather than on how it can enhance teaching and learning.
- The importance of a whole school's collaborative approach to ICT integration, especially in the countries where schools have significant autonomy, is confirmed.

The results of this study give us a good deal of very important information to frame the research on ICT's impact on the teaching of geography in the primary schools. First of all, they clear how the impact of technologies on primary school is the result of a complex system of responsibility which is shared between students, teachers, and politics. For a deeper understanding of the current level of technological impact for geography teaching and learning, the study should bring into consideration all these dimensions (Blamire, 2008). At the same time, the analysis of the literature reviews show how most of the researches are aimed at deepening the impact of technologies in the primary schools are based on the teachers' perceptions (value-based), rather than on the student's test results (evidence-based). The methodology used in the research proves to be a very significant key to comprehend the differences among the results, compared to Hattie's study (2009). At the same time, it has to be considered that the evidence for the impact of ICT on new skills, such as learning to learn, ability to create, innovate, or collaborate are not widely assessed in today's education systems (Balanskat, 2010).

From their perspective, the teachers believe that ICT influences the learners' acquisition positively for both basic skills and wider educational goals (Korte, Hüsing, 2008; Blamire, Sali, 2009). As reported in the STEPS literature review (Balanskat, 2008), and in the STEPS school survey analysis (Blamire, Sali, 2009), the teachers have a positive attitude towards ICT, and although there is high impact on both cases, they seem persuaded that ICT affects more positively on them than on their pupils (p. 19). Notwithstanding, the study also report a discrepancy between the positive opinion of the potential impact of ICT, and is actual used by the teachers. Teachers lack the pedagogical vision to integrate ICT in classroom teaching, and explicitly in teaching specific subjects (Balanskat, 2008, p. 25). It is for this reason that among the final considerations of the STEPS project, a further, subject-specific investigation of ICT's impact and potential is initiated (Balanskat, 2010, p. 36).

1.5 ICT policies in primary schools

In the recent years, international education stakeholders, like the Organisation for Economic Co-operation and Development (OECD) and the European Commission, have expressed the hope that digital technologies will substantially influence teaching and learning in both primary and secondary schools (Olofsson, 2011, p. 209). This paragraph intends to report about many of the initiatives that has been implemented at the European level, to improve the quality of learning by facilitating the access to resources and services through new multimedia technologies and the Internet. The first part of the paragraph briefly presents the initiative which has been undertaken in education since 2000. The second part focuses specifically on the primary education-specific policies.

In 2000, the European Commission adopted the "*e*Learning" initiative (European Commission, 2010), aimed at adapting the EU's education and training systems to the digital culture, and effectively integrating ICT in education. This would be achieved by stressing upon the need for innovative pedagogical approaches, and for ambitious objectives with regards to the learning quality and easy access to e-learning resources and services (2002, p.2). In 2002, the European Commission adopted the e-Learning Programme, supporting ICT-mediated learning as an integral component of the education and training systems. From here, the ability to use ICT became a new form of literacy. Since without it, the citizens can neither participate fully in society nor acquire the skills and knowledge necessary for the 21st century, digital literacy was recognized to be as important as the “classic” form of literacy and numeracy. Following this trend, the i2010 strategy underlined the need to promote education and training policies regarding ICT, which would allow Europe to have the skills to research and innovate more efficiently and effectively (European Commission, 2005, p. 9). A few years later, in 2007, ICT in education was also included as one of the four cross-cutting themes of the Lifelong Learning Programme (2007-2013), and it became a general priority in the four vertical programmes (Erasmus, Comenius, Leonardo da Vinci and Grundtvig) (Eurydice Network, 2011, p. 7). Furthermore the latest European policies have been paying attention to the ICT uptake and its use by the teachers, on account that the opportunities provided by ICT (e.g., networking, interaction, information retrieval, presentation, and analysis) are seen as the core elements in honing 21st century skills (EACEA Eurydice, 2011, p. 8). As stressed by the European Commission in the Rethinking Education strategy (2012) as well, the competency of the teachers is of significant importance for quality education which is related to the use of ICT. Teachers, in fact, for the European Commission, tend to acquire ICT teaching skills through initial education rather than through professional development; it is essential that they are well-equipped to embrace the potentials of the new technologies in the way they teach, in order to stimulate and engage the learners (2012, p. 9).

Results from the policy survey, conducted within the STEPS study (Blamire, 2008), show how in Europe, there is a general tendency to both include ICT in general education policy, and to have a specific ICT policy. There are only a few countries which have a specific policy for ICT in primary schools, and they are those where it has long been used (p. 8). According to Blamire, policies tend to focus on three main tendencies: rethinking the curriculum, pedagogical change, and increasing the school's autonomy. Unfortunately, ICT are seen as more useful and effective in changing the curricula, as well as improving the school's capabilities to teach the pupils, instead of actually being the focus of the teaching (both as a subject and as a tool). ICT is perhaps still more associated with motivation than with playing a key role in a modern curriculum which is suited to the 21st century children (p. 7*).* Nevertheless, no matter the reason why they are included in primary education, ICT has a clear value in the primary schools, as children's experience with computers early on in their lives have long been argued to be crucial to them to develop positive attitudes towards ICT in their later life (Williams, Ogletree, 1992). Probably, even more significant for primary school teachers is the need for the educators' personal involvement and competency in the pedagogical use of ICT, which is in need of being strengthened (European Council, 2012, p. 2). Again the STEPS study report that the teachers entering the profession may have little formal training in using ICT while teaching in a significant number of countries, owing to the lack of equipment or experienced trainers, or training being unrelated to day-to-day practice, or to the absence of ICT in courses *(*Blamire, 2008, p. 25). This situation can also be a reflection of the fact that continued professional development is mainly based on a voluntary basis (Caena, 2011). Due to this, the competitiveness of the school depends solely on the teachers' personal interest in the subject, and not on the school's commitment to training its personnel or improving its curricula. The situation is not to be underestimated. As reported in the 2007 McKinsey report, "*How the world's best-performing school systems come out on top",* in fact, the quality of an education system cannot exceed the quality of its teachers, and the negative impact on the students through a series of poor quality teachers in the early years is both severe and irreversible (Barber, Mourshed, 2007, p.111). It is then clear that the importance of involving and training teachers to be able to successfully utilize ICT in all their potential, allowing the students to be inspired and motivated by these new tools to both learn and flourish.

Considering that children's use of ICT in the primary school is undoubtedly an important foundation for the government's vision of establishing an 'information society' (Selwyn, Bullon, 2000, p.330), all European countries should work towards having national strategies in place, to foster specifically the use of ICT in primary education. According to Eurydice (2011, p. 9), these strategies should aim to provide the necessary ICT skills to the pupils (in particular, the literacy skills), as well as provide ICT training to the teachers.

1.6 Barriers to the use of ICT at school

In over thirty years of discussion on technology integration in education, thousands of articles have been published which recommending effective strategies to facilitate meaningful integration (Ertmer et al., 2012, p. 423). The majority of the researches reported evidence on both the actual and the perceived barriers to the uptake of ICT (e.g., An, Reigeluth, 2012; Anderson, 2010; BECTA, 2002; Balanskat, 2010; Buabeng-Ando, 2012; Cox et al., 2004; Ertmer et. al., 1999; European Schoolnet, 2012; Hew, Brush, 2007; Kopcha, 2012; Loveless, 2006; Pelgrum, 2001).

In the literature, several factors are considered, and their different organization are proposed.

The European Schoolnet (Balanskat, Blamire, European Schoolnet, 2007; Balanskat, 2008), after examining 17 qualitative and quantitative studies about the impact of ICT in schools in Europe identified three main levels of barriers. Teacher-level barriers, which are directly related to the quality and quantity of teacher-training programmes, include their poor ICT competence and lack of confidence while using new technologies in teaching. School-level barriers, consisting of the limited access to ICT, poor quality, and inadequate maintenance of hardware as well as unsuitable educational software. Finally, system-level barriers, which is the educational system itself and its rigid assessment structures that impede upon the integration of ICT into everyday learning activities.

Ertmer et al. (1999) classified technology integration barriers into first- and second-order barriers. First-order barriers for the authors are those which refer to the obstacles concerning the institution, such as the lack of resources in the school, assessment, and subject culture. Second-order barriers, on the other hand, are all those which are intrinsic to teachers, such as attitudes, beliefs, knowledge, and skills. For the authors, first- and second-order barriers are linked intimately together and respectively influence each other.

More specific classification are proposed by Hew and Brush (2007), who analysed research studies from 1995 to 2006, and classified six major barrier categories (resources, knowledge and skills, institution, attitudes and beliefs, assessment, and subject culture), and by Kopcha (2012), who summarized the barriers that teachers face when integrating technology into their instruction, into five main categories: access, vision, beliefs, time, and professional development (see *Table 2*).

Table 2 - Kopcha's organization of teachers' barriers to ICT integration into their instruction (source: Kopcha, 2012)

Access	Teachers can feel as if they lack access to technology even when it is available, because it does not work properly or because it is not useful for teaching
Vision	Teachers with a strong administrative vision for technological use are less likely to abandon their efforts to integrate technology which they encounter
Beliefs	A teacher's beliefs about the usefulness of and the difficulty associated with integrating technology influence, whether they use technology for instruction
Time	Teachers have reported that technology requires more of their time to deal with student misbehaviour when using technology, or to plan for and learn to use it
Professional Development	Training can be a barrier to technology integration, whether it lacks connection to actual classroom practice (e.g. standalone workshops), or focuses solely on technical skills

From all the studies, a clear indication emerge: in order to be effective, the researches on ICT implementation in the school should ideally take into account all types of barriers and address them together, rather than separately (Ertmer et al., 1999; Ertmer, Ottenbreit-Leftwich, 2010; Hew, Brush, 2007; An, Reigeluth, 2012; Frederick, Schweizer, Lowe, 2006).

In this research, the attention was mainly directed towards the teachers' level (second-order) barriers, and in particular, to their attitudes and beliefs towards the use of ICT while teaching geography. This is because a specific research focus on primary geography teachers was spotted.

1.7 Technology impact on teachers' role and their impact on technology implementation

In order to address the challenges of the 21st century, school systems today are facing a "Copernican revolution of teaching", showing a marked shift of emphasis from teaching to learning (Bauman, 2005), and, consequently, from the teachers to the students. In terms of praxes, this consists of promoting teaching approaches that put children in the centre of the learning process, and build a network of tools and resources around them, that engages him/her to be active in the process of learning.

Teachers in this scenario are moving from being "sages on the stage", or, to become "guides on the side", acting as learning facilitator, collaborator, coaches, and knowledge navigators, providing students more options and responsibilities for their own learning (Anderson, 2010, p. 6). However, this change did not lighten

the teachers' workload, but made their role even more complex and delicate, because they were asked to address a completely new set of demands:

[…] *it is teachers who mediate between the students and the rapidly evolving world they are about to enter; they work with pupil groups that are more heterogeneous than before (in terms of mother tongue, gender, ethnicity, faith, ability etc.); they are required to use the opportunities offered by new technologies, to respond to the demand for individualised learning and to assist pupils to become autonomous life-long learners; and they may also have to take on additional decision-taking or managerial tasks consequent upon increased school autonomy*. (Commission of the European Communities, 2007, p. 9).

The figure of the teacher in Europe cannot be defined anymore by the mere presence of personal "vocation", but it requires a scientific and formative educational process which is able to prepare the teachers to face educative and institutional duties from their life-long learning perspective. Teachers are invited to become reflexive practitioners (Schön, 1993) at institutional, pedagogical-didactical, and psychological-relational levels (Galliani, 1999). They need to be prepared to work in a growing, complex organization and environment, and need to be trained to monitor their own efficacy in teaching. But, they also need to be educated while working with emotion and motivation (of children and their own). Being reflective "in action" and "on action", as suggested by Donald Schön, require the teachers to work on both their experience and their consciousness of being teachers (p. 93).

When the introduction of computers in schools started, many policy approaches underestimated both the degree of change required in the teachers' understanding and beliefs (McCormick and Scrimshaw 2001) and their reluctance to abandon their existing pedagogy (Cuban, 2001; Cuban et al., 2001). It was soon realized that classroom change would have not arisen by simply providing more machines, software, and functionality (Hennessy, Ruthven, Brindley, 2005, p. 159).

However, the role of teachers' personal experiences, attitudes, beliefs is not new in education.

The psychologist, Carl R. Rogers, who was known and valued for his pioneer work in non-directive therapeutic psychology, assigns a key role to the uniqueness of the experience and individual subjectivity. He is, in fact, convinced that the way a person sees and interprets his/hers life's events determine the response to those events, and the way that person behaves. The centre of interest for Rogers is, therefore, represented by the individual's perceptions as determinants of the action: it is from the way the events are understood that the person's reactions to them come from.

Rogers (1974) believed that a person should always be considered in his/her globality as an organism, or through a globally organized system, where it is always possible that modifying one part might lead to changes in any other part (p. 137). Furthermore, he thinks that everyone tends to realize their own potential:

experiences that are perceived as unfavourable are judged negatively and avoided. In this context, motivation coincides with the push towards personal realization and research of personal positive experiences. With this vision, Rogers supported that a person learns in a significant way only those things that s/he perceives as relevant to the satisfaction of his/her needs, and for the realization of personal purposes.

This approach clearly advocates a pedagogical approach which is centred on the student, but, it also introduces the knowledge that the teacher, as a professional figure called to continuously educate and update oneself throughout its professional career, is not immune to this kind of reasoning, but, on the contrary, is studied through their perceptions of effectiveness. As we will be able to read in the next paragraph, the teacher's perceptions are studied with the belief that they are able to offer an authentic look on their motivations, and on their belief system, that also guides their didactical practices.

This is done in order to investigate the teachers' practices and the aspects as well, as the teachers' motives, beliefs, confidence, and competence, which cannot be ignored (Olofsson, 2011). When teachers enter their class, they bring along their personal experiences and understanding of the subject they teach (Varisco, 2002; Rocca, 2007a). Beliefs can be meant as a system of knowledge, which would result from the mental construction and re-construction of reality from individual experience and would be able to influence the teacher's perception and action (Mugny, Carugati, 1987). Those beliefs are grounded in the teacher's' personal belief systems, and they represent their psychologically held understandings, premises, or the propositions felt to be true (Richardson, 2003). As beliefs are organized in systems, and they are often not conscious (Albanese, Doudin, Martin, 2003), they are very powerful and resistant to changes (Kagan, 1992; Pajares, 1992; Richardson, 1996).

Even if some research studies have documented the incongruence between teachers' beliefs and practices (Lim, Chan, 2007; Becker, 2000), many studies had confirmed the impact of their beliefs on teaching and learning (Kagan, 1992; Pajares, 1992; Prawat, 2002; Woolley, Benjamin, Woolley, 2004; Moè, Pazzaglia, Friso, 2010; Moè, Pazzaglia, Ronconi, 2010; Preston et al., 2000; Moè, 2011; Richardson, 1996, Ertmer et al., 2012).

However, in teaching and learning, the teachers' educational beliefs are relevant to understand their educational use of computers. Recent studies demonstrated that teachers' beliefs about learning and instruction are a critical indicator for the classroom use of computers (Albirini, 2006; Becker, 2000; Dede, 2000; Ertmer, 2005, Hermans et al., 2008; Olofsson et al., 2011; Tondeur, Hermans, van Braak, Valcke, 2008; Watson, 2006; Mishra, Koehler, 2006).

As reported by Christensen and Knezek (2008, p. 352), researchers have known for decades that IT attitudes and beliefs have powerful influences on their actions. Loyd and Gressard (1986) showed that positive attitudes toward computers are positively correlated with the teachers' experiences. Lillard (1985) found that

knowledge has a positive impact on the teachers' attitudes toward technology. Summers (1990) stated that one of the most common reasons for teachers' negative attitudes toward technology is their lack of knowledge and experience in this area.

More recently, Hermans et al. (2008) specifically investigated the relationship between the teachers' educational beliefs and their computer use, on a sample of 525 primary school teachers from 68 schools in Flanders (B). In this multi-level study, empirical evidence was found, which confirmed the hypothesis that teacher's beliefs about the practice of teaching are a significant determinant in explaining why they adopt computers in the classroom. Similar result was provided by Ertmer et al. (2012), who examined the beliefs and practices of 12 award-winning technology-using teachers. The study aimed to determine the alignment between the teachers' beliefs, as expressed in one-on-one interviews, and their practices, as evidenced on their websites, and which were described during their interviews. The study showed that the teachers' practices can closely align with their beliefs, and how their attitudes and beliefs were not a barrier, but rather, they served as a facilitative factor, providing the passion needed to devote extra time and effort to enact their strong beliefs about good teaching and learning (p. 433). Another confirmation came from a study on geographical education. Demirci (2009) collected data from 79 Turkish geography teachers from high schools, in order to investigate their attitudes towards the use of Geographic Information systems (GIS). The study revealed that although barriers, such as lack of hardware and software existed, the teachers' positive attitudes towards GIS was an important determinant to its successful integration into geography lessons.

Summarizing, the most interesting aspect that emerge from the literature review is the role of the teachers' confidence and attitude towards the use of ICT for the purpose of teaching and learning. This is identified as one of the most resistant barriers to the implementation of ICT in class, as well as one of the most reliable supports provided to its actual use in the classroom.

1.7.1 TPACK. Conceptual framework for ICT use and uptake

To research the teachers' beliefs towards ICT is a complex task. The aim of this section is to introduce the 'Technological Pedagogical Content Knowledge' (TPACK) model, which is one of the most influential 21st Century conceptual developments in the field of technology and teacher's education.

Theorized by Mishra and Koehler (Koehler, Mishra, 2008; Mishra, Koehler, 2006), the TPACK model (formally TPCK) has been developed to help both teachers and researchers think about the knowledge and skills a teacher needs, in order to successfully integrate educational technologies into the classroom.

Mishra and Koehler's model is inspired by the Pedagogical Content Knowledge (PCK) model proposed by Shulman (1986). Shulman's work starts from the analysis of what knowledge the teachers need (content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of the learners, knowledge of educational contexts, and knowledge of educational ends), and define the Pedagogical Content Knowledge to be the distinctive body of knowledge for teaching. "It represent the blending of content and pedagogy into an understanding of how particular topic, problems or issues are organized, represented, and adapted to the diverse interest and abilities of learners, and presented for instructions" (Shulman, 1987, p. 8). The Pedagogical Content Knowledge was the natural result of an addition that was not working out for Shulman. Having knowledge of the subject matter and the general pedagogical strategies, though necessary, was not sufficient for capturing the knowledge of the teachers. Something else was missing, which was able to explain the art of those teachers who know well about the subject and their students, and were able to choose the right strategy for presenting a particular content to a particular set of students. The PCK model is an analytic model that is represented through two merged circles, and it makes evident that the intersection between them is something more than their summation.

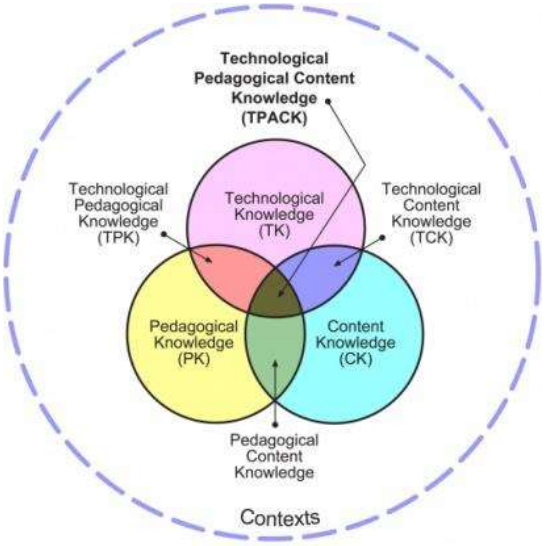


Figure 1 - TPACK model by Mishra and Koehler, 2006)

The TPACK model adds to PCK representation the circle of Technology (*Figure 1*). The intent of the authors is to let the teachers and researchers reflect on the presence of many 'intersections' between different factors. The intuition of having "something more than the sum" remains, but what is stressed upon is also the fact that each knowledge is built on the others, and TPACK can be reached only when all knowledge is obtained. The author notes:

"TPACK is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that student face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones" (Mishra, Koehler, 2006, p. 1029).

The TPACK model stands against the idea of emphasizing upon the teachers' knowledge of the current versions of hardware and software, and the idea that they will be able to incorporate successfully some technology into

their classrooms, only because they use proficient software. Mishra and Koehler believe that the emphasis should be on *what* and *why* more than in the *how* it is done (Mishra, Koehler, 2006).

The TPACK model have been widely used and criticized (Niess, 2011; Webb, Cox, 2004; Graham, 2011; Cox, Graham, 2009; Tondeur et al., 2012). Both the uses and the critics are included in the research work of Voogt et al. (2012) that analysed 55 articles from 2005 to 2011 (44 empirical and 11 theoretical), in order to investigate the theoretical base and the practical uses of TPACK.

On the theoretical base, it clearly appears that different views on Technological Knowledge (TK) lead to different understanding of the model. Therefore, it is essential to define which technologies are included, and what sort of knowledge is addressed in TK (Anderson, Krathwohl, 2001). Mishra and Koehler considered the need for a third knowledge domain, even if Shulman's notion of PCK (1986, 1987) already included the appropriate use of technologies in it. This leads, as highlighted by Graham (2011) and Voogt et al. (2012), to different interpretations of TPCK over time: *"T(PCK) as extended PCK; TPCK as a unique and distinct body of knowledge; and TP(A)CK as the interplay between three domains of knowledge and their intersections and in a specific context"* (Voogt et al., 2012, p. 5).

On the practical base, Voogt and his colleagues found a variety of measures and measurement methods for determining whether TPACK useful as they tend to measure a teacher's self-efficacy but not very well developed for research purposes (Voogt et al. 2012). Between the theoretical base and the practical use of TPACK, the need to apply this model to specific subject domains emerged (Cox, Graham, 2009; Niess, 2011), together with the need to better understand what that knowledge base for specific subject domains is (Voogt et al., 2012, p. 12).

Only a few applications, studies, and critiques of the TPACK model within geographical education exist (Doering, Veletsianos, Scharber, 2007; Doering et al., 2009a; 2009b; Favier, 2011). However, they are disconnected from each other, and do not refer to primary education. Further reflections on the application of the TPACK model to primary geography teaching are discussed later in the course of this dissertation (see Chapter 4).

1.8 European primary schools ICT equipment

Since the European Commission's report on 'ICT and education' (2013) recently found that shortage or inadequacy of equipment across the EU is still today the biggest inhibiting factor (European Commission, 2013, p. 53) this paragraph focus on providing the reader with an update situation on ICT infrastructure in European primary schools. In February 2013, the European Commission published the final report *Survey of Schools: ICT*

in Education. Benchmarking Access, Use and Attitudes to Technology in Europe's Schools' (European Commission, 2013). Based on over 190,000 responses from schools (school heads), classrooms (teachers) and students (at primary, lower secondary and upper secondary level of education) this study is today the most comprehensive and up-to-date study regarding ICT and school in Europe. In the report, almost all the items have differentiated analysis for each level of school. The following paragraphs are based on the data collected within the primary level of education in Europe from the European Commission study 'Survey of School" (European Commission, 2013).

Computers

In Europe, children's access to computers is improving. Notwithstanding, while the EU average ratio is seven students per computer, there are countries where more than 15 children have to share the same computer. Luckily, there are also virtuous countries as Denmark, Norway and Spain having one computer every three students (see Figure 2). The same three countries are also those who count more online laptops than desktops. On average, anyway, primary schools have more desktop computer than laptops (European Commission, 2013, pp. 35-36).

Figure 2 - Students per computer. Grade 4, country and EU level, 2011-2012. (Source: EC, 2013)

An interesting element useful to analyse the role of computer in the schools is the study of the computers' location in the school. The results of the European Commission study (2013) shows how computers, in primary schools, are usually located in computer rooms (Figure 3). This is particularly evident for states like Bulgaria, Slovakia, Italy and Romania. The opposite situation happens in Austria, Malta and Sweden where computers tend to be in classrooms. It is interesting, to this concern, to highlight that students in the northern countries schools often find computers in other spaces from the class, the labs or the library. According to the authors of the study these 'other spaces' may be open resource areas (European Commission, 2013, p. 38).

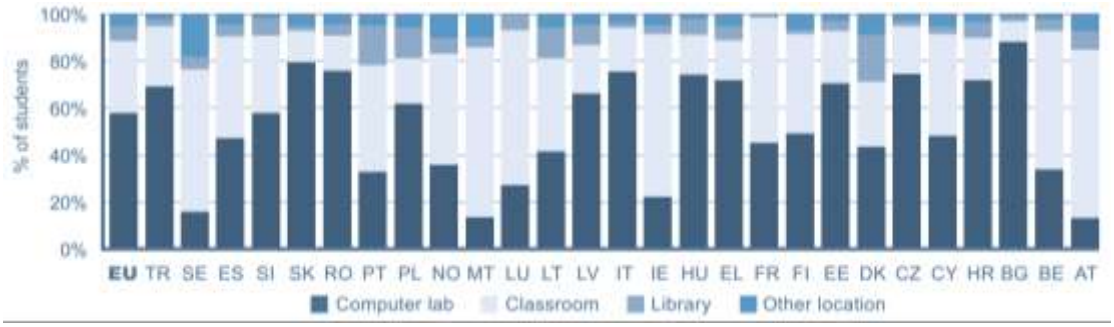


Figure 3 - Location of computers (% of students, grade 4, country and EU level, 2011-12). (Source: EU, 2013)

Another factor investigated by the European Commission is the operationality of the computers. This is very interesting because it allows discussing on computers' quality rather than just focus to the numbers. It is, for example, very common in Italy to find schools with more than 10 computers in their lab where just two or three are properly working. "*At grade 4, on average in the EU, 71% of students are in schools where more than 90% of the equipment is operational*" (European Commission, 2013, p. 39). The most efficient countries in providing operating computers to the students are Belgium, Finland and Sweden. At the bottom of this particular ranking there are Croatia and Slovenia where only "*35% and 40% of grade 4 students are in schools where more than 9 out of 10 computers are fully operational*" (European Commission, 2013, p. 39).

Interactive whiteboards

The study of Interactive whiteboards (IWBs) distribution across primary schools in Europe highlights the contraposition between the forerunners countries that already included IWBs in every school (less than 50 students to each IWB) and those countries where IWBs are not part of the daily teaching environments yet (more than 200 students per IWB) (Figure 4). Not surprisingly, "*interactive whiteboards tend to be located in classrooms; where between 65 and 75 per cent of IWBs are installed*" (European Commission, 2013, p. 40).

Figure 4 - Students per interactive whiteboard. (Grade 4, country and EU level, 2011-12). (Source: EU, 2013).

Data projectors

In European primary schools there are approximately twice as many data projectors than interactive whiteboards (Figure 5). Italy and Romania are the countries where the students have less opportunity to have lessons done through a data projector (one for more than 250 students). The same situation is much common for students from Cyprus and Finland, countries who leads the ranking with one data projector every 19 and 21 students (European Commission, 2013, p. 42).

Figure 5 - Students per data projector. (Grade 4, country and EU level, 2011-12. (Source: EC, 2013)

Students in schools without broadband

A huge limitation for the uptake and use of technology by the teachers is the lack of broadband at school. Primary level is where this issue is more current. The results (see Figure 6) show at grade 4 an EU average of 8% of students attending schools with no broadband. This issue is particularly 'acute' in Italy where 34% of the students are in schools without broadband (European Commission, 2013, p. 46).

Figure 6 - % of students in schools without broadband. (Grade 4, country and EU level, 2011-12). (Source: EC, 2013)

Virtual Learning environment

According to the European Community's study, the presence of Virtual Learning Environments is a very significant indicator of school connectedness (European Commission, 2013, p. 48). For this reason, Norwegian

primary schools with almost all pupils attending schools with a VLE, result very connected (Figure 7). Conversely, pupils in Hungary, France and Greece are substantially unfamiliar with a VLE because only less than 10% of the schools have one (European Commission, 2013, p. 48).

Figure 7 - % of students in schools with a virtual learning environment. (Grade 4, country and EU level, 2011-12). (Source: EC, 2013)

The digitally equipped school

Starting from the analysis of all the indicators investigated by the study "Survey of School: ICT in education" the authors of the study developed the notion of 'digitally equipped school'. This attribute considers schools equipment (in terms of provision and operativity), their connection speed and their connectedness in general. From a further analysis, the authors individuated the following three school profiles:

- *Type 1: Highly digitally equipped schools, characterised by relatively high equipment levels, fast broadband and relatively high connectedness*
- *Type 2: Partially digitally equipped schools, with lower than type 1 equipment levels, slow (less than 10mbps) or no broadband, and some connectedness*
- *Type 3: As type 2 but with no connectedness* (European Commission, 2013, p. 51)

The result of this very interesting combined analysis shows that while Norway results the top country in providing digitally equipped schools to its pupils, are all four Scandinavian countries leading the ranking of 'highest percentage of students attending digitally equipped primary schools' (Figure 8). The first not Scandinavian country is Spain, which follows with more than 70% of students in type 1 schools and only a small part of them (less than 10%) in type 3. To the other and of the ranking there is Poland, the country with the lower number of students in schools of type 1 and with the highest percentage of students attending schools of type 3. Slightly better than Poland but all with less than 10% of students in type 1 schools and more than 10% in type 3 schools there are Turkey, Romania, Italy and Slovakia (European Commission, 2013, pp. 51-52).

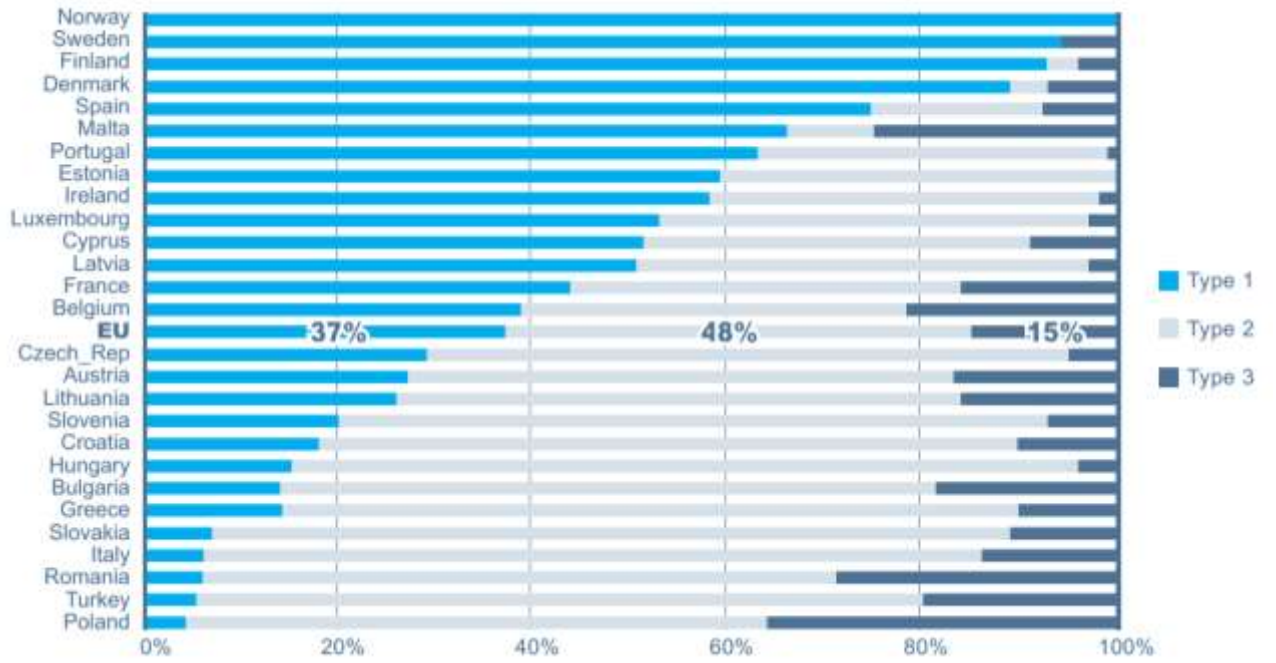


Figure 8 - Percentage of students by school type in terms of equipment *(Grade 4, country and EU level, 2011-12).* (Source: EC, 2013)

2 GEOGRAPHICAL EDUCATION, PRIMARY GEORGAPHY TEACHING AND GEOMEDIA

The first step, before starting to explore the importance of creative and passionate geography education practices, is to define what geography is today and what its contribution to education is.

2.1 What does geography study?

Many researchers posed the question: “What is geography?” but it has never been easy to define the “scientific territory” of the discipline that includes the study of land, space and place. Geographers from different generations gave many definitions, but the broader meaning of geography has always kept evolving with the result that a clear and widely approved definition is still missing. The problem in all likelihood lies in the intrinsic need for definitions to be precise. Geography is an antique science and its ‘spectrum’ keeps on expanding and narrowing depending on many factors (i.e. historical period, country, field of geographical experience, personal understanding). All definitions of geography are influenced by these factors and consequently many of them resulted too specific or too limited/weak to be definitive. Nonetheless, each definition cannot be considered wrong as it preserves its sense, if read under the light of the context within which it was conceived. Definitions might be limited by the time and the approach that inspired them, but certainly cannot be dismissed on the base of their integrity. The concept of geography does in fact evolve together with society and scientific progresses and today, thanks to the opportunities the use of technology provide, is wider than a few years ago.

The only way to define broadly geography leads to wide and inclusive definitions, which at first sight may appear inefficient to describe it precisely. To define geography we should start from the origin of the word *geographia* itself. From the Greek word γεωγραφία, geography literally means "earth description” or "writing or describing the world". From this opening clue many interpretations were given, as for example Tuan’s definition of geography as “study of earth as the home of people" (Tuan, 1977) or Farinelli’s understanding of geography as *“disegno del mondo, discorso sul mondo”* -representation/depiction of the world, discourse on the world (personal translation)- (Farinelli, 2003).

All different definitions of geography seem to look for a balance between what can be seen and what is behind it, the result and the process, the organic and the holistic. The problem in defining geography, therefore, might

be that *"rather than having one central organizing concept, geography has many"* (Holloway, Rice, Valentine, 2003, p. IX).

To define geography is (and will remain) hard and partial. Alastair Bonnett, author of *What Is Geography* (2008), argued that geography is "the world discipline" and therefore it cannot be adequately defined in narrow or specialist terms because geography is *"*both ancient and modern, connecting different types of knowledge rather than compartmentalizing them, vast in its intellectual and empirical reach" (Bonnett, 2012, p. 39). Geography is for Bonnett one of humanity's big ideas (Bonnett, 2008; 2012) and being such, there is not an encompassing definition of it (Singh, 2008, p. 5).

2.2 From geography to education

Even though geography is difficult to be defined precisely because of its' complex and wide concerns, it is possible to agree that geographical knowledge is directly related to the world we live in and therefore to us. Geography is visible and tangible; it is happening right now and all around us. Being aware of what geography is helps realizing how much geography matters and how much geographical understanding is needed today.

When we think about the major challenges in the world, we are probably thinking to issues like:

multicultural societies, globalisation processes, energy and natural resources, citizenship education, participation and e-democracy, sustainable development, global warming, natural hazards, urbanization process, human rights, access to education and information, health, etc.

Each one of these topics have a significant geographical core and express clearly how relevant and actual geography is today. These issues cannot be defined within countries' boundaries or following private interests, but need an overall perspective able to consider different perspectives (cultures, values, interest, etc.) and complex system of relations starting from the same topic. Geography offers a multi-scale and multi-disciplinary approach that guarantees its efficiency. Everything that helps people foresee the importance and the power of such approach, concerning the many relations between the world and us, is improving geographical education.

2.3 Geography's contribution to Education

It was 1992 when the Commission on Geographical Education of the International Geographical Union published the *'International Charter on Geographical Education'* sure that geographical education was

indispensable for the development of responsible and active citizens, and valuable for a lifelong enjoyment and understanding of the world (IGU-CGE, 1992). The document represented the first official affirmation of geographical education importance at planetary level. Its release inspired many national curricula and opened the on-going discussion on the role of geography knowledge as conceptual and methodological tool to face the XXI century challenges (Giorda, Di Palma, 2011).

The International Charter on Geographical Education affirms that the contribution of geography to education is a "*powerful medium for promoting education of individuals and a major contributor to international, multicultural, citizenship, environmental and development education*" (IGU-CGE, 1992).

In the following paragraphs, each dimension is briefly introduced with the aim of providing a closer view to what kind of contribution geography should be able to provide in school today.

2.3.1 Individual education

Regarding the education of individuals, the *International Charter on Geographical Education* suggested that the contribution of education might be to encourage students to explore and develop:

- Knowledge and understanding:

  e.g. locations and places – to understand basic spatial relationships, major natural systems of the Earth – to understand interaction within and between ecosystems; major socio-economic systems of the Earth - to achieve a sense of place, diversity of peoples and societies on Earth - to appreciate the cultural richness of humanity, structure and processes of the regions and countries - as daily action space; and the challenges of, and opportunities for, global interdependence;

- Skills:

  e.g. using verbal, quantitative and symbolic data forms, practicing field work and mapping, interviewing people and applying statistics; using communication, thinking, practical and social skills to explore geographical topics at a range of scales from local to international;

- Attitudes and values:

  e.g. interest in the variety of natural and human characteristics on the surface of the Earth, concern for the quality and planning of the environment and human habitat for future

generations, understanding the significance of attitudes and values in decision making, readiness to use geographical knowledge and skills adequately and; respect for the rights of all people.

(IGU, 1992)

In addition to knowledge and understanding, skills, attitudes and values, the general geographical approach makes a special contribution to education. Geography, by encouraging multi-perspective, systematic and problem solving thinking, offers the tools for the education of autonomous and critical minds that will be able to decide responsibly, plan and deal with different issues (DGfG, 2012, p. 6; MIUR, 2012, p. 46).

2.3.2 International and multicultural education

The international perspective is without a doubt one of the cornerstones of geographical education. Geography, with its attention to the world as one unique complex system of natural and human interactions, offers a significant contribution to the international education. Astronaut Eugene Cernan, the last man who walked on the Moon, said, *"We went to explore the Moon, and in fact discovered the Earth"*. Luca Parmitano, the first Italian astronaut who reached the International Space Station (ISS), in a recent interview confirmed how fascinating is to realize that national borders are not visible from that far. From space, all countries are a continuum without internal or external boarders (Parmitano, 2013) and this is one of the key points from where geographical understanding starts. The consciousness of the presence of human intangible and tangible "structures" (such as boarders, countries, languages, religions, cultures, and so on) have to go together with the awareness that the world is one. Convinced that the world is a dynamic living organism as well as a close system where interdependence is both positive and inevitable, geography investigates on different scales and with different lenses, the way local actions have an impact on a global level and vice versa. Therefore, geography is global and inclusive. Geographical education positively influences international education and mutual intercultural respect, emphasizing similarities instead of differences, relations instead of facts and understanding instead of studying.

International education and multicultural education are often promoted with geography because of their intrinsic affinity. The interest in different cultures and environments has always been important in geographical education because it is within the always new and regenerating relations between people and space that geography arises. This was confirmed in the early sixties when UNESCO, convinced by the importance of geography in education, asked the Commission on Teaching of Geography of the International Geographical Union to prepare a source book with practical advice for teachers on the teaching of geography.

As a result, the UNESCO source book for the teaching of geography was published in December 1961. "*Geography* - is written in the book - *among the subjects taught in school, is by its very essence one of those which can most easily be used to give both children and adults a knowledge of the relations and ties between the people of the world*" (UNESCO, 1961, p. V). Today as in 1961, geographical education offers an international dimension and a global perspective by promoting understanding, tolerance and friendship amongst nations, racial and religious groups (IGU, 1992). It grows awareness of the increasing global interdependence of people and nations, stressing the necessity for international solidarity and cooperation, thus the ability to communicate and mediate with others. Geographical education is therefore able to respond to what Brunelli defines "*a structural demand of modernity*" (Brunelli, 2010, p.106) by enhancing the ability to live in a multicultural environment and by promoting awareness of global citizenship (Oxfam, 1997; Andreotti, 2006).

2.3.3 Citizenship education

Citizenship is something that is intimately connected with geography. Every citizen needs a place to live in and other people to connect with. Citizenship in its core is a matter of place, identity and relationships, which are all typical questions that geography aims to answer.

Strong relations between geography and citizenship education have been shown by many authors (Machon and Walkington, 2000; Lambert and Balderstone, 2000; Lambert and Machon, 2001; Anderson et al., 2008; Gaudelli, Heilman, 2009; Rocca, 2003; 2010; DEA/GA, 2004; AIIG-SGI, 2009; Brunelli, 2009; Cook et al., 2008; Giorda, 2009a; 2009b; De Vecchis, 2009; Schmidt, 2011; Giorda, Puttilli, 2011).

Today citizenship education attracts strong interest from both international and national scales. Internationally a major contribution in this direction came from the United Nations Educational, Scientific and Cultural Organisation (UNESCO) who actively promoted the idea of citizenship education on a global scale through its UN Decade for Human Rights Education (1995 to 2004). At the European level policy makers, educators and teachers took up the international challenge and investigated the significance of promoting active citizenship. Nowadays, this is one of the main objectives of the Strategic Framework for European Cooperation in Education and Training (European Council, 2009a), as well as the main objective of the EU Youth Strategy 2010-2018 (European Council, 2009a) and one of the focal aims of educational systems throughout Europe (European Council, 2001). Social and civic competences have also been included among the eight key competences identified as essential for citizens living in a knowledge society, based on the fact that they *"equip individuals to fully participate in civic life, based on knowledge of social and political concepts and structures and a commitment to active and democratic participation"* (European Council, 2006, paragraph 6). In addition to this, another important document regarding citizenship education is the Charter on Education

for Democratic Citizenship and Human Rights Education of the Council of Europe. The Charter aim is providing every person within their territory with the opportunity of education for democratic citizenship and human rights education (European Council, 2010). Social and civic competences have therefore featured strongly in the field of education in Europe (Eurydice, 2012b), confirming the authentic need for citizenship education today and the tangible possibility of geography contributing to it.

In Europe, thanks to the Comenius Programme, several educational researches and actions have been funded to promote citizenship education at different levels (i.e. mobility, partnership, multilateral projects or networks). One important example is the SPACIT project (http://www.spatialcitizenship.org/). This is a project aimed at providing teachers with the relevant education to support active spatial citizenship in the classroom through a competence model and curriculum for an increased participation in the geoinformation society. The project offered also materials for teachers to teach actively Spatial Citizenship skills and competences to pupils (SPACIT, 2013).

2.3.4 Environmental and development education

Another very important contribution of geography is environmental and development education.

The interest of geography in the environment as theatre and result of both natural and anthropic processes is intrinsic and explicit, as well as rapidly expanding in size and in its increasingly diverse nature. This, together with the growing awareness regarding ecological issues, produced numerous geographical researches on environmental education (EE) (De Vecchis, 2011b).

Improving students awareness on actions' impacts, their ability to evaluate and to operate the necessary changes in order to preserve the natural and cultural heritage, are some of today's fundamental objectives for schools (Pasquinelli d'Allegra, 2011, pp. 43-4). Considering the report commissioned by the Environment Directorate-General of the European Commission (Stokes, Edge, West, 2001), at primary and upper secondary school level the majority of EU Member States include environmental education in the curriculum. Denmark, Finland, Germany, Spain, Sweden and the UK (England) are the countries where the attention to EE in primary education receives most emphasis (Stokes, Edge, West, 2001). Environmental education is also one of the main geographical education research field.

In 1991, environmental and development education, at all levels and for all people, have been defined by the Preparatory Committee for the U.N. Conference on Environment and Development essential in ensuring the sustainable development of the world (IGU-CGE, 1992). Geography teachers and educators have always considered Education for Sustainable Development (ESD) a familiar construct. In 2007, during the UN Decade

of Education for Sustainable Development (UNDESD) 2005-2014, the IGU Commission on Geographical Education met in Lucerne and signed the 'Declaration on Geographical Education for Sustainable Development'. The document proposes "*the paradigm of sustainable development should be integrated into the teaching of Geography at all levels and in all regions of the world*" (Hartwig, Sibylle, Yvonne, 2007).

The Lucerne declaration discussed not only the contribution of geography to ESD, but also the criteria for developing geographical curricula for ESD and the importance of ICT in ESD in Geography. Therefore, the Declaration on Geographical Education for Sustainable Development holds the credits to renew the attention on environmental and development education. Starting from 2007, in fact, many researches within geography confirm the recent grow of geographical contribution to Environmental Education and Education on Sustainable Development (e.g. Tal, 2010; Rocca, Donadelli, Ziliotto, 2012; Rocca, Donadelli, 2012a; Westaway, 2009; Grimwade et al. 2000; Chambers, 1995; Chalkley et al., 2010; Curren 2009; Hicks, 2011; Huckle, 1996; Geographical Association, 2009).

2.4 Teaching and Learning geography

Alfred North Whitehead, in the first decades of 1900, introduced the concept of inert ideas to define those knowledge that students learn but do not use or test or thrown into fresh combinations also in extra-school contexts. "*Education* - write Whitehead - *is the acquisition of the art of the utilization of knowledge, an art very difficult to impart*" (Whitehead, 1924).

In order to move from inert ideas to meaningful knowledge (Ausbel, 1968) each field of knowledge needs some fundamental requirements such as affective-emotional involvement, personal cognitive connection of learning and cooperative knowledge building. According to Pasquinelli d'Allegra (2011) these requirements are valid also in geography where meaningful knowledge is not only that related to local case studies (close to the students' experience) but also one which students can apply to different contexts, at school and in life.

Meaningful learning only happens when students are in the real centre of the learning process. Particular teaching practices as well as technologies have to be implemented when they are useful for learners, enabling them to do something better or to learn more. Geography, in order to be understood, has to be meaningful, it can result or abstract or the most important of all sciences, depending on what the learner understands by geography. Children need real subjects/objects to investigate; they need to enquiry in and out the classroom (Rocca, 2007a). If we leave out direct experience, what left are just crumbs, which in geography means long lists of names and fact (heights, lengths, capitals, rivers, etc…) that usually do not engage the students (Donadelli, Rocca, 2012a). To learn is very different from remember, as it requires understanding. What has

not been understood can be remembered but it definitely cannot be learnt if it has not been understood properly. In geography, probably more than in other disciplines, to connect different types of knowledge is essential. This offers the chance to appreciate geography through different views, to add new and enhanced information, not limiting to register and study changes but also promoting new ones.

Therefore, geography is a living subject, a discipline oriented to the future where curiosity and investigation, reasoning and connecting information are essential to asking and answering questions. These are crucial skills needed in geographical thinking, which should be very familiar actions also for all kind of geographers. In teaching geography asking and answering questions confirm to be very effective (Slater, 1993; Leat, 1998; Roberts, 2003; 2010) probably because, as Kissock and Iyortsuun affirmed, *"effective questioning has greater potential than any other teaching method for stimulating student thinking"* (Kissock, Iyortsuun, 1982, p. ix).

Starting from researches that led to similar considerations (Bradbeer, 1996; King, 2001; Perkins et al., 2001) the use of Enquiry Based Learning (EBL) - also called Inquiry Based Learning (IBL) - became quite popular in geography education and particularly in the UK, in Australia and the USA. EBL and IBL (from now on, EBL) focus on students' engagement and promote learning strategies as for example learning by doing, formulating and answering personal questions, reflecting on experiences and group discussion. EBL supports autonomy, fosters curiosity and reflects a student-centred approach based on learning by doing and on the personal construction of knowledge and being student-centred favours motivation and interest. Watson (2008) in his review study have reported the applicability and utility of these methods in teaching geography. However, EBL's approaches are more demanding and time consuming than classic lectures and require particular efforts in evaluating the outputs of the learning process (Pawson, Fournier et al., 2006).

EBL activities in geography can be distinguished into problem-based learning, small-scale investigations and project work (Pawson, Fournier et al., 2006; Spronken-Smith, 2005). The following paragraphs present a short review of four teaching approaches that are particularly interesting because very simple and effective when applied in primary school geography.

2.4.1 Learning through geography

In his *"Learning through Geography"* (1993) Frances Slater proposed an issues-based, question-driven inquiry method very simple and effective. His point was that geographic questions stimulate students to study any issues from a geographic point of view.

"Where it is?"

This is probably the first geographic question that everybody can think of. Any geographical topic refers to a place and this is likely the starting point of many discussions in geography. But as usually happens in schools, this is only the icebreaker question.

"What is it like?", *"Why is it there?"*, *"What impacts does it have?"*, *"Could it be elsewhere?"*, *"What else is there spatially associated with that phenomenon?"*

These are only some of the numerous geographical question that could be asked in order to enable geographical understanding (for more see Slater, 1982; Neighbour, 1992, Klein, 1995; Leat, 1998). What makes an enquiry specifically 'geographical' anyway is not just what is being investigated and the kinds of questions asked, as shown through Slater' method; but more asking the right question on the right topic. It is important to remember, says Roberts, that both what geographers study and the questions they ask change over time, and *"a list of questions not considering different geographies and perspectives such as how space and place is experienced and represented by different groups of people"* (Roberts, 2006).

2.4.2 Teaching geography as a "multi-" process

Dematteis' lectio magistralis (2008) represents a key contribution to geographical education. Lorena Rocca "translated" them for geography teachers by creating a checklist of dimensions teachers should consider in order to teach geography differently, more adherently to the actual understanding of the discipline (Rocca, 2013). Her work offers a sort of practical guideline for teachers. A list of seven different dimensions to compare with, while setting up their lessons and their approaches to the subject.

The first four dimension allow teachers to compare their approaches with Dematteis understanding of what geography is. These are:

Process – Dematteis consider geography a process. This conception contrasts with the study of what classical geographers assumed as "ethernal things". Geography is an ongoing process that follows human traces and social logics of people on the territory (Turco, 1988). Geography in Dematteis opinion should read territorial processes and human actions through the dimension of "multi-": multi-players, multi-function and multi-scale analysis.

Change - Pupils need to explore and know their territories but they also should be trained to imagine what change they would like to see and how they could contribute to it (Rocca, 2013, p. 24).

People - geography highlights their perceptions and investigate the values they confer to the places. Geography focusing on the people as "social actors" aims to contribute in solving social, economical and political problems (Dematteis, 2008).

Time – crucial in order to understand the evolution of every geographical process is the time. Geography supports an approach of deconstruction and narrations that suggest the vocation of territories and their possible future developments.

Dematteis in his lectio magistralis not only describes what is geography but also mentions how geography should be taught. Rocca summirezed his intuitions in three additional dimensions:

Field analysis – Being in contact with the territory enables an adventurous dimension that touch and engage teachers and learners. Teaching on the field helps to focus on reciprocal relations between man and environment considering both the subjectivity of values and relations, and the historical and natural contingency of the territories.

Participation – Geography is inclusive towards not only the disciplines but also the subjects. The attention given to the reciprocal engagement that lead to changes, from educative attention becomes good practice for the citizens of tomorrow (the students) who will be able to be active in manage their territories.

Representation – Maps, discourses and representations of any kind were in the past assumed as true, real. Today geographical representations are exposed to processes of deconstruction and interpretation and are considered tools useful to understand territorial processes and show the conditions of a possible future (Dematteis, 2008).

In conclusion, teaching geography as a "multi-" process requires attention not only to the contents but also to the methods. The checklist represents a good support for the lesson planning process because it helps teachers to understand and promote geography as a multi-players, multi-functions and multi-scales approach of analysis to the territory.

2.4.3 Thinking through geography

A perfect example of questioning geography in school is offered by "*Thinking through geography*", written by David Leat and nine teachers, closely connected to Newcastle's Department of Education, winner of the prestigious Geographical Association Gold Award in 1998. The book represent one of the finest contemporary examples integrating Dewey's thinking on geography as intimately associated with human activity (Wegner,

2002, p. 78). It provides a practical framework and many teaching strategies that help engaging with the students and encouraging them to question and become independent learners. What can be learned from the experience of Leat's circle of teachers is that in order to be successful all strategies require teachers to practice them (*many of the strategies which better help students often began without theoretical framework*), to take risks in teaching (*when the teacher plays safe and cover content, some of what is good in geography teaching is lost)* and to learn more about students' learning (Leat, 1998). There are no magic formulas to teach geography, no best practices or universal strategy that work with every class and with every student. There are instead flexible teaching strategies, reflexive teaching and learning processes and personalization as key factors able to help teachers to affect student's learning. It is the level of reasoning, enquiry and creative thinking that makes a good geography lesson, as Leat's work confirmed by showing how different levels of use for these strategies, correspond to a different impact on the students. Teaching geography by empowering students' ability to think, connect, critic and explain, as Wegner affirms, is not for those (teacher) "*timid souls at peace with the reification of knowledge legitimized by the proliferation of multiple choice and true/false form of non-thinking*" (Wegner, 2002, p. 83).

2.4.4 Learning through enquiry in geography

Margareth Roberts, who proposed a geographical learning framework defined as *Geography through enquiry*, have given another important contribution to geography teaching strategy.

Roberts's book *Learning Through Enquiry* (2003) is one of the most influential within geographical education in the UK, probably because she offers many examples and guides the reader through a systematic read. The book starts re-defining the meaning of 'geographical enquiry' (understood in many different ways by teachers and educators) as an active process through which learners construct and make connection between knowledge about the world (Roberts, 2003, p. 6).

In her book, Roberts affirms that justifications for the use of 'enquiry' in geographical education, have to be found in the learning theory of social constructivism. Here, in Roberts opinion the role of other people in helping us to make sense of the world is emphasised, the teachers have a crucial role promoting a critical questioning attitude and providing opportunities for students to explore new ideas and information for themselves.

As Margaret Roberts points out, *"the use of questions in a planning framework does not necessarily ensure that what happens in the classroom is enquiry based" (*Martin, 2006a, p. 10). What is necessary is that children make the geographical big questions, their big questions. In order to guide teachers to apply geographical

learning through enquiry, Roberts also offers a framework for learning geography through enquiry in four steps: (a) creating a need to know, (b) using data, (c) making sense of data and (d) reflecting on learning (Figure 9). For each of these aspects the meaning of enquiry contrasts with a transmission approach to teaching. The teacher in a traditional transmission approach decides what the students need to learn, selects what data to use in the lesson, describes, explains, analyses and interprets the data for the students. In addition to this, while debriefing, puts the emphasis on what the teacher had planned rather than what the student has learnt. In contrast, an enquiry approach emphasizes the students' questions and encourages their curiosity, lets them select, analyse, interpret and challenge data. It provides time and opportunity for students to make sense of data for themselves, and in debriefing the teacher's aim is to understand what has gone in the students' minds and to what outcomes this learning led the student (Roberts, 2010, p. 7-8).

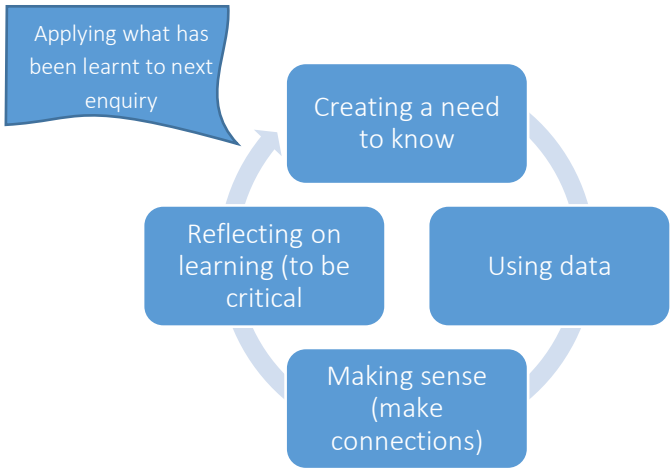


Figure 9 - A framework for learning through enquiry. (Source: Roberts, 2003)

Each step, in Roberts's vision, can be addressed to promote particular skills (reading, writing, speaking and listening, or numeracy) and an important situation where geographical literacy should be promoted.

2.5 The role of emotions in teaching geography

Both teaching and learning are activities in which emotions play a central role, whatever is the discipline (citation needed). A team of Italian psychologists and geographers from the University of Padua, in 2012 investigated this role within primary geography through a study named after the questionnaire they created and employed in the study: GeoINS (Donadelli et al. 2012). This study is based on the studies on geographical education carried out by Lorena Rocca (2007a, 2010a, 2010b, 2012) and the studies on teachers motivation and teachers emotions realized by Angelica Moè and her research team (Moè, 2010; 2011; Moè, Pazzaglia, Friso, 2010; Moè Pazzaglia, Ronconi, 2010). Its aim was twofold: (1) test the hypothesis that want that having

a positive experience studying geography determinates the interest in that discipline and is related with the ability of teaching it; and (2) stimulate a discussion on the numerous teaching strategies and their efficacy within geography (Donadelli et al., 2012).

The first consideration suggested by the results of the study is the confirmation of the importance of emotive-motivational factors in the teaching profession (Donadelli et al., 2012). Be motivated is a necessary condition in order to perform the job at its best (Moè, Pazzaglia, Friso, 2010; Moè, Pazzaglia, Ronconi, 2010).

Another stimulating consideration that emerged from the study concerns the powerful role of emotional and motivational aspects in teaching geography. GeoINS data shows how coming into contact with positive experiences as geography students positively affect those who later decide to become geography teachers. Among its positive aspects is also the influence in the capability to present the discipline through several different strategies and to 'transmit' the interest and the importance the teacher attributes to the discipline. This data is crucial because it confirms that technical competences are not sufficient for good teachers in geography. Continuous professional development needs to consider both emotional and motivational factors because "the way the discipline is perceived (pleasantness, utility) contribute considerably to the quality of its future teaching" (Donadelli et al. 2012, p. 16).

For this reasons, the team of Italian researchers suggests geography teachers to strengthen their perceptions of utility and pleasantness regarding the geographical discipline and to share them with their pupils through the wider range of strategies and tools as possible, including those thought to make the discipline more pleasant, useful and interesting.

2.6 Primary geography

Primary geography is the first step children take towards the geographical understanding of the world they live in. The key elements of a geography curriculum are geographical concepts and skills that are discussed since the first level of education.

2.6.1 Primary geography concepts

Holloway, Rice, and Valentine (2003) define seven key concepts of geography: Space; Time, Place; Scale; Social formations; Physical systems; Landscape and Environment. Their classification represents one of the most fitting definition of actual geography curriculum for primary education in Europe. It includes concepts from

both physical and human geography (which is not divided clearly yet, in primary education) as well as basic geographical concepts (space, time, place, scale) and concepts that open to subjective and interdisciplinary issues (the landscape and the Environment).

Of course, several other classifications include dimensions excluded by Holloway et al. Is this the case, for example, of Leat's definition of the big concepts of geography (1998) that propose eight concepts (Cause and Effect; Classification, Decision-making; Development; Inequality; Location; Planning; and System) and that were adopted as part of the New Labour Key Stage 2 Strategies (Brooks, 2013, p. 79). Other examples are the classifications given by Rocca (2012) named "the five doors of geography" (space, environment, territory, landscape, place) and Taylor's (2008) "organizational" concepts (diversity, change, interaction, perception and representation). Lambert and Morgan (2010) who define concepts as both 'significant ideas' and powerful mechanisms to support and develop geographical understanding support a conceptual approach to geography also. Concepts therefore are lot more than just the contents to be taught. They express the *what*, the *how* and the *why* of the teaching and "*are used by geography educators to support the learning process, by emphasising the subject, pedagogy or the students' experiences (respectively)*" (Brooks, 2013, p. 86).

Geographical concepts for primary geography in particular need not to be too abstract. They need to be useful to the teachers in helping the pupils to explore their environment and making sense of it. Geography, thanks to the abundant direct experience made by the pupils (i.e. traveling for holiday, walking in the city, participating to social movements with their parents), is one of the most familiar subjects for the children because it includes many situations they already experienced (Donadelli, Rocca, 2012a). Primary geography concepts in conclusion contribute to the education of future citizens by offering meaningful knowledge to the children that include contents and strategies. Besides this, in the European curricula for primary education, several concepts emerge.

2.6.2 Primary geography curricula

While for secondary and higher education comprehensive comparative researches on geographical curriculum in Europe are available (Donert, 2007), this is not true for primary school level. The reasons can be found in the fact that at primary level the teaching of geography is combined with other disciplines (in particular history, science or biology). Only in few countries (Italy, UK and Ireland for example), geography is taught in primary school as independent subject from the first year (Catling et al. 2007; Catling, Willy, 2009; De Vecchis, 2011b). Geography plays different roles and receive different space depending on the national curriculum and the understanding of the discipline in each state. It is useful, in this sense, to analyse the names of the disciplines that include geography in the European curricula in order to realize how many difference there are only within

European countries. In her personal web site (http://www.blaseio.de/) Prof. Dr. Beate Blaseio presents a table where for each country there is the name of the disciplines that include the teaching of geographical themes and a link to the national curriculum. The table, which unfortunately is not up to date anymore, shows clearly that in Europe geography is often connected to history, science or social studies.

Rellou and Lambrinos (2008) identify two main approaches to the teaching of geography in European primary, lower and upper schools. The first is based on themes and is present in Denmark, Finland, The Netherlands, Poland, United Kingdom, Portugal and Sweden; the second is based on regional geography and can be found in Belgium, Germany, Check Republic, Greece, Croatia, Cyprus, Malta, Serbia-Montenegro, Romania and Ukraine. There are also, according to the authors, other differences concerning the time schedule, the content and the didactical approach.

A similar study made by Curić, Vuk, Jakovčić (2007) also reports many differences between the geographical curricula in Europe in terms of the name of the subject, its educational goals and contents and the level of its being compulsory. Curić and his colleagues by studying geography curricula from eleven European countries found that "*emphasis is laid on the significance of geography in learning about living space, on the role of geography in basic education, on the importance of its being current, as well as on developing educational values that will enable students to take active roles in the community*" (Curić, Vuk, Jakovčić, 2007, p. 488). They also studied the aims of teaching geography and ended organizing them in three main areas that combine perfectly to what the IGU-CGE defined the contribution of geography to education (IGU, 1992): acquiring knowledge, developing abilities and skills, and developing educational values. This confirms that primary geography is not something else than geography even if we are teaching to children. Its contribution is fundamental to the development of geo-literacy and preparatory to geographical thinking and understanding.

However, if we consider that the aims of geographical education are always in function of the society, is natural that national socio-economical and political situations influence the teaching aims of the discipline (Haubrich, 1982, p. 9).

2.7 Technology for geography and geographical technologies. Introduction of geomedia.

Geography is a dynamic and forward-looking discipline but for many students and teachers is simply boring. With the advent of internet and the spread of online geographic services, however, geography is having the ability to recover the breadth and relevance of its proposal. Mike Parker, author of Map addict (2009) is convinced about it. In April of 2011 Parker gave the opening address of the Annual Conference and Exhibition of the Geographical Association at the University of Guidford (UK) and in his speech he affirmed that geography

“is risking” to come back to the fore in today's society. The digital revolution and the pervasiveness of mobile devices from his point of view has deceived those who thought that the satellite navigation would put further into the geography crisis. On the contrary, in fact, these new possibilities have increased interest around maps, cartography as well as geographical thinking and reasoning.

The Internet today is a wealth of geographical empowered information and thanks to strong impulse generated by social networks and the emerging world of mobile device applications (commonly "App" calls), we all seem to be rediscovering the usefulness of geography. In this perspective, the web is less and less a cyber-space, a digital reality pleasant and intangible, and increasingly a cyber-territory, one intimately connected environment, and continuous dialogue with our daily actions on the world (Donadelli, Rocca, 2012).

Terms like media, technology, ICT, web, literacy and information have been quite used within the field of international geographical education ever since the advent of the Internet. In the last decade it has become easier to find such terms anticipated by the suffix ‘geo‘: geomedia; geo-technology, geo-ICT, geo-information, etc.

The reason why such suffix has become quite popular among geographers at all levels, is linked to the fact that geography matters in a plethora of situations, and most of the information we receive and use contains explicit or implicit geographical references. The suffix ‘*geo’* clearly refers to geography and gives the concept to which is applied a spatial connotation. Its application, in fact, emphasize the geographical dimension of things.

With the term geo-technology or geo-ICT are usually addressed all those digital devices that make use or produce geographical information, as for example computers, digital globes, digital maps, Global Positioning System receiver (GPS) and Geographical Information Systems (GIS). All the data used by these devices, and all information that has a spatial reference, are defined geo-information (pictures, video, GPS traces, measurement data, shape files, etc.). Geomedia refers to the combination of geo-technology and geo-information, merged with the aptitude of digital media to be employed and shared in different contexts and with different purposes. More generically, they are any form of media that incorporates or portrays geographical information (Digital-Earth.eu, 2012).

Among the most familiar geomedia used in geographical education are digital texts, pictures and videos, digital maps and globes, GIS software, GPSs and smartphone/tablet applications. This list encloses some of the most used devices within educational environments, especially in primary education. However, most of the digital devices we use today are geomedia in the sense that they use or produce spatial information. Every time we make a call, we use the credit card or we search on the Internet, we are using and creating geo-information. Every signal sent by mobile devices includes information regarding the position from where the signal was sent. Our communications, no matter how we realize them (voice call, sms, instant messaging, Facebook™

post, tweets…) leave a “trace”. The geographical position of our devices is always “visible” to the mobile company we are connected to. The study of all information linked to our communications on a geographical base (phones calls and messages, Facebook™ conversations, Twitter™ streams of communication) open new horizons for ‘real-time geographies’ (Doering, Veletsianos, 2007; Strobl, 2011).

Geomedia are engaged in geographical education in an indefinite number of different ways, depending on various factors, as for example: lesson aims, time, targeted group, teachers and students skills. Teachers’ uptake and use of geomedia is functional to both the enrichment of the resources used in the lessons and the support in the development of the pupils’ spatial and geographical thinking competences.

The enrichment of the geographical lessons is due to the fact that geomedia, paraphrasing Carletti and Varani (2007, p. 238), allows us to know places too far, expensive or dangerous to be reached; to store, use and share a quantity of data otherwise too difficult to be elaborated; to investigate phenomena too complex and too wide (in time and space) to be studied; and to do all these activity using high quality resources available on-line.

On the other side, the use of geomedia in the lessons can also contribute to engage the students in spatial and geographical thinking processes by making evident processes otherwise invisible, by questioning and asking to investigate on their own. The use of geomedia supports students in becoming protagonist of their learning processes, enabling them to research and access information directly from the source. Working and learning with geomedia however requires competences in handling technology, in using them properly to enhance personal understanding and to reflect on their potentials and their limits (Gryl, 2012). Teachers and students need both technical and methodical competences to handle spatial representations, the competences to communicate with and actively participate in spatial representations, as well as to reflect, evaluate and appraise the use of spatial representations (Kanwischer, Schulze, Gryl, 2012).

2.8 Geomedia analysis

Based on media forms and uses, it is possible to highlight three main categories of geomedia, which are resources, devices and applications. In the next paragraphs each category is presented.

2.8.1 Geo-resources

Geomedia are first of all geographical sources and resources. They use the different languages of geography (Staluppi, 2002; Trimarchi, 2003) which are: digital data, images, pictures, videos, sounds, songs, texts, textbooks, maps and globes, coordinates, digital communications (posts, tweets, timelines, podcasts, wikis, etc…), TV and radio programs.

As we anticipated before, the suffix *'geo'* applies only if the resource offers a spatial reference. This reference can be explicit (coordinates, maps, globes, textbooks, etc.) and/or implicit (pictures, tweets, TV shows, etc.). The easier is to get the spatial reference, the easier is to use of that resource with the students.

Primary school students (but not only them) need to link their learning to their experience; therefore, the integration of geographical resources in class is vital to their geographical learning. Every piece of information, every single data or reference helps to better understand the world.

A short review of the most used media resources in primary school, analysed briefly by their strengths, weaknesses and applications in geography (studies, experiences) will be now presented. In particular the following media are considered: texts, images, maps, audios, videos, data and multimedia narrations.

Texts - Descriptions have always been part of the geographical lessons. Depending on their topics and their quality, texts provide extremely precise information and are essential resources to understand complex processes and to include different points of views. Very easy to produce, share and combine, texts are the most used media in school. On the contrary, children do not love texts because they are not immediate, as they require time and energies to be understood. The risk is that they will not stimulate the children even in topics they like because of the efforts they demand.

Images – There is a strong partnership between images/pictures and geography. The use of pictures and the drawing of maps and models has always been a useful tool in teaching and learning geography. Images use a visual communication language, their message is less structured and evident than written text, but it is more direct and intuitive for children. Pictures, in particular, are very effective and commonly used in geographical education because they complete/support text and offer a different perspective. Picture's fixity can then be considered both a positive and negative aspect. It is positive because it requires students to investigate its subject, to understand what is it and how it works by asking and searching for answers. On the other hand it may be negative as they are often perceived as flat and mute, can not easily take into account time or the subject' perceptions and if they do it might be not explicit.

Maps – Maps and globes are the most used and known geographical media. They are the visual representations of the world that include geographical references in it. There are many types of maps but none of them is a perfect representation of the space. The major issue regarding the value of maps in

education, in fact, is that each map is the result of several approximations, which simplifies a reality too complex to be drawn in a small, two-dimensional support and therefore it is not a neutral tool as too often people and children think. However, maps are essential tools. Their strength lies in the ability to represent complex spatial issues and to make them easy to understand thanks to the use of legends. To draw a map is a complex task that requires not just the knowledge of what is there, but also the positions of each element in relation to the others. Both maps and globes are much more powerful in their digital editions. Intuitive software makes them easy to create or personalize. At the same time, digital technology allows us to embed in the map any sort of media, transforming the map in a visual, dynamic, multimedia, geographical text.

Sounds – Mere sounds are not the type of media that usually are associated to space and location. Geography on the contrary demonstrated to be able to get the most out of sounds as well as images and texts. Sounds can describe close and open spaces, situations and landscape. Audio registrations can report geographical activities evaluations or interviews. Songs can artistically describe people, land and cultures by their sounds, their words and their rhythms. The power of sounds lies in the "empathy" they can offer. Through an audio recording, we can determine not only positions (closer and farther, left and right) but also the emotions of people speaking, the emphasis of situations and their rhythms (different tones, volumes and frequencies). The weakness of sound is linked to the fact that its dimension is not taken into consideration enough and people are more used to see and feel more than listen.

Videos – Videos are somehow the sum of all previous media and as usual, they are worth much more than a simple sum. The right sound, combined with the right situation and the right words can reach a level of co-participation of the user that is hardly comparable with any other media. Their strengths consist in the power they have to motivate by offering a combination of texts/words, pictures and sounds, which make videos the closer media to reality. The "dark side" of videos is that they generally are products of plans and choices and it is not always easy to understand who made them and for which reason. Like pictures, videos are usually not neutral.

Data – Primary geography teachers too often forget that numbers are information as well as text, images or videos (we should not forget that every digital information/resource is made by numbers -bit and bytes-). Data can give clear answers, support theories and promote learning from the environment. In geography it is a powerful media, probably one of the most effective when the data collection and analysis is done directly by the students. Temperatures, positions and measures are only some of the possible results of geographical activities, and their strength depends on how scientific is the method used to collect and interpret the information.

Multimedia narration – One of the most interesting results of Internet usages is the presence of digital multimedia narrations. These are collections of all the media presented above, more or less organized

depending on the nature of the collection. The Web 2.0 'philosophy' contributed to the creation of many personal multimedia narrations, produced by users with Internet tools such as social networks, blogs and wikis. Facebook™ timelines, MySpace™ pages and blogs, for example, can be personal multimedia narrations because they cannot be considered simply the sum of many media as, in this case they are organized by personal criteria. Websites are the most common example of multimedia narration and the more different media they include, the more information they offer. Each narration can ask/answer questions, engage/direct dialogues as well as explain situations or promote further learning through in-depth analyses. The combination of different media offers a wide approach that engages different kind of learners. On the other side, limits of multimedia narrations can be found in the uncertain quality of the information provided, in their dynamicity and in the restrictions of the choice made by who is organizing them.

2.8.2 Geo-devices

Geomedia are also hardware. The term 'Geo-devices' refers to all those digital devices that make possible working with geo-information and geo-resources. Depending on their functions, dimensions, fragility and availability, on the aims of the lessons and on teachers' and students' familiarity with them different devices are used in school to access, modify, research, create and share new geographical resources.

Devices are essential to work with geo-resources, and their availability is considered one of the main limitations to the use and uptake of ICT in schools (European Commission, 2013). However, devices availability is a necessary but not a sufficient condition for an efficient use of geographical resources in class. There is no such thing as the best device for teaching. All hardware offers support but it is the way teachers include and use them in their lessons that makes the difference. This is also the reason why it is not possible to define what lesson is more effective only by looking at the technology through which it is made.

Television – Television is probably the most familiar device for primary school pupils. Its simplicity makes pre-school children able to handle it on their own. Even if the number of channels continues to grow and their technology turned to the digital world (televisions today are able to connect to a wide range of devices, from smart-phone to digital video camera and Wi-Fi connected to the internet), users' options remain circumscribed to basic functions. Given the fact that the television offers shows, movie, cartoons and advertisements designed for young people, it is particularly attractive for children, emotionally more than intellectually. Diffused in most of the primary schools, television is often used to play documentaries, movies or shows from VHSs or DVDs, as part of the teaching process.

Computer – At school three different kinds of computer can usually be found: personal computers, laptops and netbooks. The main differences are the dimension and the functionalities. The first computer to enter school was a personal computer and today it still can be found in class as well as in computer laboratory. Laptops and netbooks are more used in class, being more comfortable to take along and to be used during the lessons. Computers have many strong points, including running infinite software and allowing users to research, share, create, reproduce and edit all kinds of digital media. Among their weaknesses we can list their interface, not very user-friendly for children; their high demand in terms of care, particularly when used by multiple beginner users; and their fast rate of innovation, making a 5 years old device obsolete.

Radio, Portable music players – Radio and portable music players can be used to listen to local and global programs, music and audio registrations, wherever you are. The strength of such devices is their portability and availability. The weaknesses are a very low interaction user-device, the impossibility to run software (usually) and the lack of exclusive functions (almost all devices can reproduce music and play radio today).

Interactive White Boards – The beginning of the digital era in school was marked by the introduction of Interactive White Boards (IWB). Considering the changes made to the teaching practices after its introduction, the IWB can be seen as the most innovative technology in schools today. The possibility to search and surf the Internet and present every kind of media directly in front of the class, engaging them to play with any software with an interactive, children-friendly device is the great opportunity teachers were missing. IWB share the computer control with the class transforming what was individual in collective. Its weakness may be their cost and the common perception that lessons are interactive only if IWB are used in class.

GPSs – Global Positioning System receivers are devices able to provide geographical position and time information anywhere on Earth where there is an unobstructed line of sight to four or more GPS satellites. GPS devices do not need an Internet connection to work, but they need computer software in order to upload and download data. Nowadays, GPS devices are included in all smartphones and tablet. The limitations include the price (especially for tablets and smartphones), and the fact that most of the devices can be used only outdoor (not many schools are taking the students outdoor, even during geography lessons). The use of these various devices in geographical education is associated with fieldwork, measures and data collection. In primary education, it is easier to include the use of GPS in orientation games as for example geocaching (Lo, 2010; Taylor, 2010; Donadelli, 2013b; 2013c).

Tablets and smartphones – This is where progress is revealing itself. All the others hardware we presented (including the IWB) might be soon substituted with tablets and smartphones. Of course, this is not the interest of teachers and educators, but gives an idea of how powerful these technologies are. They are *'handy computers'* equipped with user-friendly touch-screen interfaces and infinite possibilities of personalization. They provide an interactive and intuitive user experience and are becoming ubiquitous (Henning, Vogler,

2013). Soon, every phone will be *'smart'* and probably schools will take advantage of them (Lee, 2012a; 2102b), for their strengths are the variety of functions, the small dimensions and their feasibility in formal, informal and not formal situations. On the other hand, their implementation in class might affect the students' attention and concentration to the lesson, thus making them not so welcome in educational environments.

Wearables – In the last few years, a new category of devices has been created. Thanks to the incorporation of advanced electronic technologies, almost any object can become a "smart" device. Watches and glasses (visors) were the first accessories to welcome the new era of the "Internet of Things" but many others are to come. Concerning their use in school, wearables are not of primary interest yet.

2.8.3 Geo-applications

Geo-applications are specific software or applications that enable teachers and students to work with digital geo-information in one or more geo-devices. They allow geographical contents and processes to be brought in class much faster and easier than before, therefore many geo-applications are already used in school and their number and their potentials is growing constantly. The speed of their evolution however makes it harder for many teachers to follow their ongoing developments. Furthermore, even though Internet offers infinite opportunities, in most of the cases users know and use only a small part of Internet real potentials. It is quite common, for example, to meet teachers that use Google Earth in class only as digital map because they do not know what else the software could serve for in the lesson.

The list of the most useful and interesting geo-applications for primary geography education, including a brief description on their potential can be found in Appendix A. That list is the result of a personal and professional collection of software done through experiences, studies, web sites, social networks and discussions with researches and colleagues. It contains web-based multi-platform applications with a clear geographic essence and others where the geographical dimension is not preponderant, for example all those software that enable to get/search/edit/comment/upload/download/play/analyse/visualize generic information as well as geographical ones.

The selection of geo-applications was driven by their viability in a primary school environment, and took into account the following variables: contents, presence of advertisements, usability of the application, functions, language (English), level of competence needed by the pupils to use it, and quality in terms of affordability, design and maintenance (being up to date). All the geo-applications are then organized in the following "topics" depending on what kind of geo-resources (see Section 2.8.1) they work with:

- Geographical websites (1)

- Images, pictures and visual representations (2)
- Maps and cartography (3)
- Audio and sounds (4)
- Videos, documentaries and graphic models (5)
- Exercises and games (6)

In the following table (Table 3), some of the geo-applications implemented in the research modules of this study are presented. The following list includes geo-applications from each of the six topics presented above and one that work for all of them. The aim of including this short table is to present the methodology used to build the Appendix A, thus, to make it easier for the reader to use and understand it.

Table 3 - Geomedia for primary school teachers and students.

Topic	Name and URL	Brief description *(part of the text might be taken from the Internet)*
1	The Geographical Association Web Site www.geography.org.uk/	The Geographical Association (GA) is a UK-based subject association with the charitable objective of furthering geographical knowledge and understanding through education. They support teachers, students, tutors and academics at all levels of education through journals, publications, training events, projects and by lobbying government about the importance of geography. The GA web site offers many materials for teaching geography at primary level and have a section dedicated to ICT and geography. Registered members of the association have also the opportunity to read online GE journals and access members-only contents. Interesting news on geography education are often reported thanks to the constant update.
2	The Big Picture www.boston.com/bigpicture/	The Big Picture is a photo blog produced by a select group of picture editors of the American newspaper "The Boston Globe". Entries are posted every Monday, Wednesday, and Friday. The Big Picture is intended to highlight high-quality, amazing imagery, with a focus on current events. The majority of the images come from companies such as the Associated Press, Reuters, and Getty Images. Other photos come from public domain sources such as NASA, or from private photographers. Pictures tell a story and have captions to supplement them. They represents a great resource for teachers because of their great actuality and quality. Pictures and caption used in lessons let the children work with real contents.

3	Google Maps www.maps.google.com	Google Maps is a web mapping service application provided by Google that powers many map-based services and maps embedded on third-party websites via the Google Maps API. It offers street maps and a route planner for traveling by foot, car or with public transportation. It also includes a locator for urban businesses in numerous countries around the world. Google Maps satellite images are updated on a regular basis and most of the images are no more than 3 years old. Google Maps provides high-resolution aerial or satellite images for most urban areas of the world. However, all areas of the satellite imagery do not appear in the same resolution. In Google Maps, when authenticated users can personalize and create personal maps that include waypoints, tracks and polygons. Moreover, Google maps can be easily embedded in blogs, web sites and social networks. Teachers can use Google Maps to support their teaching action in several way. Search and edit maps together with obtain satellite images and street pictures are probably their most appreciated features of google maps.
4	Vacaroo http://vocaroo.com/	Vocaroo is a shiny new service for sending voice messages across the interwebs. It allows to record sounds and voices from the microphone storing them in the web site. Vacaroo enables to share and embed sounds and voices in web sites, blogs, social networks and in Google Earth. It is in this particular environment that Vacaroo can help describing place marks (as well as polygons, pictures, etc.) by recording their voices instead of using written texts. This simple and very engaging tool can support maps, pictures and videos. An additional value is that registration is not required.
5	Vimeo https://vimeo.com/	Vimeo is a U.S.-based video-sharing website on which users can upload, share and view videos. Vimeo contains less videos than the much larger Youtube, but has a stronger focus on longer videos such as shorts or movies. Many professional video-makers as well as artists upload their videos in Vimeo and this allow teachers to find great geographical resources for their lesson (i.e. documentaries). It is possible to perform advanced researches upon quality, duration, license and download availability.
6	Geography-map-games www.geography-map-games.com/	Geography Map Games (GMG) is a web site that offers free geographical flash games. The kind of games is mainly the kind of games where the user is asked to point the city/river/province/region/state/capitals in a country or world map. The smooth design of each games makes this web site one of the best of its kind. The same authors made personalized partner web sites for many other languages such as Spanish, German, Italian, Portuguese and Japanese. The main web site however is French. Geography Map Games are an excellent tool for students to practice and for teachers to engage their students. No registration is required to play the games but only registered members can save results and be included in the web site rankings.

1, 2, 3, 4, 5, 6	Google Earth www.google.co.uk/earth/	Google Earth (GE) is a virtual globe, map and geographical information program owned by Google™. It maps the Earth (but not only) by the superimposition of images obtained from satellite imagery, aerial photography and GIS 3D globe. It is available in a free version with limited function and a professional edition to pay, intended for commercial use. Both versions allow in addition to what Google Maps already do, to measure lines, create videos and enable infinite layers on the map. Layers are what makes Google Earth probably the most powerful and rich tool freely available for teachers today. To use this software it is enough to download and install it: the log in is optional. Google Earth allows also importing, visualizing and exporting GPS traces and singular elements of the cartography (place marks, lines, polygons, etc.). With GE it is also possible to save the images we are seeing in our screen. Thanks to its' safe environment it is the ideal application to work with in class. The only advertisings are coming out as result of the researches because of the integration with Google Locals (shops and local activities). This tool with more than one billion downloads and 46 translations is the most widely known geographical software. Thanks to its huge versatility Google Earth suite indiscriminately all the six topics. Texts, images, maps, videos and games in fact can all be found in Google Earth environment.

2.9 Geomedia education

In order to consider and use geo-resources, geo-devices and geo-applications teachers need to be geographically literate and digital enabled. Geographical literacy is a necessary and sufficient condition for teaching geography but is not enough if we consider teaching using geomedia. When digital devices and resources are involved in the lesson, digital literacy becomes also necessary. When we talk about geomedia education, we do not mean only *education to geomedia* and *education with geomedia* but also *education through geomedia* (Galliani, 2002a; 2002b; Messina, 2004)

Importing Galliani's vision (2002a) to geomedia education, we consider that:

> '*Education to geomedia*' refers to a scientific and semiologic paradigm that considers the knowledge of languages and their meanings crucial. This paradigm acknowledge geomedia as objects of the study therefore focus on studying geo-resources in order to increase the knowledge and improve their potentials in teaching.
>
> *'Education with geomedia'* adduces instead to a technological and functional paradigm that considers essential the use of different strategies (devices) in learning and teaching processes. This paradigm sees geomedia as tools for study.

The dichotomy between the two paradigms find solution in the mediate educative communication ("*education through geomedia')* that is at the same time (1) critic knowledge of the geomedial languages, (2) use of technological media in the individual/collaborative learning process and (3) original expressive/artistic form of technological and social communication (Galliani, 2002a, p. 569). Following the transposition of Galliani's intuitions into geomedia education, results that education through geomedia, happen with the implementation of geo-application in the lessons. Such applications require in fact both the knowledge of the language and the strategy of how to use it. Teachers, in fact, may use geographical devices and know geomedia languages but is when they use geo-applications that they are called to merge both their potentialities (see also Shulman, 1986; Koehler, Mishra, 2008; Mishra, Koehler, 2006).

2.10 Limits of geomedia

Geographical media can counts on media potentials and strengths but at the same time share media' fragilities.

Geomedia can serve as great supports to the teaching but they need to be involved in the whole process of learning. As explained in the previous section, it is easy to teach with geomedia or teach geomedia, instead of teaching through geomedia. Geomedia are not the lesson: they help teachers but they cannot substitute them. This was already experienced in education. It was popular the misunderstanding that saw Interactive White Boards magically making the lessons interactive but it did not too long for teachers and policy makers to realize the limits of this vision.

The uncertain quality of many geo-resources and geo-application represent also a limit. Too often teachers believe all they find in Internet is good to use. Data, but also texts and multimedia narrations, are probably the domains where this issue have been discussed the most. For any kind of resource they intend to use in class, teachers should consider the source and its aim in order to promote a critical approach to geomedia and to information by the students. The risk is for the students to believe that information is always ready to be used, when on the opposite, information always have to be collected and discussed before to be used.

Geomedia are powerful. Among their potentials, they can elaborate hundreds of data, collect information and media from all over the world, map topics automatically. These are very useful and flexible features but at the same time, they limit the eager of student and teacher to do it by themselves. It make no much sense to them, in fact, to elaborate, search and do something that can be done faster, easier and sometime even better that how they might do it. Geomedia can do almost all we need to do as geography teacher and student. This is

not a good reason, anyway, for limiting our action to reflection. Teachers and students need to go understand how geomedia works, be aware of their structures, edit or create some of them. This is essential in order to avoid the risk to use geomedia as content instead of technology.

Another limit of geomedia, might be found in their being digital *medium*. It is well known how much primary school students take advantage from direct (not mediated) experience within the learning environment. The use of digital device may impose learners a distance between them and the learning material. If for all those resources hard to reach for many reasons, this is necessary, it is not for all the rest. Geo-devices for their nature stay between the learners and the world. If teachers do not realize this, they risk educating their students to an indirect approach to the world, which is exactly the opposite of what geography aims to.

SECOND PART

3 RESEARCH DESIGN

The presence of ICT in European schools and their growing use in the formal educational system is constantly monitored both by the European Union (through its annual report as for example those done by Eurydice, Eurostat, etc.) and the scientific community (through the studies published in many scientific journals in this field). Despite this widespread and growing interest, a knowledge-gap still need to be closed regarding the study of the uptake and use of digital technologies in schools and in education (Anderson, 2010; Olofsson et al. 2011). At the same way, the study of ICT impact in the teaching and learning of specific subject is growing but has yet to reach a mature development.

In the case of geography teaching, for example, scientific literature shows a strong imbalance between the developments of this research in different levels of education. If Geographic Information Systems (GIS) has attracted the attention of many researchers and practitioners on secondary school level, promoting also a debate on an international scale (e.g. Donert, 2010; Jekel, Koller, Donert, Vogler, 2010; 2011; Jekel, Car, Strobl, Griesebner, 2013). Such convergence has not occurred in primary school and this has contributed to the development of a fragmented research production often limited to experiences or educational projects at national context (e.g. Catling, 2008; Geographical Association, 2000; May, 2000; McGarr, Kearney, 2009; Giorda, 2006, 2014; de Vecchis, Pesaresi, 2011; de Vecchis, Staluppi, 2004; Donadelli, 2013c; Donadelli, Rocca, 2012a; Rocca, 2007a). The reasons for this difference could be explained by the fact that geography as an independent discipline is a reality in European high school but not at primary school grades. Here, geography education takes place as part of different disciplines highlighting a great heterogeneity in the content and objectives (Gerber, 2003; Rellou, Lambrinos, 2004; Lidstone, Williams, 2006).

In order to improve the international debate on the role of ICT in primary geography this research investigated teachers' perceptions of knowledge in using ICT at school. The research, initially has sought to be action and stimulus for a change. However, the main intention was not to evaluate the interventions effectiveness or to compare data from different national contexts. It was rather to investigate the knowledge of teachers related to the use of technologies for geography teaching and to research the strategies to overcome today schools and teachers' barriers.

3.1 Methodological considerations

Olofsson, Lindberg, Fransson and Hauge in their thematic review of research (2011), reviewed 171 peer-reviewed articles concerned with the uptake and use of digital technologies in primary and secondary schools published between the years 2004 and 2010. In their analysis, the authors identified a theme concerning research on teachers, teachers' professional development and teacher education in relation to the uptake and

use of digital technologies in schools. Within the studies classified in this theme by the authors, teachers are seen as key players for the uptake and use of digital technology, coherently with the results of other review studies on the impact of ICT in school (e.g. Balanskat, 2008; Buabeng-Andoh, 2012; Cox et al. 2004; Livingstone, 2012; Webb, Cox, 2004). In all the studies taken into consideration, schoolteachers result primary stakeholders because they participate to all levels of the process, from the policies to the class, from the planning to the evaluation, having also control on the implementation of ICT and geomedia at school. At the same time, aspects like teachers' motivations, beliefs, confidence and competence are also taken into consideration as well as teachers' professional development, which is mentioned as factor that favour the uptake and use of digital technologies in schools by developing teachers' pedagogical skills, ideas, visions and attitudes.

Starting from their review, Oloffson et al. suggested that in order to include different factors such as emotions, mentality, organization, time, equipment, etc., research design should include both large-scale surveys, and small information-rich cases (2011, p. 220). However, the challenge in examining PCK remains to construct an instrument that measures teachers' perceptions of technological, pedagogical and content knowledge (TPACK) in a time -and labour- efficient way. Rohaan, Taconis and Jochems (2009) consider that the best way to achieve this is by constructing a personalized multiple-choice test (p. 331) and by the facts, most of the researchers who have researched teachers' TPACK agree with them (see for example: An, Reigeluth, 2012; Archambault, Crippen, 2009; Graham, Borup, Smith, 2012; Voogt et al., 2012).

With the intent of following the indication of Olofsson' research, the present study was organized provided two main research both qualitative and quantitative as well as small-scale and large-scale surveys.

3.2 Set-up of the study

This dissertation focus specifically on primary teachers' perceptions concerning their use of technology in geographical education. The research is education-centred rather than technology-centred and intents to contribute in the ongoing discussion by presenting a clear image of what are teachers' perceptions about their familiarity in implementing technology to support geographical teaching and primary school students geographical competences in the digital era.

The set-up of the study started from four basic considerations, partly explained in the first part of the dissertation.

First, it is important to remember that educational systems always need some time to implement the innovation that comes from the society. What in society is defined revolution, in education is perceived as evolution because it takes some time in class to find out how something new may contribute to the students'

learning process. The implementation of innovations in school is also slow because teaching and learning processes are both very sensible in terms of change and complexity. As confirmed by many studies now, it is known that the simple embedding of new technologies in class do not effect students' learning (e.g. BECTA, 2002; Cox et al. 2004; Balanskat, 2007, 2010; European Commission, 2007; 2010). However, schools' technological equipment are growing and understanding their role in students' learning process represents today one of the biggest challenges in education.

Second, is useful to consider the many different kind of limitations to the teachers' uptake and use of technology in school. The main two constrains are school equipment and teachers' mentality (An, Reigeluth, 2012; Kopcha, 2012). The first consider the scarcity of devices, resources and spaces in school. The second consists of teachers' systems of beliefs. The examination of both these dimensions is crucial in order to address the topic investigated.

Third, scientific literature shows that in order to investigate primary schoolteachers' use and uptake of geomedia there is the need to consider the role of geography in the national curriculum, the students' perceptions of the discipline and the teachers' emotions and satisfaction in teaching geography (Donadelli et al. 2012; Moè, Rocca, Donadelli, 2014). In addition, knowing the teaching strategies usually employed in geography and the kind of tools that teachers prefer to include in their lessons is significant (Rocca, 2007; 2012).

Fourth, it is important to consider that as reported by Cox et al. (2004) there is evidence to show that using simulations can enhance students' reasoning and decision making also in geography. Furthermore, there is very little evidence of ICT being used or evaluated in primary schools for the teaching of geography and clearly, this is an area of the curriculum where more ICT use and research is needed (p.5).

Fifth and last, is clear that deciding for a qualitative or quantitative methodology might affects the scale of the study. Usually, to quantitative research tool and methods correspond large-scale surveys while qualitative methods are favoured when there are small-scale investigation.

By taking all these points into consideration, it has been decided that in order to address all the research question defined in the introduction of this dissertation it was useful to set-up two research projects that make different use of a similar research tool.

3.3 Design process

Since from its first conceptualization, this research aimed to engage participants in the research process. Action Research and Participatory Action Research are two fundamental methodological references that inspired the design of the research. Evidential reasoning, fact-finding and learning are some key actions enabled by a research method that consider research an action that must be done with people and not on or for people (Whyte, 1991; Chevalier and Buckles, 2008). Within this vision, participants on a small-scale were engaged as members of a community of learners (Lave, Wenger, 1991) and the main result was not set as producing scientific knowledge to be used in real contexts, but instead to produce contextualized knowledge aimed to improve a particular educative practice (i.e. teaching geography using geomedia). The action in this kind of design is therefore crucial because the final aim is to transform the reality and not just collect data from it.

The process of an action research project consists of a number of phases that includes initial reflection, planning, action, observation and reflection. This process, therefore, proceeds in a spiral of steps each of which is composed of a cycle of planning, action, and fact-finding about the result of action (Lewin, 1952, pp. 462-463). The result is a design of the research where the activities of planning, action and reflection represent the basic system of investigation (Rocca, 2010) and where the researcher reflexivity is crucial (Sorzio, 2002). As result of a bigger complexity, in a large-scale research this spiral of steps usually is applied during the pilot phase, when the survey is built together with the help of some respondents, in a small-scale process.

As mentioned above, in order to investigate all aspects identified by the research questions (see the Introduction chapter), the study includes two independent research projects that examine different issues and therefore apply different methods (Sorzio, 2010). The projects even if autonomous, work as two modules of the same research because are linked each other's and their results contribute to the outcomes of the whole research project (Figure 10). Both the research projects aims to investigate teachers' perceptions on their TPACK but while the first project, called Geomedia@School, consist of a large-scale survey and have linear evolution, the second, called Geografi@Scuola, consists of a small-scale investigation and follow a circular evolution, typical of action-research projects. Both type of evolutions, anyway, are structured upon three stages: planning, action and reflection. The same phases are also recursively included in each of the three stage. While the planning phase follow similar criteria, the research actions and the reflection activities are different in two projects because of the different research tool they have implemented.

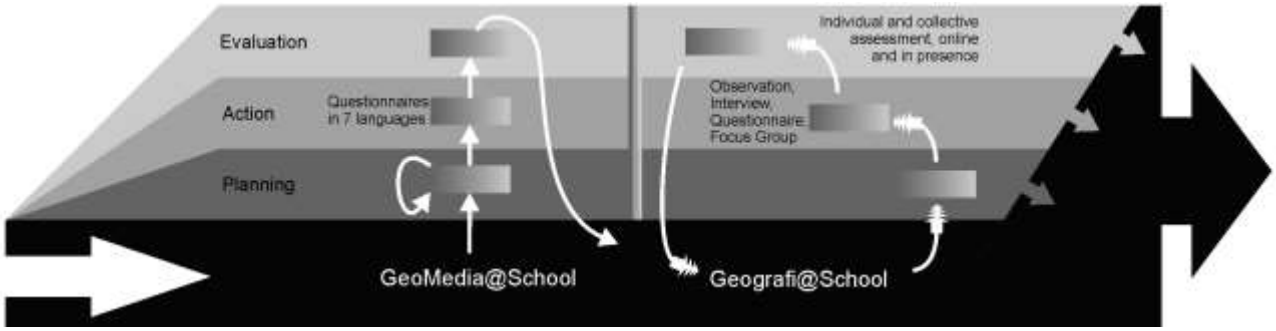


Figure 10 - The research design of the practical part of the dissertation.

Geomedia@School and Geografi@Scuola research projects are reported in the next two chapters. Both chapters the same structure, which consist of five sections: research questions, research context, research method, analysis and results, and discussion. A comprehensive and conclusive discussion of both results is provided in the third and last part of this dissertation.

4 GEOMEDIA@SCHOOL

The research 'Geomedia@School', as its name suggests, draws attention to the use of geomedia within the teaching of geography in Europe's primary schools. In this chapter, the research procedure carried out is presented in detail. First, the research questions are presented (paragraph 4.1) followed by a brief introduction to the research context (par. 4.2). Then the research method and the pilot stage (par. 4.3) are described followed by a presentation and the discussion of the results and their analysis in the last two paragraphs (par. 4.4 and 4.6).

4.1 Research questions

As mentioned in Chapter 3, the Geomedia @ School" research was born with the aim of deepening on a European scale the use of geomedia within the teaching of geography for primary education. Taking into account the existing literature in the field of geographic education for primary school, the limitations related to the use of technology in education and the studies carried out on teachers as key actors in teaching and learning processes, it has been possible to identify four spheres of research.

The first sphere investigates the presence and quality of ICT in the schools and classes of those subjects to whom the research is addressed. As a matter of fact, the literature agrees in defining the presence of ICT in schools as one of the most influential elements to the use of ICT for teaching purposes (Eurydice, 2011; European Commission, 2013; Anderson, 2010). Collecting this information will let us interpret the responses of individual teachers in relation to the equipment they have available.

The second is represented by the personal perceptions and the teacher's motivation towards the teaching of geography. This sphere keeps in consideration the studies on teacher's beliefs, a research field that during the years has consolidated the practice of measuring and describing the personal perceptions of teachers (Shulman, 1986; Koehler, Mishra, 2005). In this context, attention was paid in particular to the studies that tried to organize teachers' perceptions compared to the areas of knowledge suggested by the TPACK model (An, Reigeluth, 2012; Archambault, Crippen, 2009; Doering et al., 2009a; Graham, Borup, Smith, 2012; Koehler, Mishra, 2005; Niess, 2011; Schmidt et al., 2009; Voogt et al., 2012).

The teaching strategies put in place by the teachers during their geography lessons constitute the third sphere of research. This refers in particular, to the observations and research instruments developed by Prof. Lorena Rocca as part of her studies on the relation between the beliefs of teachers, their different teaching styles and didactical instruments used in class (Rocca, 2007a; 2010a; 2010b; 2012; 2013).

The fourth area, finally, is identified as continue professional development. In fact, several studies, as summarized by the UNESCO document edited by Caena (2011), show that promoting teachers continued

professional development is strategic in order to support a deeper awareness regarding the use of ICT in teaching.

From the examination of the related bibliography, the following research questions were formulated:

- What kind of ICT have primary school teachers in their school/class?
- Which are teachers' perceptions of their pedagogical, technological and content knowledge?
- Which strategy primary teachers use for teaching geography?
- Do primary geography teachers include any geomedia in their geography lessons? What kind of geomedia?
- Which form of continued professional development is considered the most useful by primary geography teachers?

The whole research process was subsequently built starting from these questions.

4.2 Research context

Given that researching primary school teachers in all European countries was not affordable, a selection of countries considering few specific criteria was required. In the following list each criteria is briefly presented:

a) The choice of country was limited to the 28 EU member states plus the current candidate states: Albania, Macedonia, Montenegro, Serbia and Turkey (http://ec.europa.eu/enlargement/countries/check-current-status/index_en.htm). This was done in order to have guaranteed access to national data and information through the European dataset

b) National results from the international research on students' performance in reading and science were taken into account to include both countries with mean performance above and below the OECD average. Such information was collected through OCSE PISA test' results (OECD, 2012).

c) Economic and political situations from each country were considered as guarantee for stability of social and working conditions of the teachers involved in the research (e.g. political disorders, civil wars). This information was retrieved from specialized newspapers and journals (e.g. the Economist, the Financial Times, World Politic Review, Limes) as well as from the European Institutions and international bodies deal with these topics (i.e. European Parliament, Council of the European Union, European Commission, European Social Fund, European Economic and Social Committee, Commission for economic and social policy).

d) In light of the relevant influence that national policies have on teachers' motivation in making adequate use of ICT in class (UNESCO, 2015, p. 15), the presence of a national ICT strategy in education was considered an essential condition for the country eligibility.

e) Primary geography educational research was considered in order to include both high and low represented countries within this field of research in Europe. This indicator was obtained by taking into account the provenience of the participants (both researchers and teachers) who attended international conferences and/or meetings promoted in Europe by the following three organizations: International Geographical Union, EUROGEO and Geographical Association.

f) The geographical position of each country in Europe was considered in order to balance geographically the research context.

g) Finally, because of the future support they could have provided, also the presence of researcher's personal and professional contacts in the countries was also took into account.

The combined analysis of all these criteria led to the individuation of a group of seven European countries: Germany, Finland, Italy, Romania, Spain and Turkey (Figure 11). The group shows a very balanced selection according to all the criteria mentioned above. These are states with solid national economies (UK, Germany, Finland) as well as struggling economies (Spain, Italy, Romania) and rapid developing economies (Turkey). Scores in the PISA 2012 were also considered with the particular intention to include countries with a mean performance above (Finland, Germany and United Kingdom) and below (Italy, Spain, Turkey and Romania) the OECD average for the level of students' performance in reading and science (see Table 4). Finally, and more importantly, the different organization of the teaching of geography in European primary schools was also taken into account. Among the selected countries, two have geography as independent discipline (Italy and UK), four include geography in the social areas (Germany, Romania, Spain and Turkey) and one in the area of natural sciences (Finland). With the purpose of offering further understanding of the results obtained by this research, the organization of each school system with regards to the teaching of geography is briefly described in the next paragraphs.

Figure 11 - Map of the countries included in the research project 'Geomedia@School'.

England

Each county of the United Kingdom has its own curriculum. In England, geography is taught from the first year of primary school (5 to 11 years old) as an independent subject. The curriculum for geography (UK Department for Education, 2013) is oriented to develop the pupils' knowledge of the world, the United Kingdom and their locality as well as to enhance their understanding of basic subject-specific vocabulary relating to human and physical geography. There is also a clear focus on specific geographical skills as for example first-hand observation and experimentation (p. 2). Geography is a compulsory subject that well represents a link between the natural sciences and social curricular areas (Curić, Vuk, Jakovčić, 2007, p.475). Thanks to the regular evaluation done on national scale by the United Kingdom's official body for inspecting schools (Ofsted), the state of geography in primary education is well known (Catling, Bowles, Halocha, Martin, Rawlinson, 2002, 2003; Catling, Bowles, Halocha, Martin, Rawlinson, 2007; Catling, Willy, 2009). This, together with the advantage of the language, are the main reasons that contributed to set British geography as example for many countries in Europe and in the World (see for example the Australian case: Catling, 2013; Catling, Willy, Butler, 2013).

Table 4 – Snapshot of performance in reading and science for the seven countries investigated by the survey Geomedia@School.

WHAT STUDENTS KNOW AND CAN DO: STUDENT PERFORMANCE IN READING AND SCIENCE

Countries/economies with a mean performance/share of top performers above the OECD average Countries/economies with a share of low achievers below the OECD average

Countries/economies with a mean performance/share of low achievers/share of top performers not statistically significantly different from the OECD average

Countries/economies with a mean performance/share of top performers below the OECD average Countries/economies with a share of low achievers above the OECD average

	Reading		Science	
	Mean score in PISA 2012	*Annualised change in score points*	*Mean score in PISA 2012*	*Annualised change in score points*
OECD average	496	**0,3**	501	**0,5**
Finland	524	**-1,7**	545	**-3,0**
Germany	508	**1,8**	524	1,4
United Kingdom	499	0,7	514	-0,1
Italy	490	0,5	494	**3,0**
Spain	488	-0,3	496	1,3
Turkey	475	**4,1**	463	**6,4**
Romania	438	1,1	439	**3,4**

Source: OECD, PISA 2012 Database.

Finland

In Finland geographical content is taught in grades 1-4 as part of an integrated group called "Nature and the Environment". ts objective is for pupils to get to know and understand nature and the built environment, themselves and other people, human diversity and health and disease (Finnish National Board of Education, 2004, p. 170). In grades 5 and 6, geography is included within the framework of a course called "Biology and Geography". Here, geography instruction helps pupils to understand phenomena associated with the activity

of human beings and the natural world and must create a foundation for intercultural tolerance and internationalism (p. 176). Both "Nature and the Environment" and "Biology and Geography" are compulsory subjects (Curić, Vuk, Jakovčić, 2007, p. 472).

Germany

In Germany, children aged between 6 and 10 (in 16 federal states) or between 6 and 12 (in the remaining four federal states) attend primary school (Grundschule). Within the first cycle of formal education, geography is taught within an interdisciplinary subject called Sachunterricht (General Science) that combines Environmental, Scientific and Social Education (Kuhn, 2003). General Science receives 2-3 weekly hours of teaching while geography aspects receive approximately the 20% of this time (Hemmer, 2012). In Ingrid Hemmer's words, primary goals of General Sciences are to facilitate pupils in constructing an image of the world, in offering methodological tools for the discovery of the world, and to help them orientate themselves in the world (p. 1). In spite of several differences, themes like map skills, weather, water, forests, local area, foreign places and different life are common themes in all federal states (ibidem).

Italy

Geography in Italy is taught as an independent school subject two hours per week in all the five grades of primary education (involving pupils from 6 to 11 years old). As stated in the latest school curriculum published by the Italian Ministry for Education, University and Research (MIUR, 2012), geography is considered a "hinge" discipline because it is able to connect knowledge from different disciplinary areas. Specifically, it contributes to build the pupils' autonomy and critical thinking thanks to its many relations with history and social sciences as well as with scientific and technical disciplines (MIUR, 2012, p. 46).

Romania

Geography in Romanian primary schools (compulsory for pupils from 7 to 11 years old) is a jointed discipline with history. It is compulsory and receives two hours per week for the first 5 years of compulsory education (Romanian Ministry of Education and Research, 2001). Geographical knowledge, as stated in the National curriculum for Geography (Romanian Ministry of Education and Research, 2005, p. 2) guides the pupils in shaping an objective image of temporal and spatial relationships that characterize their reality. The geography curriculum also ensures a gradual shift from a local perspective to a national and global one, supporting the understanding of geographical transcalarity (Romanian Ministry of Education and Research, 2005).

Spain

At the primary school level (6-12 years old) in Spain the teaching of geography is combined with science and history in a discipline named "Social Sciences". Its aim is to study the people through an approach enriched by geographical, sociological, economical and historical understanding (Ministerio de Educación, Cultura y

Deporte Espanol, 2014, p. 19372). The Social Science curriculum is organized in four blocks (themes) and those in which geographical knowledge and skills are explicitly involved are named “the world where we live” and “to live in society”. Geographical training, in specific, is devoted to a general learning of space realities, with specific reference to Spain and Europe (Valenzuela, Mollá, De Lázaro, 2004, p. 4).

Turkey

The national curriculum of Turkey was reformed in 2005 with the aim of changing the curriculum from a subject centered to a learner centered one (Artvinli, 2010a, p. 115). Geographical topics are included within the curriculum called “Life Studies” which can be seen in the 1st, 2nd and 3rd grades of primary school (pupils from 7 to 9 years old). Life Studies lessons essentially provide the basic steps to be in harmony with the environment and to become a good citizen (Aladag, Aladag, 2009, p.2). The main aim of these lessons is to help the students to gain basic life skills and to introduce those concepts that will serve as a basis for the curriculum of social studies and science that starts from the 4th grade. In order to reach such aim and to help the students to take into consideration the entire world, the curriculum of “Life Studies” makes use of a thematic approach and specifically uses three themes, which are: “My school excitement”, “My perfect home” and “Yesterday, Today, Tomorrow” (MEB, 2009). These themes can be converted to lots of disciplines and Geography is one of them (Aladag, Aladag, 2009, p. 3). Concerning the role of teachers it is interesting to note that a research, conducted 5 years after the adoption of the new curriculum, indicates that teaching styles of geography teachers are still teacher-centered and passive (Artvinli, 2010b).

4.3 Research method

Any research in education faces complex environments because related to a combination of personal values, professional skills and external variables (for example the social and personal conditions of life and work). In addition to all these, the ‘Geomedia@School’ research had to take into account all factors that connote international research as for example language, culture and national policies.

The questionnaire was the research instrument offering the most guarantees in terms of effectiveness and sustainability to carry out this investigation. What lead to the choosing of it as research method are the following characteristics:

- The capacity of gathering and managing great quantities of data;
- The ability to be spread in a capillary manner, thanks to the telematic and autonomous compilation;
- The opportunity to overcome the language barrier (of both the researcher and the respondents) thanks to the translations carried out by experts in the investigated fields;
- The fact that this choice was already widely used in the literature (An, Reigeluth, 2012; Graham, Borup, Smith, 2012; Schmidt et al. 2009; Voogt et al., 2012).

The construction of a questionnaire, as suggested by Felisatti and Mazzucco (2013), requires specific steps. In the following sub-paragraphs, the main steps are presented according to the authors: the choice of the administration modality (par. 1.3.1), the structuring of the questionnaire (par. 1.3.2) and the pilot phase of testing (par 1.3.3). Ultimately, the complete description (section 1.3.4) and the administration modality of the questionnaire (section 1.3.5) are provided.

4.3.1 Research administration and management system

Conducting surveys, as in all forms of data collection, requires making compromises (Fricker, 2008). In this case, it was impossible to reach all primary school teachers in the seven countries taken into consideration, and was not possible to operate a probability-based sampling because it would have been too demanding for the researcher to obtain a representative sample of the primary school teachers universe. The research has therefore adopted a non-probability sample, leaving to each individual the choice to participate or not.

The survey was administered online and since the research method does not define a statistically relevant sample, its analysis and results cannot be generalized to fit bigger populations or being compared to other groups of participants (Felisatti, Mazzucco, 2013; Fricker, 2008). Therefore, attention to oversimplification and comparisons should be paid in the analysis.

The need of researching in seven countries with seven different language and specific differences in each school systems represented a difficult task. The choice regarding which online platform to use was therefore very important. Nowadays many platforms allow the creation, organization, administration and analysis of online surveys.

Initially, a draft of the survey was created as a Module in Google Documents (today renamed Google Drive). However, the limits of this easy and free software (the registration is required) came soon to be evident. First, the number of question types available was limited to 6. Secondly, its level of personalization was inadequate and did not allow addressing all the necessities of a multi-language survey as 'Geomedia@School' needed to be. Additional limits were also the poor graphic (only few professional themes from which to choose), the energy-demanding process of creation of the survey (copy and paste not allowed in all elements) and the impossibility to manage freely its administration (as for example to allow anonymous answers or the possibility to save and continue filling the survey later).

Once Google Module revealed all its limits in offering support in professional surveys administration, the attention was directed to four others applications:

- SurveyMonkey (http://www.surveymonkey.com/)
- LimeSurvey (http://www.limesurvey.org/)
- Moodle (https://moodle.org/)
- Ilias (http://www.ilias.de/).

All these applications offer great services for online survey administration. While SurveyMonkey and LimeSurvey are platform developed and dedicated mainly to the management of online surveys, Moodle and Ilias are both web-based learning management systems.

Moodle and Ilias platforms were tested. They offered very similar features but compared to online survey specialized platforms both resulted not competitive enough. Strong deficit were noticed in their management surveys tools, graphic options, system simplicity (backhand and user-friendliness), in the possibility of sharing and embedding surveys in other websites and direct exportation of results to SPSS (quantitative analysis software).

The choice was then restricted to SurveyMonkey and LimeSurvey. The first is a registered company, which offers its high professional services under payment. Basic users can use the system with some strong limitations: only 10 questions and 100 answers were allowed for each survey. The second is a free and open source on-line survey application distributed under the GNU General Public License. This enables the user to do everything without limitations and to receive free support from a rich and dedicated support forum. In addition, LimeSurvey offered almost unlimited features (see Table 5), factor that, contributed to the final decision of using LimeSurvey.

Table 5 - LimeSurvey features. (Source: http://www.limesurvey.org/en/about-limesurvey/features)

• Unlimited number of surveys at the same time • Unlimited number of questions in a survey • Unlimited number of participants to a survey • Multi-lingual surveys • Supporting more than 50 different languages (frontend and backend) • User-management • 28 different question types • WYSIWYG HTML editor • Integration of pictures and movies into a survey • Option for participants to buffer answers to continue survey at a later time • Conditions for questions depending on earlier answers (Skip Logic / Branching) • Re-usable editable answer sets • Anonymous and Not-Anonymous survey	• Open and closed group of participant surveys • Optional public registration for surveys • Extended and user-friendly administration interface • Creation of a printable survey version • A detailed manual is available in several languages in our Online Manual • Assessment surveys • Back-office data entry possibility • Survey expiry dates for automation • Screen Reader Accessiblity • Basic statistical and graphical analysis with export facility • Enhanced import and export functions to text, CSV, PDF, SPSS, R, queXML and MS Excel format • W3C compliance • Template editor for creating your own page layout

Once the survey platform had been defined and the survey translated to the different languages (read more in Section 6.3.3), each version of the survey was published online (Figure 12). In order to facilitate the diffusion of the surveys, personalized short URLs were created for each survey (Table 6). This was made possible thanks to the free services offered by the website Shorturl.com (http://www.shorturl.com).

Table 6 - Personalized URLs for each country.

Country	Redirecting URL
United Kingdom	www.geouk.shorturl.com
Finland	www.geofi.shorturl.com
Germany	www.geode.shorturl.com
Italy	www.geoit.shorturl.com
Romania	www.georo.shorturl.com
Spain	www.geoes.shorturl.com
Turkey	www.geotu.shorturl.com

Figure 12 - Welcome page of the English version of 'Geomedia@School' (Source: www.geouk.shorturl.com).

Thanks to the support of both international and national associations of geography teachers, and thanks to the collaboration of many individuals (university professors, geography experts, geography teachers, educators, personal friends, etc.) the survey was sponsored in all the countries involved in the research. Where possible, national, regional and local mailing list of primary school teachers had been used to publicize the survey. The two most responsive networks were found in Finland and in Italy. In Finland, Prof. Dr. Sirpa Tani (Helsinki University) shared the questionnaire through a voluntary mailing list called "luma-luokanopet" which is signed by approximately 2000 Finnish primary school teachers interested in teaching science subjects (including also geography). In Italy, the questionnaire was shared with almost 500 primary geography teachers thanks to the network of the Italian Association of Geography Teachers.

The survey was available online from March to June 2013.

4.3.2 Survey's structure

The 'Geomedia@School' survey consists in a questionnaire aimed to investigate four areas of interest: the presence and quality of ICT in primary schools, teachers perceptions' on TPACK, geography teaching strategies used in class, and the type of support teachers consider the most useful for their professional development (see paragraph 1.1). These areas and the research questions the survey wanted to answer were considered as base for the construction process of the survey. During the process, the order through which the areas were investigated was slightly modified, leading also to the inclusion in the survey of a fifth area of interest (personal and professional information), which worked as complementary to the four ones already set.

The final survey was therefore organized in five different parts.

The first part was conceived for collecting demographic and professional information from the respondents including basic personal information, information on their education background and information about their job experience. In this section, specific attention was directed to technology-related information (presence in their study curricula, their teaching experience, their geography teaching experience) and to the actual age of the students to which teachers are teaching geography. This part intended to take into account all personal factors that could influence teachers' uptake and use in class, specifically those highlighted in the studies of Cox et al. (1999), European Schoolnet (2006), Hermans et al. (2008), and Buabeng-Andoh (2012).

The second part was built in order to investigate the beliefs of primary geography teachers on their pedagogical, technological and content knowledge. This was mainly inspired by the research in the fields of teachers' Technological Pedagogical Content Knowledge and teachers' self-efficacy. The research of teachers' TPACK is a field of study that is growing on international scale (Cox, Graham, 2009). Among the many research concerning TPACK, those that showed particular affinity with the case of 'Geomedia@School' were taken into particular consideration for the formulation of the items of this second setion and for the elaboration of the results. Affinity was considered specifically in terms of methodology (An, Reigeluth, 2012; Archambault, Crippen, 2009; Doering et al., 2009a; Graham, Borup, Smith, 2012; Koehler, Mishra, 2005; Niess, 2011; Schmidt et al., 2009; Voogt et al., 2012) and scientific content (Doering et al., 2009b; Doering et al., 2014; Favier, 2011; Graham, et al., 2009; Niess, 2005). While the affinity in the content was considered mainly for the definition of the items, the affinity in methodology offered a solid support in terms of data collection and methods of analysis. In the literature, it is common to measure teachers' TPACK with a questionnaire where different items relate to only one specific TPACK domain. The measure of each TPACK domain is the mean of all the values given to the items related to that specific domain. For domains that combine two or more basic domains (i.e. TK, PK, CK), the value is measured taking into account also the value of the basic domain involved (e.g. teachers' PCK is the average value calculated on all the items specifically related to PCK). The other field of

research that has directly influenced the construction of this second part of the survey refers to teachers' self-efficacy as originally explored by Albert Bandura (1977, 1997). Particular interest was given to the research method developed by Angelica Moè and her team of phsycologists (Moè, Pazzaglia, Friso, 2010). In order to investigates emotions in teaching, work satisfaction, teaching praxis, teaching strategies, teaching self-efficacy and improvement, they created MESI, a metacognitive questionnaire for teachers that represents a tool for promoting their self-engagement with the profession (Moè, 2011). This questionnaire has a very simple structure consisting of six arrays of items, all assessed through a five-level Likert scale. By answering to all items and comparing their personal results with a provided range of normality, teachers could self-assess their own perceptions on four main categories: motivation, emotions, strategies and teaching. Another research that has influenced the second part of the survey is named Geo-INS, based on the MESI's methodology but specifically created for primary geography schoolteachers. Developed by a mixed team of geographers and phycologists, Geo-INS aimed to investigate the relationship between teachers' personal experiences in studying geography as students and their teaching praxis as geography teachers (Donadelli et al., 2012). Both MESI and Geo-INS tools have served as positive examples for the investigation of teachers' beliefs and the definition of the items to include in the second part of the survey.

The third part of the survey was oriented at exploring which strategies teachers employ in their geography lessons by asking them to express how often they used which teaching strategy and praxis while teaching geography. The main reference for the construction process of this part is Rocca's research (2007; 2012). In her work she reflected on the importance of considering both the teachers' perceptions on the subject and their teaching praxis used in class. To do so, she built a questionnaire where teachers could assess how often they used a specific teaching strategy. Several of the strategies listed in the third part of 'Geomedia@School' were taken from Rocca's research, while others were defined on the base of specific teaching strategies in geography.

The fourth part intended to explore how teachers personally value the different types of support they might receive from the use of ICT in geography teaching. The list was defined by comparing international studies on continue professional development (e.g. Hustler et al. 2003; OECD, 2009c; Caena, 2011) and by taking into consideration the former experience developed in this area by the Italian Association of Geography Teachers (www.aiig.it) and the Geographical Association (http://www.geography.org.uk/).

Finally, the fifth section was dedicated to the teachers' schools equipment. This information was deemed necessary in order to provide generic information on the presence of ICT and their reliability in respondents' schools. Many institutional surveys and academic researches have been focused on investigating school equipment at national and international scale. In particular, some items of the developed survey were directly

taken by some of the most reliable surveys investigating school-technology relationship (e.g. Cavalli, Argentin, 2010; Eurydice, 2011; 2012; 2013; European Commission, 2013).

4.3.3 Pilot stage

The construction process took over three months of consultations, negotiations and editing. During this time, the questionnaire draft was discussed with school teachers, researchers and university professors in both Germany and Italy. Once a final draft was defined, a pilot stage was launched.

The pilot stage began in Germany, in November 2012. The questionnaire draft was administered online to a group of eight people (3 males, 5 females). Participants were all affiliated to the University of Cologne: two of them were geography undergraduate students, three were doctoral students in geography related topics, two were lecturers and one a professor. In order to collect suggestions and notes by the respondents, the pilot survey included a particular form allowing for comments. The different competences and various backgrounds of the participants were helpful in spotting different critical points in the pilot questionnaire. All participants who provided interesting comments (as well as unclear answers) were later contacted by telephone and asked to further explain their understanding of the questions and their answers. The comments gathered from this first small group of participant suggested the need to review the formulation of few items and highlighted the incoherence of some others. However, because of the respondent's general lack of experience in both teaching and primary geography teaching (Table 7), the data collected was not considered reliable for assessing the second part of the questionnaire.

Table 7 – Gender, age and teaching experience of pre-tests' respondents.

	ID	Gender	Age	Years of teaching	Years of geography teaching
Germany	DE_1	M	31 - 40	5	5
	DE_2	F	31 - 40	0	0
	DE_3	F	< 30	1,5	0,5
	DE_4	M	31 - 40	6	6
	DE_5	M	31 - 40	2	0
	DE_6	F	< 30	0	0
	DE_7	F	< 30	0	0
	DE_8	F	< 30	0,5	0,5
Italy	IT_1	M	41 - 50	4	4
	IT_2	F	41 - 50	8	8
	IT_3	M	41 - 50	10	2
	IT_4	M	41 - 50	15	4
	IT_5	M	31 - 40	5	5
	IT_6	M	31 - 40	7	2
	IT_7	M	41 - 50	3	3
	IT_8	F	31 - 40	4	1,5
	IT_9	F	< 31	4	4

	IT_10	M	< 31	1	1
	IT_11	F	31 - 40	6	2
	IT_12	F	31 - 40	6	6
	IT_13	F	< 31	3	3

In order to fill this experience gap and to test the survey with people from a different cultural background, a second pilot administration was undertaken in December 2012. Thanks to the connections provided by the Italian Association of Geography Teachers, the survey was emailed to several primary schools teachers in Italy targeting those with solid professional experience in teaching geography at school. Thirteen primary school teachers (all females) filled the questionnaire but no relevant comments on the questionnaire were collected. Notwithstanding, the analysis of the answers given in the second part of the questionnaire resulted very interesting. They highlighted an issue that led to the exclusion of the items number 13, 14, 15 and 23 from the assessment of the TPACK domains (see Table 8) as they resulted to be linked specifically to beliefs and attitudes more than knowledge on one of the TPACK domains. However, since those items were providing some interesting information it was decided to keep them in the questionnaire to allow future analysis based on their individual values. The pilot administrations of the questionnaire in Italy provided evidence indicating the second part of the questionnaire as it is most delicate.

The perceptions on average less positive relate mainly to the use of geographical technologies (TCK) and the use of technologies for the teaching of geography (TPACK), as it can be seen in Table 8. The levels of increased perception of effectiveness were instead registered as part of the knowledge related to teaching (PK), geography (CK) and the teaching of geography (PCK). Slightly positive were also the dimensions of both education with technology (TPK) and technological (TK), where the highest standard deviation is registered (S = 0.56). Six of the thirteen participating teachers (IT_6; IT_7; IT_9; IT_10; IT_11; IT_12) perceive its effectiveness in TPACK as significantly lower (below 0.10) to that shown in the context of TK. These figures give the idea that these teachers had more confidence in the personal and generic use of ICT rather than in its use when specifically directed to the teaching of geography. This is in line with the expectations of the researcher, as it is more consistent to think that a generic and personal use is an important prerequisite for applying the same technology in a more specific context, such as that of the teaching of geography. It is therefore interesting to note that, of the remaining seven teachers, four did not reveal significant differences in efficacy and three even perceived this situation upside down, recording stronger knowledge and confidence in the geographical education compared to the generic one (IT_2; IT_3; IT_4). From these results it was assumed that the profiles of the interviewed teachers could be divided into three categories: a group with a perception of effectiveness towards TK significantly greater than for TPACK (pedagogical or content affected); a group characterized by a low perception of effectiveness towards TK and greater for TPACK (pedagogical or content

supported); and finally a group with no particular differences in their own perceptions of effectiveness (balanced).

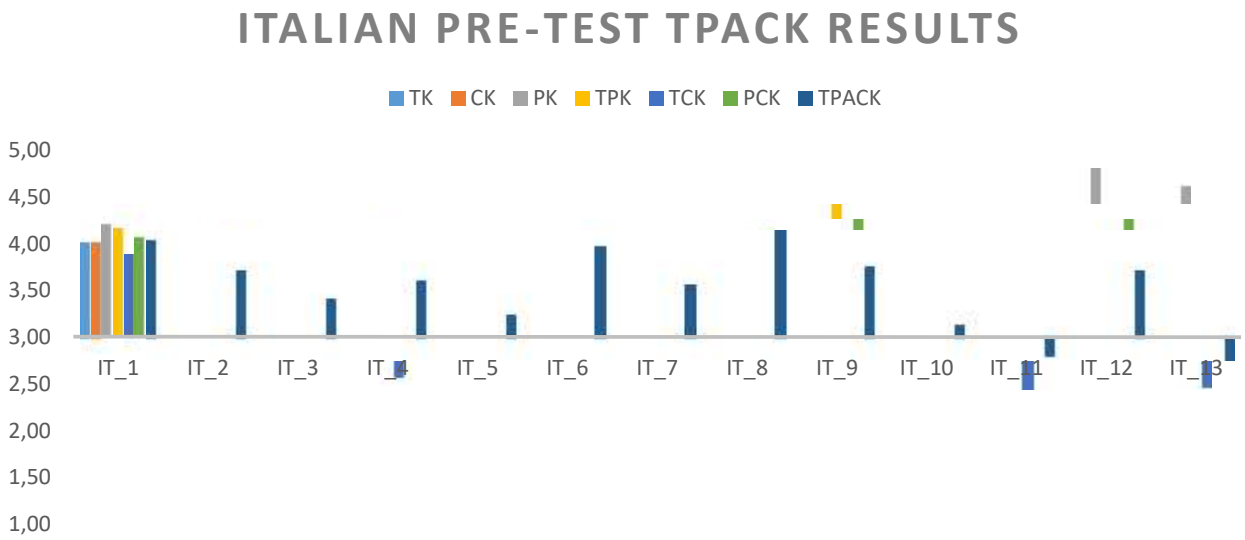


Figure 13 - Italian pre-test TPACK results.

Table 8 – Descriptive statistics for the Italian pre-test group.

	TK	CK	PK	TPK	TCK	PCK	TPACK
N	13	13	13	13	13	13	13
Mean	3,72	3,91	3,98	3,85	3,20	3,90	3,52
St. Dev.	0,56	0,41	0,42	0,36	0,52	0,31	0,44

4.3.4 Survey description

The survey used in this research consists in a questionnaire divided into five parts. Each part is described in the following paragraphs.

The first part aims at collecting teachers' personal and professional information. It consist of eleven questions divided into three sub-parts. The first refers to basic personal information, the second investigates teachers' educational background and the third explores their past and present experience in teaching. The items are listed in Table 9.

Table 9 – Items of the survey's first part.

	ID	Item	Type of question	Options	Required
Basic information	1	Country	Open		*
	2	Postal Code	Open		
	3	Gender	Closed	Male Female	*
	4	Age	Closed	< 31 31 – 40 41 – 50 > 50	*
Educational background	5	Was your training	Closed	Depends by the Country	*
	6	Which subjects received most teaching time?	Closed	Depends by the Country *Multiple answers allowed*	*
	7	Did Technology receive teaching time?	Closed	Yes No	
Professional experience	8	How many years have you taught in school?	Open		*
	9	How many years have you taught geography in school?	Open		*
	10	To which age are you teaching geography this year?	Closed	4, 5, 6, 7, 8, 9, 10, 11, 12, None, Other: _____	*
	11	The school where you work is...	Closed	in a city/town with less than 100.000 inhabitants, in a city/town with 100.000 inhabitants or more	*

The second part of the survey investigates teachers' self-efficacy beliefs in the domain of technological, pedagogical and geographical content knowledge (TPACK). Forty self-efficacy items were included in the questionnaire (see Table 10). Each item was initially referred to a specific TPACK domain (TK, PK, CK, TPK, PCK, TCK, TPACK). The composition of each TPACK domain is summarized in Table 11. According to the literature introduced in the paragraph 4.3.2 (Survey's structure), the measures were scored using a 5 point Likert scale ranging from 1= Strongly disagree to 5= Strongly agree.

Table 10 - Survey's second part. Self-efficacy items and their affiliation domain.

	Teaching style and skills
1	I can adapt my teaching style to different learners.
2	I can assess student learning in multiple ways.
3	I know how to organize and maintain classroom management.
4	I can use a wide range of teaching approaches in a classroom setting.
5	I want to improve my teaching skills
6	I believe that nowadays the introduction of multimedia technologies into teaching is a requirement for up-to-date teaching.
7	I believe I don’t need technologies to make a good lesson.
8	I believe that the introduction into the teaching of multimedia technologies is a valuable support for the teacher's work.
9	I can use technologies to improve the presentation of information to learners.
10	I can use technologies to engage students in learning.
11	I can help others to use technologies for teaching.
12	I can use technologies to engage students in learning geography.
13	I think geography is important in school.
14	I think geography requires memory.
15	I think geography requires reasoning skills.
16	I can select effective teaching approaches to guide student thinking and learning geography.
17	I feel confident in teaching geography.
18	I have sufficient knowledge about geography.
19	I know various ways and strategies of developing my geographical understanding.
20	I can use a geographical way of thinking.
21	I think geography is useful in real life.
22	I want to improve my geographical competence
23	I believe that the introduction into the geography teaching of multimedia technologies is a valuable support for the teacher's work.
24	I feel confident in using every kind of technology.
25	I can search the web to find current information on a topic that I need.
26	I can create a presentation using PowerPoint or a similar program.
27	I can create a document with text and graphics in a word processing program.
28	I can learn how to use a new program on my own.
29	I can solve my own technical problems.
30	I can edit a digital photograph.
31	I can use Web 2.0 technologies (e.g., blogs, social networking, podcasts, etc.).
32	I feel confident in using digital maps (e.g. Bing, Yahoo or Google maps).
33	I know how to use digital globes (e.g. Google Earth).
34	I know about technologies that can be used in outdoor geography.
35	I know where to look for new/additional digital/technological resources on geography.
36	I know digital games with focus on geography.
37	I can find online resources that effectively demonstrate a specific geographical process/content
38	I can help students to use technologies for collecting and organizing information related to a specific geographical topic.
39	I can teach lessons that appropriately combine geography, technologies and teaching approaches.
40	I want to improve my skills on technologies

Table 11 - Composition of TPACK domains.

TPACK domain	Composition *(items and domains considered)*
Content Knowledge (CK)	17 18 19 20 22
Pedagogical Knowledge (PK)	1 2 3 4 5
Technological Knowledge (TK)	24 25 26 27 28 29 30 31 40
Pedagogical Content Knowledge (PCK)	16 17 PK CK
Technological Content Knowledge (TCK)	32 33 34 35 36 37 TK CK
Technological Pedagogical Knowledge (TPK)	6 7 8 9 10 11 TK PK
Technological Pedagogical and Content Knowledge TPACK	12 38 39 PCK TCK TPK

The third part of the survey aims at exploring which teaching strategies are employed in their geographical lessons by the teachers. This part includes 16 items concerning teaching strategies and praxis (see Table 12). For each item teachers were asked to express how often they use them while teaching geography. Answers were collected using the following 5-point Likert-type scale: 1 (Never), 2 (Rarely), 3 (Sometimes), 4 (Often), 5 (Always).

Table 12 - List of teaching strategies and praxes included in the third part of the survey.

In my geography lesson
I start the lesson proposing a problem to solve or a question to answer.
I use the textbook.
I link different topics and subjects.
I let students work in groups.
I encourage discussion.
I invite experts.
I suggest outdoor activities/investigations.
I use digital technologies to improve geographical understanding.
I let students use computers (in the classroom/computer lab).
I let students use photo cameras or video cameras.
I let students use GPS devices, smartphones or tablets.
I suggest resources taken from the Internet (e.g. texts, pictures, animations, videos).
I show videos, documentaries or movie from CD, DVD or VHS.
I let students work with basic software (e.g. Word, PowerPoint, Excel).
I let students work with geographical software (e.g. digital maps, digital globes, geographical games).
I let students search for online resources.

The fourth part of the survey examines how teachers value the different supports for teaching geography with technologies. Various styles of technological support are included (see the complete list in Table 13). The last item is an empty space to allow teachers to write one additional support and motivate their choice. For each technological support type, teachers were asked to rate how useful it was considered to be by using the

following five-level Likert scale: 1 (Very Useless), 2 (Useless), 3 (Neither Useless nor Useful), 4 (Useful), 5 (Very Useful).

Table 13 - Complete list of technological support types included in the fourth part of the survey.

How would you personally value the following types of support regarding teaching geography with technologies?
CD-Rom/DVD/USB Stick with selected multimedia materials.
List of online resources for the teacher.
List of trustworthy web pages where is possible to follow the on-going and up-to-date discussion.
Ready material for the teacher (e.g. lesson plan).
Ready material for the students (e.g. worksheets).
New textbook with robust online resources included.
In job training/workshop focused on geographical technologies and software.
In job training/workshop focused on strategies for teaching geography with technologies.
Lecture / Presentation.
Online platform / Discussion forum.
Other: _____

The fifth section concludes the survey and serves for collecting information on the teachers' schools equipment, in particular to provide generic information on the presence of ICT and their reliability in respondents' schools. According to the literature considered for the articulation of this part of the questionnaire (see paragraph 4.3.2), particular attention was given to class computers, interactive whiteboards, computer laboratories and Internet connection (see the complete list in Table 14).

Table 14 – Items of the survey's fifth part.

ID	Item	Type of question	Options	Required
1	How many students in your school?	Open		*
2	Is there at least one computer in every classroom of your school?	Closed	Yes No	
3	Do at least half of the classrooms in your school have an interactive whiteboard?	Closed	Yes No	
4	Does your classroom have an interactive whiteboard?	Closed	Yes No	*
5	Does your school have a computer lab?	Closed	Yes No [(a)]	*
6	If yes, how many computers are in the laboratory?	Open		
7	How would you describe the computers?	Closed	Unreliable Unsatisfactory Poor reliability Good Excellent	
8	Are the computers connected to the Internet?	Closed	Yes Yes, some of them Yes, but the connection is limited No	
9	Based on your experience how often the teachers in your school are using the computer lab?	Closed	Not at all Rarely Sometimes Frequently Regularly I don't know	

[(a)] *The questionnaire ends here if this answer is given.*

4.4 Analysis and results

The first analysis that was carried out tested the survey for reliability, a lack of which could place a limit on the overall validity of the research (George, Mallery, 2001; Davidshofer, Murphy, 2005), Cronbach's alpha was applied to measure the internal consistency of part II, III and IV of the survey (Table 15). Part I and V were excluded from this analysis because Cronbach's alpha is only applicable to groups of homogenous items. Results show good ($0.9 > \alpha \geq 0.8$) or excellent ($\alpha \geq 0.9$) internal consistency (George, Mallery, 2001) for the three parts investigated and the same time, it was a positive sign that there were no exceptional high reliabilities (0.95 or higher), which would have indicated that the items might be entirely redundant (Ibidem). In light of the resulting values, the survey can be considered as reliable.

Table 15 – Survey's internal consistency (N=200)

Survey's parts	Internal Consistency (alpha)	Items
Part I – Demographic information	-	11
Part II - Teaching style and skills	.92	40
Part III - Strategies used for teaching geography	.84	16
Part IV - Types of support	.83	10
Part V - School Technology	-	9
Total		86

Reliability statistics have also been applied in the second part of the questionnaire to each TPACK domain. The internal consistency of each group of items ranged from 0.75 to 0.84, which are considered by George and Mallery (2001) to be acceptable ($0.8 > \alpha \geq 0.7$) or good ($0.9 > \alpha \geq 0.8$). The TPAKC domains investigated in the second part of the survey result also reliable. All alpha reliability coefficients for the second part of the survey are reported in table 16.

Table 16 - Survey's subscale internal consistency (N=200)

TPACK subscale	Internal Consistency (alpha)	Item
Content Knowledge (CK)	.75	5
Pedagogical Knowledge (PK)	.77	5
Technological Knowledge (TK)	.84	9
Pedagogical Content Knowledge (PCK)	.82	4
Technological Pedagogical Knowledge (TCK)	.84	8
Technological Pedagogical Knowledge (TPK)	.86	8
Technological Pedagogical Content Knowledge (TPACK)	.85	6

The analysis of the results is presented in six sub-paragraphs is to offer the reader an analytical view on each of the research topic investigated. While the first five sub-paragraphs coincide with the result of each of the five parts of the survey, the last one provides some general analyses based on statistical correlations between the parts.

4.4.1 Part I: teachers' personal and professional information

The study collected answers from 200 primary geography school teachers from 6 European countries: England (22), Finland (66), Germany (14), Italy (53), Spain (11) and Turkey (34). Unfortunately, no answers were collected from Romanian school teachers. Female teachers (145 female, 55 male) mainly compose the group of respondents (Table 17) with the Turkish group registering a surprisingly high participation of male teachers (71%). Most of the respondents were over 41 years old (58%) with a relevant number being in their fifties and

mostly from Mediterranean countries (Spain, 45%; Italy 40%). Only 32 teachers (16% of the total) were younger than 31 years old and almost one third of them were British (10). The majority of the participants (60%) worked as teachers in a city (91% of Finnish teachers do it), while the rest (40%) were teaching in urban or rural environments with less than 100.000 inhabitants (this is the case of 70% of the Italians who filled the survey).

The participants' background studies were heterogeneous but most of the attenders had been involved in some sort of training in using technologies at school (62%). Looking at teachers from the same country, it is interesting to see that 86% of German and 67% of the Turkish respondents did not receive such opportunity, while most of the Italians (81%), Finnish (70%) and British (68%) did.

Table 17 - Descriptive statistics regarding 'Geomedia@School''s participants.

		EN		FI		DE		IT		ES		TU		Tot.	
		N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Sex	*F*	15	68%	55	83%	13	93%	45	85%	7	64%	10	29%	145	73%
	M	7	32%	11	17%	1	7%	8	15%	4	36%	24	71%	55	28%
	Tot.	*22*	*100%*	*66*	*100%*	*14*	*100%*	*53*	*100%*	*11*	*100%*	*34*	*100%*	*200*	*100%*
Age	*< 31*	10	45%	4	6%	5	36%	7	13%	0	0%	6	18%	32	16%
	31 - 40	6	27%	19	29%	4	29%	9	17%	2	18%	12	35%	52	26%
	41 - 50	2	9%	25	38%	3	21%	16	30%	4	36%	12	35%	62	31%
	> 50	4	18%	18	27%	2	14%	21	40%	5	45%	4	12%	54	27%
	Tot.	*22*	*100%*	*66*	*100%*	*14*	*100%*	*53*	*100%*	*11*	*100%*	*34*	*100%*	*200*	*100%*
City dimension	*< 100.000*	11	50%	6	9%	9	64%	37	70%	5	45%	12	35%	80	40%
	> 100.000	11	50%	60	91%	5	36%	16	30%	6	55%	22	65%	120	60%
	Tot.	*22*	*100%*	*66*	*100%*	*14*	*100%*	*53*	*100%*	*11*	*100%*	*34*	*100%*	*200*	*100%*
ICT in Edu	*Yes*	15	68%	47	71%	2	14%	43	81%	5	45%	11	32%	123	62%
	No	7	32%	19	29%	12	86%	10	19%	6	55%	23	68%	77	39%
	Tot.	*22*	*100%*	*66*	*100%*	*14*	*100%*	*53*	*100%*	*11*	*100%*	*34*	*100%*	*200*	*100%*
Teaching experience	*Mean*	11,64		14,69		10,43		21,60		17,45		16,85		16,36	
	St. Dev.	12,00		9,43		9,37		11,01		10,05		8,23		10,29	
Geography teaching experience	*Mean*	11,41		13,90		9,36		12,02		10,55		15,68		12,91	
	St. Dev.	11,85		9,56		9,23		10,46		7,65		8,96		9,74	

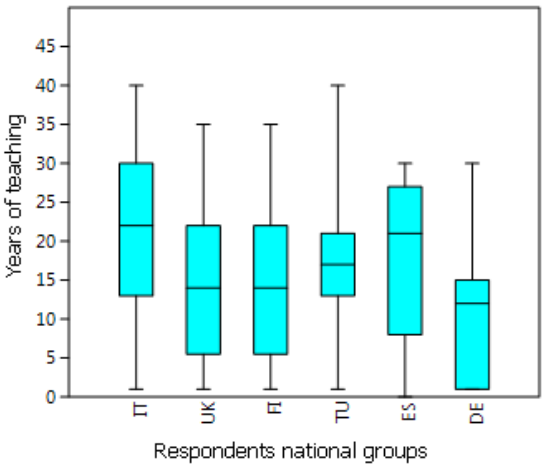


Figure 14 - Box Plot showing the distribution of years of teaching by national group of respondents.

Concerning the teachers' experience in teaching, the results show that on average the respondents had been teaching for 16 years, 13 of which spent teaching also primary geography. Even with the high discrepancy within the answers (highlighted by strong standard deviation in all national groups), this information appears strongly related to the age of the respondents (older people have longer experience). This is also confirmed by the results of the ANOVA Test for equal means, which showed that the years of teaching significantly differed between the participants in the questionnaire ($F = 5.002$; $p < 0.01$). Particularly, a pairwise Tukey *post-hoc* Q test was used to identify the groups that were each other significantly different ($Q = 5.766$; $p < 0.01$). From this test, it resulted that the German group of respondents is significantly different (i.e. lower) in respect to the Italian group (**Errore. L'origine riferimento non è stata trovata.**4).

Concerning the years of geography teaching, both the ANOVA Test for equal means and the Tukey *post-hoc* Q test showed no significant difference between national groups. This probably because while the British, Finnish, German and Turks respondents have geography teaching experience very similar to their general experiences as teacher (they almost have been teaching geography every year), teachers from Italy and Spain, despite to their long experience in teaching only have very few years of experience in teaching geography (Table 7).

4.4.2 Part II: teachers' self-efficacy beliefs on TPACK

Analysis of the resulting data were performed using both descriptive (mean and standard deviation) and inferential statistics (Pearson's product-moment correlation). Descriptive statistics are reported for each item (Table 18) and for each domain (Table 19).

Table 18 – Teaching style and skills. Descriptive statistical measures by item.

Item	EN		FI		DE		IT		ES		TU		Tot.	
	Mean (M)	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*
1. I can adapt my teaching style to different learners.	3.59	0.50	3.98	0.69	4.36	0.50	3.94	0.57	4.45	0.52	4.09	0.79	4.00	0.66
2. I can assess student learning in multiple ways.	3.64	0.49	4.26	0.73	4.21	0.58	4.09	0.56	4.64	0.50	4.35	0.69	4.18	0.67
3. I know how to organize and maintain classroom management.	3.50	0.60	4.36	0.57	4.36	0.50	4.23	0.58	4.55	0.69	4.35	0.60	4.24	0.64
4. I can use a wide range of teaching approaches in a classroom setting.	3.55	0.60	4.36	0.69	3.93	0.83	4.19	0.56	4.73	0.47	3.97	0.76	4.15	0.71
5. I want to improve my teaching skills	3.36	0.58	4.36	0.67	4.57	0.51	4.74	0.49	4.73	0.65	4.62	0.60	4.43	0.71
6. I believe that nowadays the introduction of multimedia technologies into teaching is a requirement for up-to-date teaching.	3.55	0.67	4.65	0.54	3.93	0.92	4.49	0.64	4.73	0.47	4.71	0.52	4.45	0.71
7. I believe I do not need technologies to make a good lesson.	3.64	1.14	4.58	0.66	3.29	1.07	2.13	1.09	2.27	1.42	1.76	1.05	3.13	1.51
8. I believe that the introduction into the teaching of multimedia technologies is a valuable support for the teacher's work.	3.73	0.63	3.09	1.21	4.14	0.77	4.51	0.72	4.64	0.50	4.71	0.46	3.97	1.10
9. I can use technologies to improve the presentation of information to learners.	3.68	0.57	4.27	0.67	3.86	0.66	4.21	0.72	4.91	0.30	4.56	0.56	4.25	0.70
10. I can use technologies to engage students in learning.	3.64	0.58	4.02	0.75	4.00	0.78	4.21	0.72	4.73	0.47	4.71	0.52	4.18	0.75
11. I can help others to use technologies for teaching.	4.00	0.62	3.92	0.92	3.43	1.02	3.70	0.93	4.18	0.87	4.26	0.79	3.91	0.90
12. I can use technologies to engage students in learning geography.	3.82	0.59	3.80	0.86	3.93	0.92	4.08	0.78	4.91	0.30	4.76	0.50	4.11	0.83
13. I think geography is important in school.	3.50	0.60	4.53	0.66	4.29	0.47	4.74	0.49	4.55	0.52	4.85	0.36	4.51	0.66
14. I think geography requires memory.	3.68	0.99	3.20	0.86	4.00	0.68	3.45	0.85	4.18	0.40	2.59	1.16	3.33	0.99
15. I think geography requires reasoning skills.	3.59	0.73	3.98	0.67	3.07	0.83	4.25	0.70	3.91	1.38	4.56	0.56	4.04	0.82
16. I can select effective teaching approaches to guide student thinking and learning geography.	3.95	0.58	3.68	0.84	3.57	0.76	3.87	0.62	3.82	0.75	4.18	0.58	3.85	0.72
17. I feel confident in teaching geography.	3.68	0.72	3.76	0.90	3.36	0.84	3.98	0.80	3.82	1.08	4.35	0.65	3.89	0.85
18. I have sufficient knowledge about geography.	3.77	0.69	3.55	0.96	3.50	0.76	3.75	0.68	3.73	0.90	4.18	0.72	3.74	0.83
19. I know various ways and strategies of developing my geographical understanding.	3.95	0.72	3.79	0.77	3.43	0.85	3.70	0.70	3.64	1.12	3.97	0.72	3.78	0.77
20. I can use a geographical way of thinking.	3.86	0.77	3.64	0.80	3.86	0.66	3.74	0.59	3.64	1.12	4.29	0.72	3.82	0.77
21. I think geography is useful in real life.	3.32	0.57	4.53	0.59	4.21	0.70	4.55	0.57	4.73	0.47	4.76	0.43	4.43	0.69
22. I want to improve my geographical competence	3.41	0.80	4.32	0.71	4.29	0.83	4.58	0.60	4.45	0.69	4.47	0.56	4.32	0.75

Item	EN		FI		DE		IT		ES		TU		Tot.	
	Mean (M)	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*	*Mean (M)*	*St. Dev (S).*
23. I believe that the introduction into the geography teaching of multimedia technologies is a valuable support for the teacher's work.	3.82	0.66	4.21	0.75	4.00	0.68	4.60	0,53	4.64	0.67	4.74	0.45	4.37	0.70
24. I feel confident in using every kind of technology.	3.45	1.14	3.42	1.05	3.00	1.24	3.68	0,89	4.27	0.90	3.97	0.80	3.61	1.02
25. I can search the web to find current information on a topic that I need.	3.68	0.57	4.70	0.55	4.71	0.47	3.91	0,86	4.91	0.30	4.74	0.45	4.40	0.76
26. I can create a presentation using PowerPoint or a similar program.	3.27	0.46	4.64	0.78	3.86	1.29	4.40	0,69	4.64	0.92	4.62	0.78	4.37	0.89
27. I can create a document with text and graphics in a word processing program.	3.27	0.46	4.61	0.74	4.50	0.65	4.49	0,54	4.82	0.40	4.56	0.89	4.43	0.79
28. I can learn how to use a new program on my own.	3.77	0.81	3.86	1.01	3.71	0.73	3.77	0,93	4.36	0.67	4.03	0.97	3.88	0.93
29. I can solve my own technical problems.	3.50	1.01	3.30	1.01	3.29	1.07	3.47	1,14	3.45	1.04	3.71	0.94	3.45	1.04
30. I can edit a digital photograph.	3.50	0.86	4.15	1.06	3.64	1.22	4.04	1,04	3.82	1.25	3.88	1.07	3.95	1.06
31. I can use Web 2.0 technologies (e.g., blogs, social networking, podcasts, etc.).	3.36	0.95	3.70	1.25	3.64	0.93	3.98	0,97	4.64	0.50	3.94	1.01	3.83	1.08
32. I feel confident in using digital maps (e.g. Bing, Yahoo or Google maps).	3.45	0.80	4.02	0.95	4.21	0.97	4.17	0,83	4.36	0.67	4.03	0.97	4.03	0.91
33. I know how to use digital globes (e.g. Google Earth).	3.50	0.74	4.08	1.01	4.36	0.74	4.21	0,86	4.27	0.90	4.12	0.95	4.09	0.93
34. I know about technologies that can be used in outdoor geography.	3.64	1.26	3.05	1.14	3.21	0.97	3.34	1,14	3.27	1.19	3.82	0.87	3.35	1.13
35. I know where to look for new/additional digital/technological resources on geography.	3.50	1.26	3.33	1.09	2.71	0.83	3.57	0,93	3.73	1.10	3.85	0.93	3.48	1.05
36. I know digital games with focus on geography.	3.32	1.32	3.05	1.18	2.43	1.09	3.81	0,94	3.64	1.36	3.53	0.93	3.35	1.16
37. I can find online resources that effectively demonstrate a specific geographical process/content	4.18	0.73	3.89	0.88	3.29	0.91	3.75	0,90	4.18	0.75	3.88	0.88	3.86	0.88
38. I can help students to use technologies for collecting and organizing information related to a specific geographical topic.	4.05	1.00	3.56	1.01	3.36	1.01	3.77	0,87	4.18	0.87	3.91	0.87	3.75	0.96
39. I can teach lessons that appropriately combine geography, technologies and teaching approaches.	3.82	0.85	3.98	0.83	3.43	1.02	3.81	0,79	4.27	0.90	3.62	0.92	3.84	0.87
40. I want to improve my skills on technologies	3.73	0.70	4.52	0.64	4.36	0.63	4.32	0,83	4.55	0.69	4.53	0.51	4.37	0.72

	EN		FI		DE		IT		ES		TU		TOT.	
Tot.	3.63	0.80	3.97	0.98	3.78	3.63	3.98	3,98	4.25	0.77	4.16	0.96	3.98	0.95
	N = 22		*N = 66*		*N = 14*		*N = 53*		*N = 11*		*N = 34*		**N = 200**	

Table 18 presents the analysis of all data collected in the second part of the survey, which is organized by respondents' nationality to provide the reader with a clearer view on the particularity of each group. The mean and the standard deviations of the answers given by each group provide a global view over all responses of that group and allow for a better understanding. From the analysis some differences from different national groups could be spotted. The British, for example, was the group that provided the answers with the lower values (M = 3,63; S = 0,80); more than 0.5 points lower than the Spanish (M = 4.25; S = 0,77) and the Turkish groups (M = 4.16; S = 0,96). This information is useful in order to understand the answers' trend in each national contingent of teachers, to balance future low results provided by the British respondents or, on the contrary, high results coming from their Spanish and Turkish colleagues. For the same reason, is also useful to remember that on average, the answers collected from all groups were quite high (M = 3,98; S = 0,95).

A first very interesting result regards items n.5 (*I want to improve my teaching skills)*, n.22 (*I want to improve my geographical competence)* and n.40 (*I want to improve my skills on technologies*). These three items investigate the level of personal motivation and interest on the main three areas of the research. Most of the participants strongly or simply agreed on these affirmations. Only the British group showed different opinions (M = 3.36; 3.41; 3.73). Interestingly, the Italian group of respondents considered themselves very motivated to improve both their teaching skills (M = 4.74) and their geography competence (M = 4.58), but were slightly less enthusiastic about improving their technological skills (M = 4.32), differently from the Finnish, Spanish and Turkish groups, that showed strong motivation to improve in the field of technology (M > 4.50).

The importance given by the respondents to technologies is confirmed by their conviction that nowadays the introduction of multimedia into teaching is a requirement for up-to-date teaching (item n.6, M = 4.45) and by their consideration of multimedia technologies as valuable support for their work (item n.8, M = 3.97; S = 1.10). The high standard deviation is mainly the result of the responses given by the Finnish (M = 3.09) that do not to agree at the same rate than the rest of the national groups. On the same line, the answers to item number 7: "*I believe I do not need technologies to make a good lesson".* Again the Finnish group clearly stated that they do not need technologies to make a good lesson (M = 4.58, S = 0.66) while teachers from UK agreed with less conviction (M = 3.64, S = 1.14). The other groups, with more or less emphasis, considered technology important in order to make good lessons.

With regards to the teachers' perceptions on geography, it is interesting to see that respondents strongly perceive geography as important (item n. 13, M = 4.51) and clearly believe that it requires reasoning skills (item 15, M = 4.04, S = 0.82). What results less clear from the answers is if geography also requires memory or not (item 14, M = 3.33 S = 0.99). Respondents from Turkey largely affirmed memory is not needed for geography (M = 2.59, S = 1.16) although Spanish (M = 4.18, S = 0.40) and Germans (M = 4.00, S = 0.68) agree

on the contrary. Geography, however, looks like a complex discipline to all participants in the survey. Many of them do not feel very confident in teaching geography (item n.17, M = 3.89) and do not believe they have sufficient geographical knowledge (item n.18, M = 3.74). In all items regarding geography (from n.16 to 20) however, the answers' means registered 0.2 to 0.4 points cut compared to the national answers' mean (Turkish teachers apart), therefore confirming that there might be a content related issues.

Concerning technological knowledge, the teachers involved in the research showed very good skills in searching the web (item 25, M = 4.40), creating presentations (item 26, M = 4.37) and documents with text and graphics (item 27, M = 4.43). They also knew how to use digital globes (item 33, M = 4.09) and felt confident in using digital maps (item 32, M = 4.04). Significant national digression on these items has to be made for the German group where low confidence in using technologies (M = 3.00) and low technical skills (items 28, 29, 30 and 31) contrast with three basic skills a teacher usually has: searching the web (M = 4.71), creating text documents (M = 4.50) and using digital globes (M = 4.36). Notwithstanding, the low confidence in solving one own technical problems it is not only distinctive of the German group but is also shared among other teachers (Tot_M = 3.45). Additional meaningful information comes from the results of items n.34 and n.35: the first one reports of poor teachers' knowledge of technologies that can be used in outdoor geography (item , M = 3.35), while the second one puts evidence on the fact that they do not have where to look for new/additional digital/technological resources on geography (M = 3.48).

In addition to descriptive statistics measuring teachers' perceptions of their knowledge in relation to TPACK, correlations among each of the domains described by the framework were examined. These correlations are reported in Table 19 and confirm the expected existing strong correlations between all TPACK subscales.

Table 19 - Correlations among TPACK domains (N=200).

TPACK domain	CK	PK	TK	PCK	TCK	TPK	TPACK
Content Knowledge (CK)	1	.40**	.41**	.88**	.53**	.43**	.64**
Pedagogical Knowledge (PK)	-	1	.53**	.61**	.38**	.67**	.53**
Technological Knowledge (TK)	-	-	1	.49**	.78**	.69**	.74**
Pedagogical Content Knowledge (PCK)	-	-	-	1	.53**	.54**	.71**
Technological Pedagogical Knowledge (TCK)	-	-	-	-	1	.55**	.84**
Technological Pedagogical Knowledge (TPK)	-	-	-	-	-	1	.73**
Technological Pedagogical Content Knowledge (TPACK)	-	-	-	-	-	-	1
Mean (M)	3.91	4.20	4.03	3.96	3.76	4.01	3.90
Standard deviation (S)	.56	.49	.62	.54	.66	.43	.56

***. Correlation is significant at the 0.01 level (2-tailed).*

European primary geography teachers who responded to the current survey rated their knowledge at the highest levels for the scales of pedagogy (M = 4.20), technology (M = 4.03), and technological pedagogical (M = 4.01). Average mean scores indicate that teachers reported that their technological knowledge was very good related to their abilities to use a variety of teaching strategies. They felt confident in employing technology in their teaching praxis as well as prepared to reflect on the efficacy of their use. What they are not completely confident in, are their own content knowledge and, their understanding of the geographical discipline and science (M = 3.91). This was already visible within the analysis of the single items, and found corroboration here. However, the lower TPACK subscale is the teachers' technological content knowledge, which means that the lack of digital geographical resources, geographical-devices and geographical application for primary students or the teachers' ignorance about them, has to be considered as the main reason for which geography is not taught with ICTs.

In conclusion, technological knowledge and technological pedagogical knowledge appear to be not as incisive as it could be expected. What is really affecting the technological pedagogical content knowledge of the 200 teachers who participated in the survey is their weak perception of self-efficacy in geographical knowledge and technological content knowledge. They do not feel therefore confident in geography and in using geomedia.

By using the TPACK subscales' mean is possible to visualize the teachers' perceived knowledge as a graph (Figure 15). Since the analysis of the TPACK for the complete group of respondents is not as clear as wished, national graphs were also realized (Figure 16).

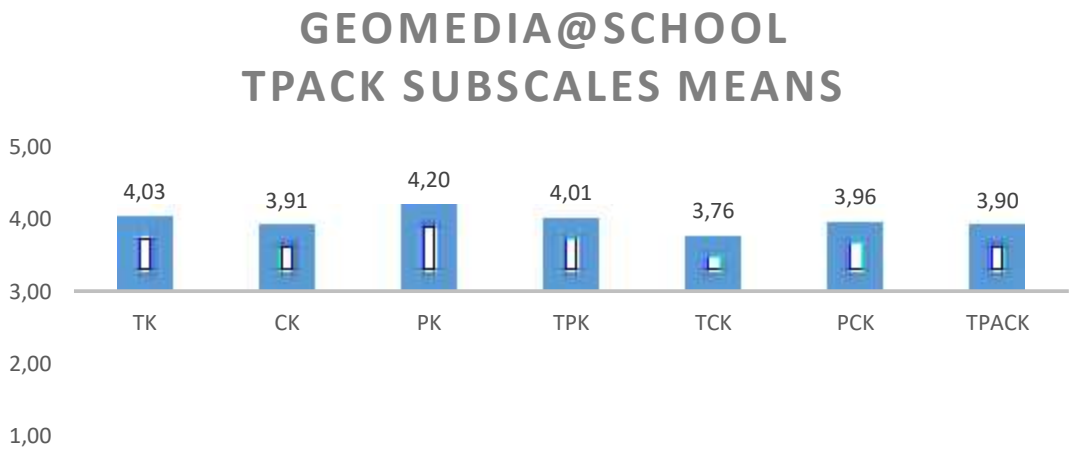
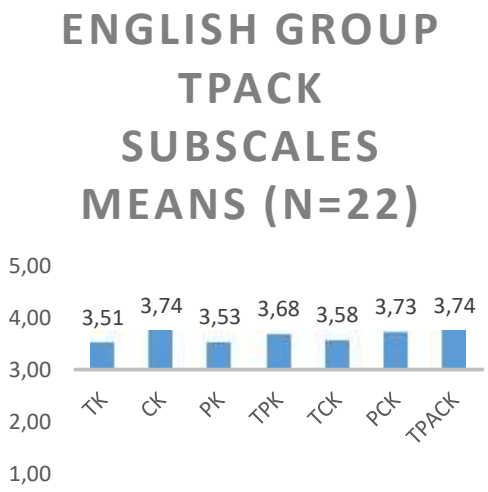
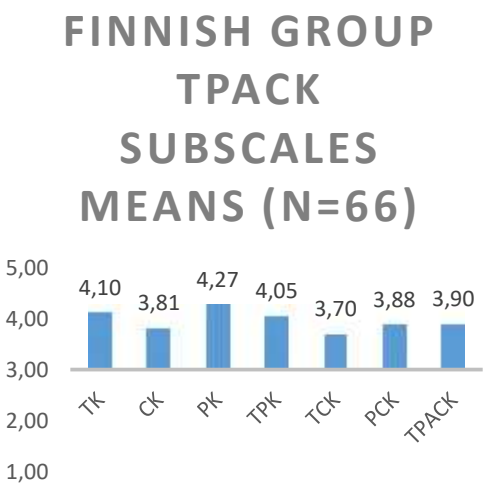
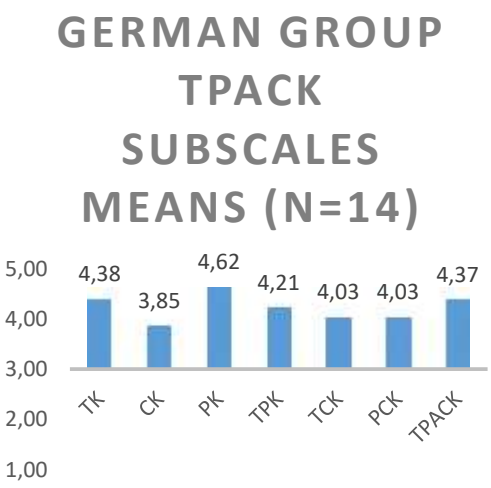
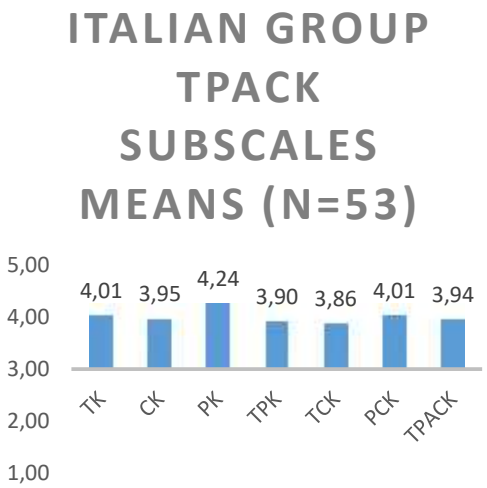


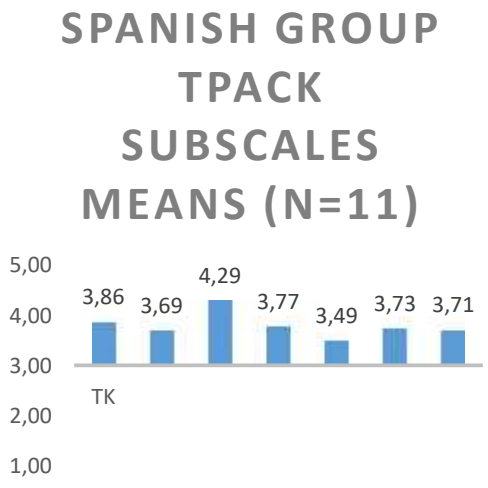
Figure 15 - Geomedia@school TPACK subscales.











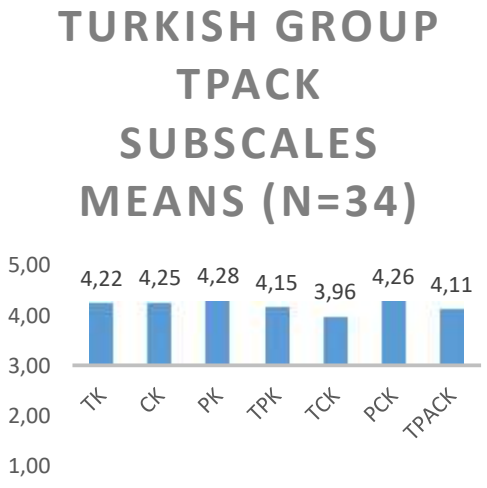


Figure 16 - Geomedia@School national TPACK subscales.

4.4.3 Part III: teachers' teaching strategies

How much do teachers use the given strategies while teaching geography? This question was the target of the third part of the survey. Among the strategies were included both traditional teaching strategies like the use of the textbook or group work, and strategies which include the use of different types of technology (Figure 23). The two most employed strategies from the responders, as supposed, refer to traditional teaching strategies, although providing very positive feedback for geographical education specialists. According to the results, in fact, teachers from every investigated country, apart from the UK, often encourage the discussion (3.93) (hopefully supporting learner-centred forms of teaching) and link different topics and subject while teaching geography (3.84) (it is indeed an interdisciplinary subject). On the other hand, there are two teaching strategies, which appear not to be very common among the geography classes of the participants in the survey. One is inviting experts (2.41) and the reason could be related to the facts that is difficult to allow external people in the school, to find geography experts or there is simply no need for experts to join the lessons. The other less popular strategy is using GPS receivers, smartphones or tablets (2.27). It is however difficult to say if the reason of such unpopularity comes from the lack of equipment, the strict policies of the school on matter of personal devices or from the ability of teachers to include these devices into their teaching.

Continuing the analysis of the strategies employed in primary geography lessons, a clear link between the results and the three dimensions of geomedia (geo-resources, geo-devices and geo-applications) emerges. The answers collected on items n.12 and n.13 suggest that geo-resources are included in primary geography classes. In particular, it resulted that teachers use resources taken from the Internet (item 12, M = 3.82) in their lessons and show their students videos, documentaries or movies from digital supports (item 13, M = 3.69). Concerning the employment of geo-devices during the lessons, the not so frequent use of GPSs, smartphones and tablets in primary geography classes (item 11, M = 2.27) was more expected than the low use of digital and video cameras (item 10, M = 2.95). Outdoor activities, as confirmed by the answers to the seventh item (*I suggest outdoor activities/investigations*, M = 3.08), are definitely not as widespread as geography educators wish. Ultimately, geo-applications result to be not so often employed by teachers during their geography lessons in primary classes, as they let students search for online resource (item 16, M = 3.53) while still using too little geographical software such as digital maps, globes or geographical games (item 15, M = 3.18).

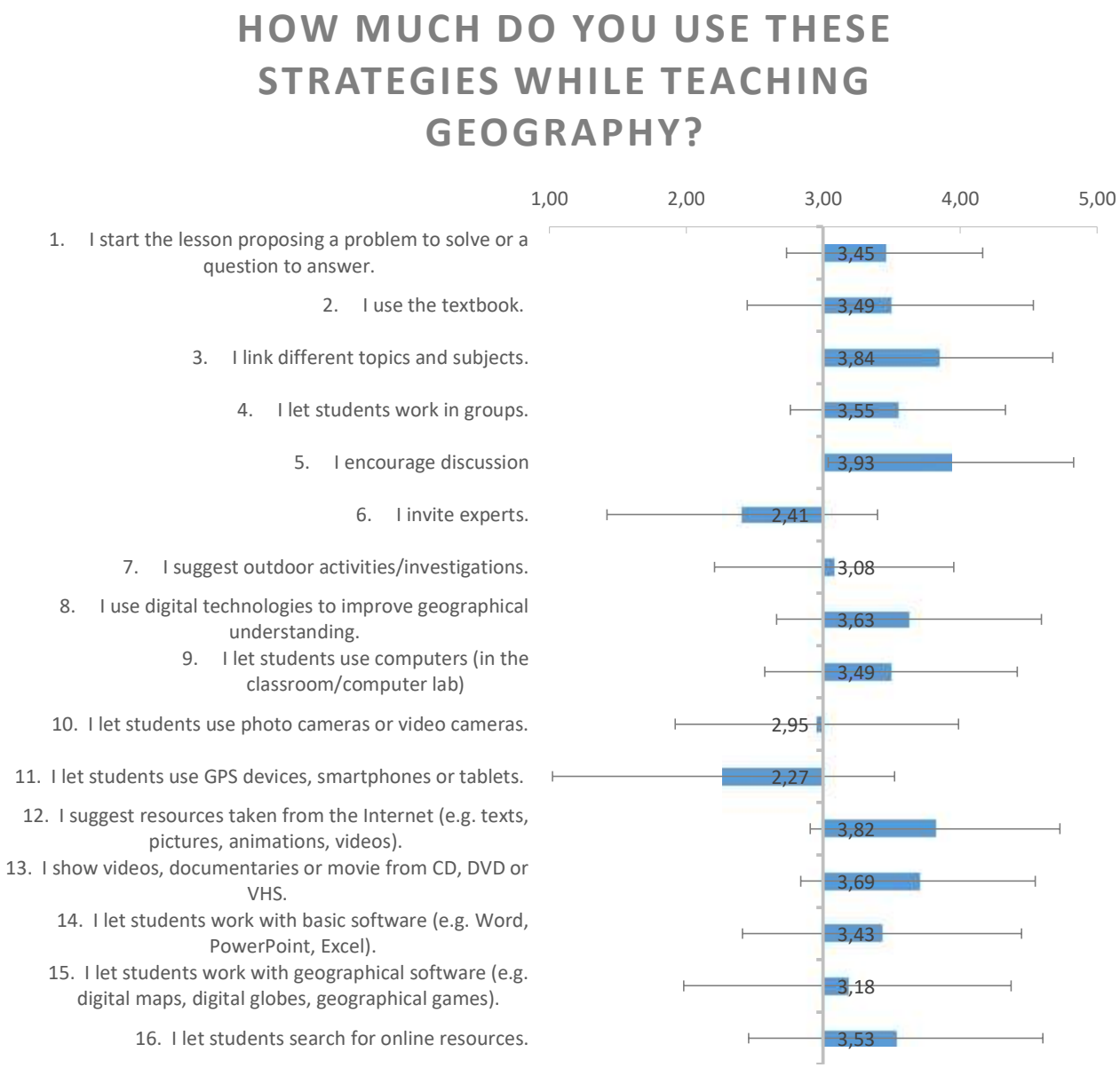


Figure 17 - Frequency of use per teaching geography strategies. (1 = never, 5 = always)

An extract of the technology related strategies answers' means and standard deviations was included to provide a closer look to the main differences between national groups of answers (

Table 20). Two particularly significant pieces of information are gained from the analysis of these data. The first refers to the German group, which confirmed high frequency in integrating technology in primary geography lesson (item 8, M = 4.16) validating the great results obtained by the TPACK subscale (M = 4.37, Figure 16). The second comes from the Spanish respondents, who clearly affirmed their rare use of, among others, geographical software (item 15, M = 1.57) and mobile devices (item 11, M = 1.21), obtaining on average the lowest scores among the national groups (M = 2.33). This result is even lower than what expected from the already little TPACK subscale (M = 3.71).

Table 20 – Descriptive statistics regarding the frequency of use of technology related strategies in each country.

	EN		FI		IT		DE		ES		TU		Tot.	
	Mean	*Dev.St.*	*Mean*	*Dev.St.*	*Mean*	*Dev.St.*	*Mean*	*Dev.St.*	*Mean*	*Dev.St.*	*Mean*	*Dev.St.*	*Mean*	*Dev.St.*
8. I use digital technologies to improve geographical understanding.	3,50	0,96	3,45	0,86	3,72	0,95	4,45	0,69	2,71	0,73	4,09	0,90	3,63	0,97
9. I let students use computers (in the classroom/computer lab)	3,23	0,87	3,44	0,68	3,68	1,00	4,27	1,01	2,71	1,15	3,62	1,02	3,49	0,92
10. I let students use photo cameras or video cameras.	3,45	0,86	2,70	0,70	2,85	1,06	3,64	1,50	2,14	1,28	3,44	1,13	2,95	1,03
11. I let students use GPS devices, smartphones or tablets.	2,73	1,72	2,17	0,92	2,02	1,25	2,73	1,49	1,21	1,19	2,88	1,15	2,27	1,25
12. I suggest resources taken from the Internet (e.g. texts, pictures, animations, videos).	3,00	0,82	3,70	0,80	3,94	0,91	4,82	0,40	3,07	0,61	4,44	0,61	3,82	0,91
13. I show videos, documentaries or movie from CD, DVD or VHS.	3,14	0,83	3,59	0,72	3,89	0,82	4,64	0,67	2,93	0,77	4,03	0,72	3,69	0,86
14. I let students work with basic software (e.g. Word, PowerPoint, Excel).	3,09	0,61	3,50	0,85	3,51	1,03	4,00	1,26	2,29	1,16	3,74	1,14	3,43	1,02
15. I let students work with geographical software (e.g. digital maps, digital globes, geographical games).	3,59	1,18	3,05	0,85	3,28	1,12	4,00	1,55	1,57	1,25	3,47	1,31	3,18	1,19
16. I let students search for online resources.	3,27	0,83	3,61	0,82	3,30	1,14	4,91	0,30	2,36	1,01	4,03	1,11	3,53	1,07
Tot.	*3,22*	*1,02*	*3,24*	*0,93*	*3,35*	*1,18*	*4,16*	*1,00*	*2,33*	*1,28*	*3,75*	*1,11*	*3,33*	*1,12*

A different view to analyze the data regarding teaching strategies is also provided. Two variables have been identified by the mean of those items that involve the use of digital technologies. The first (Strat_teach) include all the items referred to actions taken in first persons by the teachers ("I use", "I suggest" or "I show") while the second (Strat_stu) is the mean of all those items that refers to actions for the students ("I let students do/work/search"). The composition of the two variables include the following items:

Strat_teac - items 8, 12 and 13

Strat_stu - items 9, 10, 11, 14, 15 and 16

By showing the data ordered by national groups of respondents (Table 21) it appeared that investigated teachers from all countries (UK less than the rest) tend to report a higher use of teacher oriented strategies rather than student oriented ones. Is therefore interesting to see that primary school teachers who include digital technologies in their teaching use more confidently geomedia as support for their teaching instead as support for their students learning process.

Table 21 - Teachers and students oriented strategies, by country

		Strat_teac	Strat_stu
IT	*Mean*	3,85	3,11
	St. Dev.	0,89	1,10
UK	*Mean*	3,21	3,23
	St. Dev.	0,87	1,01
FI	*Mean*	3,58	3,08
	St. Dev.	0,80	0,80
TU	*Mean*	4,19	3,53
	St. Dev.	0,74	1,14
DE	*Mean*	4,56	3,89
	St. Dev.	0,62	1,30
ES	*Mean*	2,90	2,05
	St. Dev.	0,70	1,19
Tot	*Mean*	3,71	3,14
	St. Dev.	0,91	1,08

4.4.4 Part IV: teachers' professional support

Interesting figures also come from the analysis of the answers given in the fourth part of the questionnaire. Respondents had here to consider ten different types of support regarding teaching geography with technologies, and to value them accordingly to a 5-point Likert scale: 1 (Very Useless), 2 (Useless), 3 (Neither Useless nor Useful), 4 (Useful), 5 (Very Useful). The type of supports that resulted the most useful among teachers from different countries are: the list of online resources for the teacher (item 2, M = 4.41), in job training/workshop focused on strategies for teaching geography with technologies (item 8, M = 4.36) and in job training/workshop focused on geographical technologies and software (item 7, M = 4.35) (Figure 18). It would be interesting to look into and understand why teachers prefer lists of online resources instead of lists of trustworthy web pages where to follow the on-going and up-to-date geographical discussion (item 3, M = 4.12). One possible answer could be that the list of resources are ready-to-use in class materials, while the list of websites is something that teachers have to spend time on. However, this hypothesis seems to be not supported by the lower consideration teachers gave to ready material for themselves (item 4, M = 3.95) and for students (item 5, M = 4.02). Secondly, the high teachers' preferences accorded to in job training/workshop focused on both teaching geographical technologies and teaching strategies for teaching geography in primary school is attention grabbing. By analysing the results, what seems to be the discriminant factor between supports is the required participation of teachers, which includes both sharing active learning experiences with other teachers who might have their same needs, and counting on the presence of a facilitator who might answer to all kind of doubts they could have. This supposition is credible and finds confirmation in other items as the 'Lecture and presentation' (item 9, M = 3.88), which supports that how continue professional

development is structured does matter. Results clearly affirmed that for primary geography teachers, taking part in an in-job training or a workshop results more useful than attending a lecture or a presentation. By saying that, interaction with colleagues, active participation and informal environments appear to be for primary geography teachers three key elements that influence their CPD's perception of utility. Considering these elements, it is also possible to understand the reasons why the lower consideration of utility was agreed to be 'online platforms and discussion forums' (item 10, M = 3.65).

Some evident differences among the answers of different national groups are visible in Figure 19.

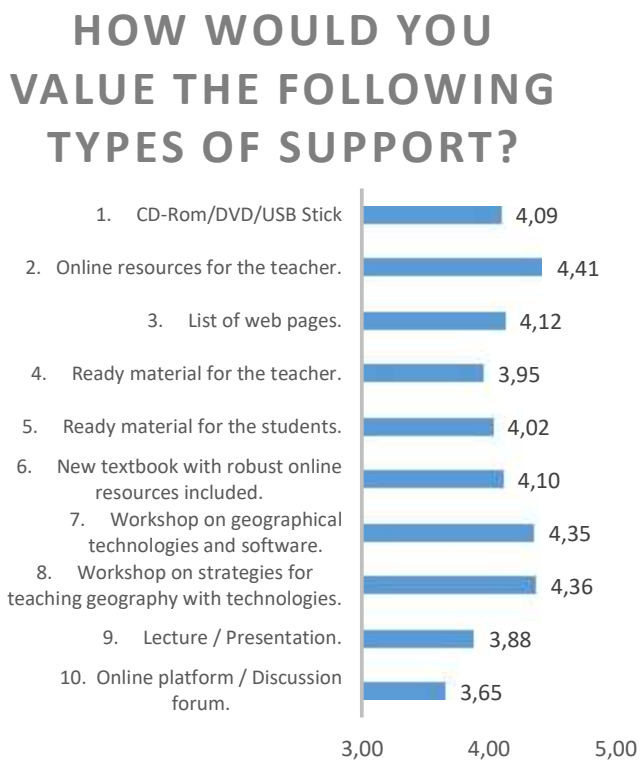


Figure 18 - Professional supports preferences.
(1 = very useless; 5 = very useful)

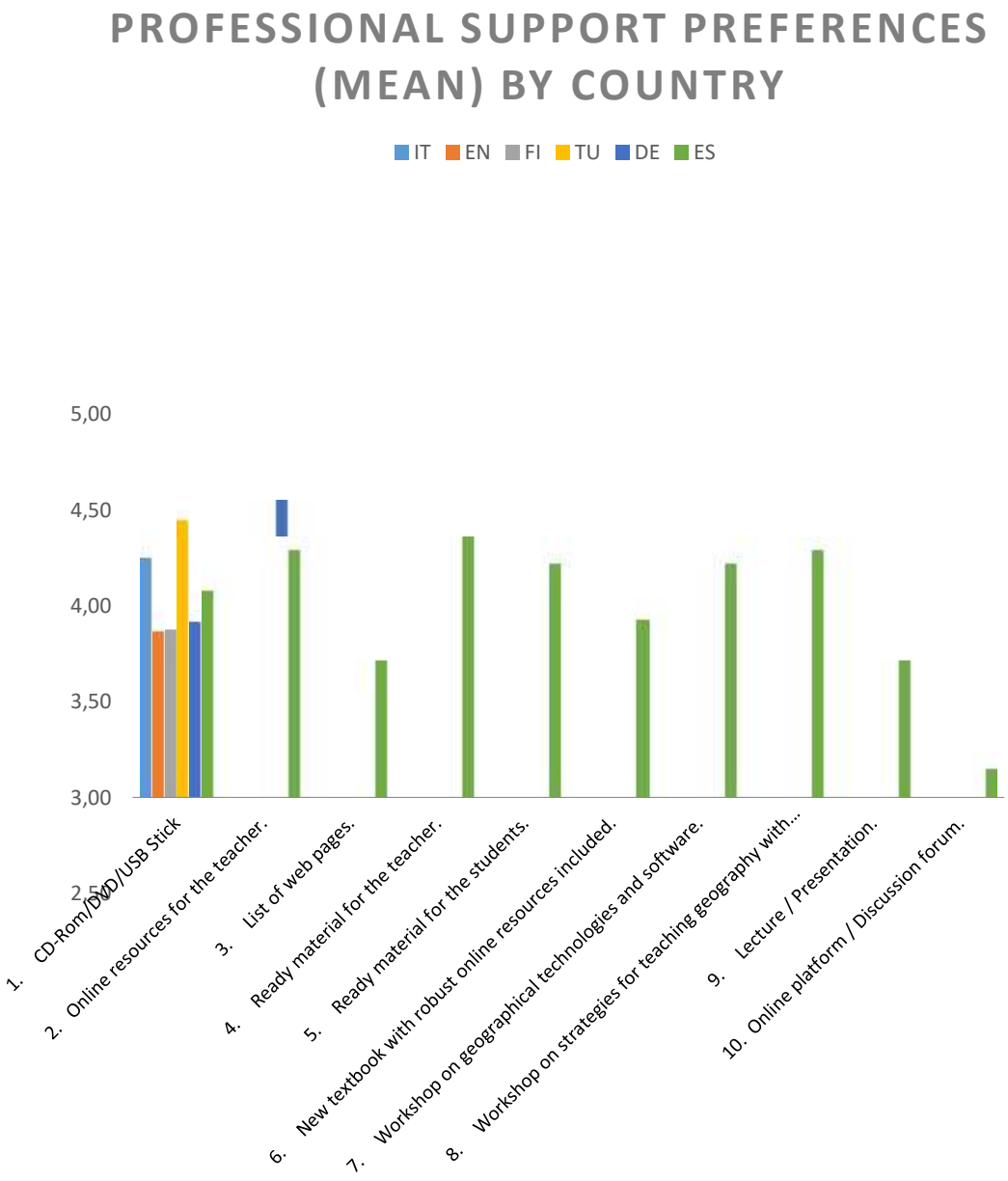


Figure 19 – Professional support preferences, by country. (1 = very useless; 5 = very useful)

4.4.5 Part V: teachers' schools equipment

The last part of the survey investigated the presence and the reliability of technologies in the respondents' schools. From the collected data (Table 18) resulted that almost one third of the schools (142) have at least one computer in each classroom. Finland and Spain report a computer in more than 9 classes out of 10. In Italy, the rate it is about 1 out of 3 (36%). Positive data comes from interactive whiteboards: 128 teachers (64%) have it in their class, and more than 50% of them (102) report that in their school at least half of the classrooms have an interactive whiteboard. This information gives another element to better understand why

both teachers' self-efficacy in technological knowledge and pedagogical technological knowledge measure over 4.00 points in the TPACK subscale analysis. Without surprise, the UK guides the list of IB supporting countries: 86% of respondents work in school where at least half of the classes have one. The same percentage indicates the negative answers given by the German respondents to the same question, while Turkey, Finland and Spain have collect between 56 and 68 percent of positive answers and Italy only 28%.

From the analysis, it also emerged that there is one computer room in most of the schools investigated (90%) with Italy and Finland collecting in total only five negative answers. The ANOVA Test for equal means showed a significant difference between the mean number of computer for each laboratory by countries ($F = 4.072$; $p < 0.01$), even if the pairwise Tukey post-hoc Q test was not able to identify the groups that were each other significantly different. The mean number of computer per computer room was 20.93. From the distribution of the answers by national group emerges how respondents from Italy have the computer rooms with the lower number of computer (M = 15.35). All other investigated countries reported a mean of 20 or more computers for each laboratory (Figure 20).

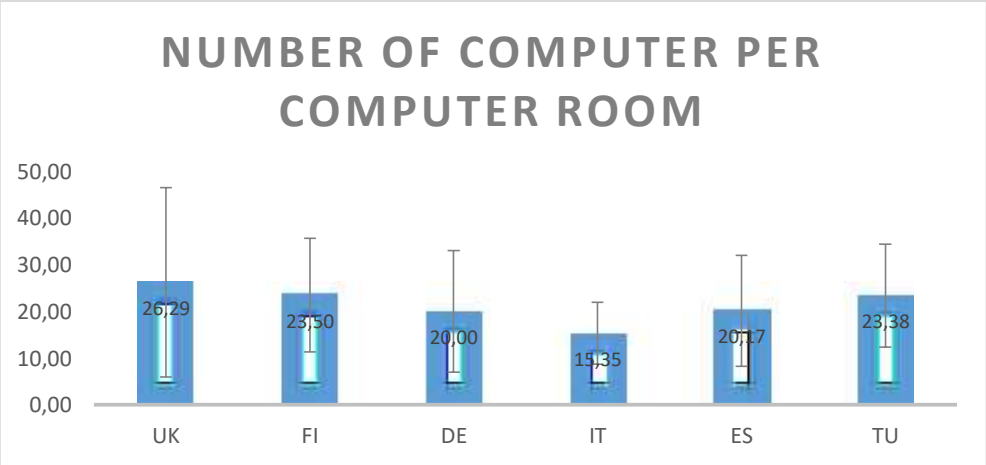


Figure 20 - Number of computer (mean) per computer room.

In most of the cases, the computers in the laboratories were reported to be in good or even excellent working condition (62%); however, many schools had their conditions evaluated as 'poor' (29%), 'unsatisfactory' (9%) or completely 'unreliable' (1%) and only 2% of the schools did not provide Internet connection (Figure 22). Positive figures refer also to the use of the computer laboratories by the respondents' colleagues, 58% of the schools see their computer room used 'frequently' or 'constantly', 29% 'sometimes', 13% 'rarely' or 'not at all' (Figure 21).

Table 22 - Technology equipment in participants' school (by country)

		Is there at least one computer in every classroom of your school?	Do at least half of the classrooms in your school have an interactive whiteboard?	Does your classroom have an interactive whiteboard?*	Does your school have a computer lab?*
IT	Yes	36%	28%	53%	98%
N = 53	No	64%	72%	47%	2%
UK	Yes	82%	86%	86%	86%
N = 22	No	18%	14%	14%	14%
FI	Yes	97%	56%	70%	94%
N=66	No	3%	44%	30%	6%
TU	Yes	65%	68%	74%	79%
N = 34	No	35%	32%	26%	21%
ES	Yes	91%	64%	73%	82%
N = 11	No	9%	36%	27%	18%
DE	Yes	64%	14%	14%	86%
N = 11	No	36%	86%	86%	14%
TOT	Yes	71%	52%	64%	90%
N = 200	No	29%	48%	36%	10%

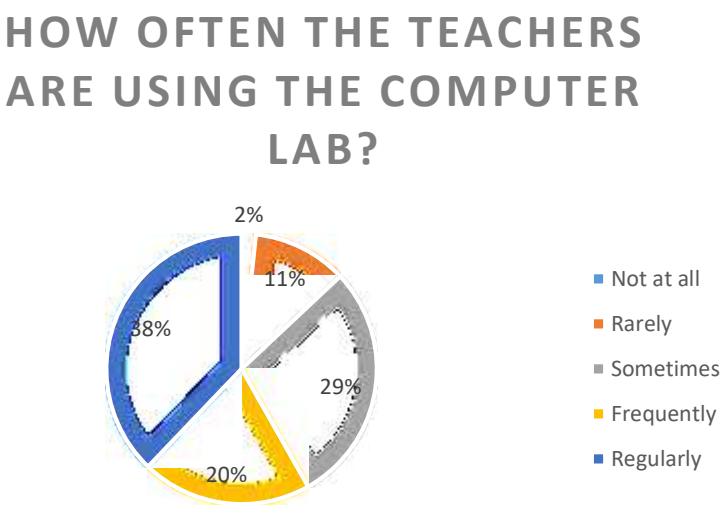


Figure 21 - Computer laboratory' frequency of use in participants' schools.

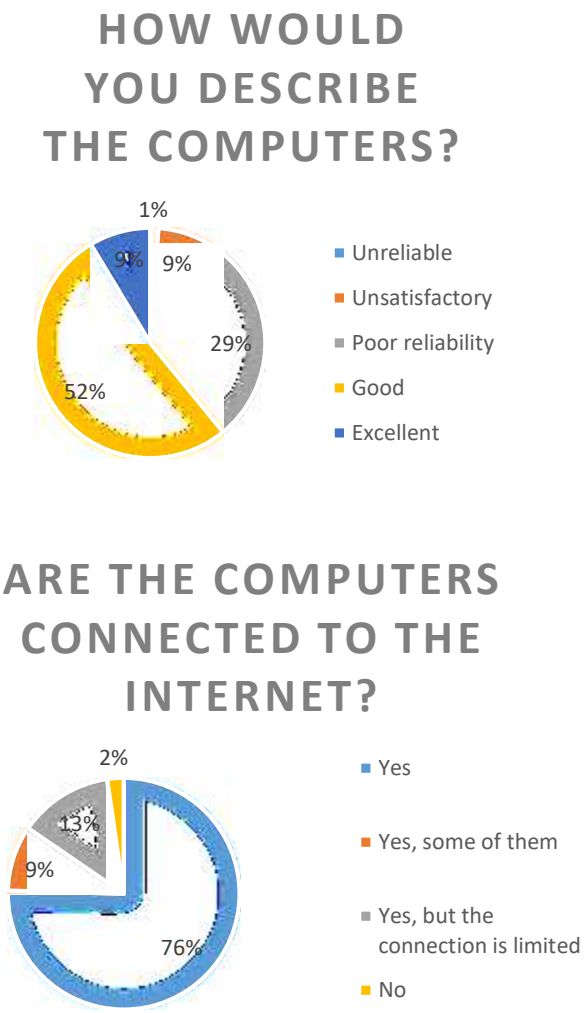


Figure 22 – Computers' condition and internet connection in participants' schools.

4.4.6 Global analysis

All the data collected from the five parts of the survey is closely related to each other's, it is therefore important to read it also through a holistic approach. The analysis shows how, in some cases, the relations between two or more items (or indicators) are able to provide remarkable insights. Among all analysis, those that take into consideration the indicators' influence on TPACK subscales are particularly interesting.

Teachers' self-efficacy perceptions on the TPACK domains result correlated with several variables like gender, age, years of teaching and teaching strategies. On the other hand, there are only few correlations with variables like geography teaching experience or city dimension. In the table below (Table 23) a list of correlation between the TPACK domains and several variables is provided.

Table 23 Pearson correlations between the TPACK domains and individual variables extracted from the questionnaire

		TK	PK	CK	PCK	TPK	TCK	TPACK
Gender	*Pearson Correlation*	,209**	,055	,093	,151*	,124	,252**	,227**
	Sig. (2-tailed)	,003	,441	,189	,033	,080	,000	,001
Age	*Pearson Correlation*	,011	,201**	,094	,122	,104	,035	,068
	Sig. (2-tailed)	,875	,004	,185	,084	,141	,620	,340
City size	*Pearson Correlation*	,128	,108	,034	,021	,242**	,028	,091
	Sig. (2-tailed)	,070	,127	,637	,767	,001	,693	,200
Teaching years	*Pearson Correlation*	,009	,169*	,133	,151*	,049	,055	,085
	Sig. (2-tailed)	,904	,019	,064	,036	,495	,448	,241
Geography teaching years	*Pearson Correlation*	,025	,129	,107	,133	,090	,074	,091
	Sig. (2-tailed)	,726	,072	,135	,064	,210	,304	,207
IWB in class	*Pearson Correlation*	-,095	,038	-,128	-,108	-,140*	-,158*	-,178*
	Sig. (2-tailed)	,180	,592	,071	,128	,048	,025	,012
Computer Room	*Pearson Correlation*	,066	,000	,073	,069	,013	,019	,102
	Sig. (2-tailed)	,353	1,000	,306	,335	,853	,795	,151
Computer Quality	*Pearson Correlation*	-,019	,078	,027	,010	-,053	,073	-,005
	Sig. (2-tailed)	,802	,306	,721	,896	,488	,340	,949
Computer with Internet	*Pearson Correlation*	,007	-,020	-,026	-,032	-,080	,049	-,031
	Sig. (2-tailed)	,922	,797	,732	,675	,292	,520	,686
Strat_Teac	*Pearson Correlation*	,528**	,414**	,362**	,433**	,492**	,489**	,558**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000
Strat_Stu	*Pearson Correlation*	,471**	,309**	,340**	,389**	,381**	,525**	,551**

**. *Correlation is significant at the 0.01 level (2-tailed).*
*. *Correlation is significant at the 0.05 level (2-tailed).*
N = 200

From the results shown in Table 24 - TPACK subscale report by Age emerge that gender still constitutes a determinant variable. In fact, data show a positive correlation between being male and one's perception of effectiveness in areas of personal use of technology, as well as in the use of geographic technologies and in how they are used in class as support to the teaching of geography. A second interesting piece of information is given by age. The only significant correlation coming out from the analysis of Pearson correlation identifies a positive relationship between the increase of age and of the positive perception of their pedagogical knowledge. This is not unusual and it is plausible to link it to the fact that the teachers, during their careers, acquire knowledge and skills allowing them to deal with their work with growing serenity. This analysis, however, does not show the whole picture which can instead be understood by looking at the next table.

Table 24 - TPACK subscale report by Age

Age		TK	PK	CK	PCK	TCK	TPK	TPACK
< 30	*Mean*	3,82	3,82	3,77	3,80	3,49	3,73	3,74
	N	32	32	32	32	32	32	32
	St. Dev.	,64	,50	,49	,68	,72	,49	,64
	% of total N	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%
30-40	*Mean*	4,17	4,29	3,93	3,78	3,83	4,13	4,02
	N	52	52	52	52	52	52	52
	St. Dev.	,49	,43	,60	,74	,72	,37	,67
	% of total N	26,0%	26,0%	26,0%	26,0%	26,0%	26,0%	26,0%
41-50	*Mean*	4,09	4,31	3,91	3,93	3,70	3,97	3,84
	N	62	62	62	62	62	62	62
	St. Dev.	,64	,42	,61	,72	,82	,46	,82
	% of total N	31,0%	31,0%	31,0%	31,0%	31,0%	31,0%	31,0%
> 50	*Mean*	3,94	4,21	3,97	3,92	3,67	4,00	3,94
	N	54	54	54	54	54	54	54
	St. Dev.	,65	,52	,51	,69	,75	,48	,68
	% of total N	27,0%	27,0%	27,0%	27,0%	27,0%	27,0%	27,0%
Tot.	Mean	4,03	4,20	3,91	3,87	3,69	3,98	3,90
	N	200	200	200	200	200	200	200
	St. Dev.	,62	,49	,56	,71	,76	,46	,72
	% of total N	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

What emerges from this table is the fact that it is not the younger teachers' that is perceived as more effective in all domains of TPACK, but rather the group with teachers aged between 31 and 40 years. In line with early expectations from Pearson's analysis, the domains more closely related to pedagogy (PK and PCK) appear to be linked to the older participants (from 41 years and up). On the contrary, it is interesting to note that the group of younger teachers (under 31 years) does not perceive itself as effective in any of the subdomains. All the data, beyond age, present discouraging values compared to one's perception of efficiency within the geographical scope (CK). Over all, the domain linked to knowledge of geographic technologies and their functioning (TCK) is what appears to be the least understood and known.

Proceeding with the reading of Table 24 - TPACK subscale report by Age, it is interesting to reflect on the only positive correlation recorded by SPSS software while carrying out Pearson's bivariate analysis: that between city size and perception of efficacy recorded in the TPK domain. The correlation shows that there is a stable and significant relationship between working in a city with more than 100,000 inhabitants perceiving oneself as effective in teaching using technologies. One explanation for this result may be found in Table 23 where the relationships between the presence of interactive whiteboards (IWB) and the domains of TPACK are also presented. These unequivocally highlight how the mere presence of IWB appears as a strongly connected element to the domains showing the perception of efficacy compared to teaching in general and teaching of geography through the use of specifically technologies (TPK, and TCK TPACK). The one assumption that can be

done is therefore that the presence of IWB is somehow linked to the size of the city in which the school is located and that schools in large cities tend to have better equipment.

Furthermore, the analysis of the teachers' confidence on their technological pedagogical content knowledge (TPACK) in relation to the type of technology they have in class or at school (see Figure 23) shows that the responders' TPACK indicators are sensible to what technology they use at school. Indeed, while TPACK indicators (good and low level) are balanced among teachers who can only use the computer laboratory, the majority of teachers with an IWB in class have positive perceptions regarding their ability to teach geography using technology. In conclusion, this specific graph shows how the quality of the computer room as well as the quality of their equipment or their being connected to the Internet, is not correlated to teachers' confidence in using technology in their teaching. What resulted to be a positive indicator of high levels of TPACK was the presence of ICT in class and in particular of an interactive whiteboard.

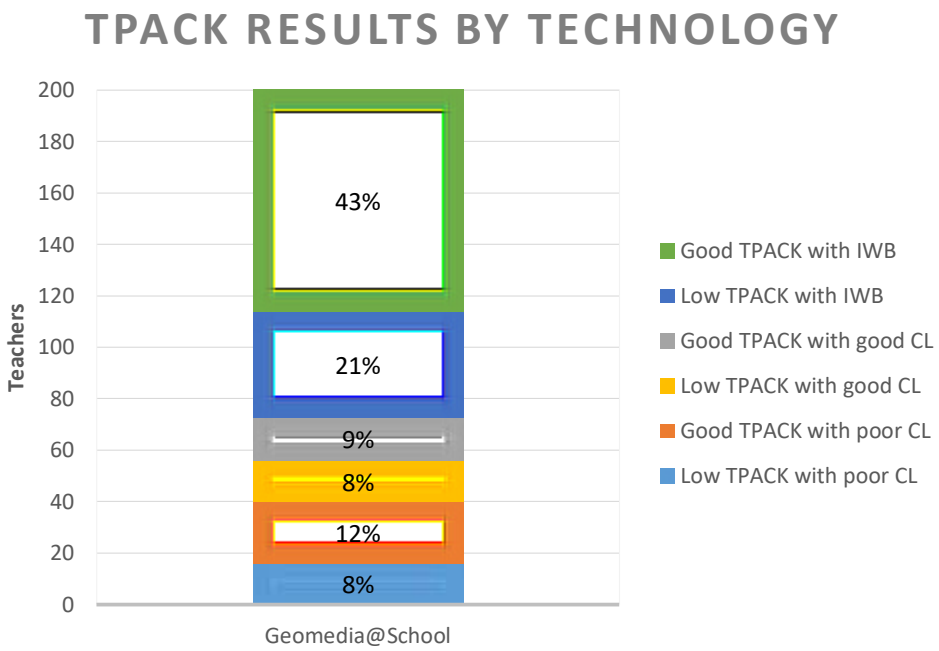


Figure 23 - Technology equipment' influence on TPACK.

Another very interesting fact highlighted in is the presence, or even more the lack of correlation between years of education and the domains of TPACK. If we could in fact expect that with increasing experience of teaching both the perceptions of effectiveness in teaching fields (PK) and the teaching of geography (PCK) would also increase, it is perplexing to note that the years of experience in teaching geography are not correlated with any specific domain.

What is on the other hand significantly related with all the domains are the teaching strategies, both the teacher and student oriented ones. To learn more about this, the relation between the use of individual strategies and the seven domains of TPACK (Table 25) were specifically analyzed.

Table 25 - Pearson Correlation between TPACK domains and Teaching Strategies

		TK	PK	CK	PCK	TPK	TCK	TPACK
1. I start the lesson proposing a problem to solve or a question to answer	*Pearson Correlation*	,128	,189**	,217**	,241**	,079	,134	,154*
	Sig. (2-tailed)	,070	,007	,002	,001	,267	,058	,029
2. I use the textbook	*Pearson Correlation*	-,011	-,068	-,112	-,051	,011	-,078	-,034
	Sig. (2-tailed)	,877	,336	,114	,473	,880	,273	,629
3. I link different topics and subjects	*Pearson Correlation*	,326**	,350**	,327**	,344**	,209**	,284**	,278**
	Sig. (2-tailed)	,000	,000	,000	,000	,003	,000	,000
4. I let students work in groups	*Pearson Correlation*	,252**	,290**	,052	,109	,141*	,164*	,129
	Sig. (2-tailed)	,000	,000	,466	,126	,046	,020	,069
5. I encourage discussion	*Pearson Correlation*	,274**	,420**	,165*	,214**	,223**	,192**	,173*
	Sig. (2-tailed)	,000	,000	,019	,002	,001	,006	,015
6. I invite experts	*Pearson Correlation*	,101	,056	,084	,113	,044	,190**	,172*
	Sig. (2-tailed)	,156	,433	,239	,110	,533	,007	,015
7. I suggest outdoor activities/investigations	*Pearson Correlation*	,120	,138	,026	,084	,082	,141*	,167*
	Sig. (2-tailed)	,092	,051	,710	,238	,248	,046	,018
8. I use digital technologies to improve geographical understanding	*Pearson Correlation*	,534**	,345**	,369**	,425**	,434**	,566**	,589**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000
9. I let students use computers	*Pearson Correlation*	,415**	,360**	,193**	,247**	,381**	,388**	,439**
	Sig. (2-tailed)	,000	,000	,006	,000	,000	,000	,000
10. I let students use photo cameras or video cameras	*Pearson Correlation*	,316**	,137	,263**	,280**	,214**	,347**	,391**
	Sig. (2-tailed)	,000	,054	,000	,000	,002	,000	,000
11. I let students use GPS devices, smartphones or tablets	*Pearson Correlation*	,236**	,143*	,221**	,240**	,232**	,368**	,346**
	Sig. (2-tailed)	,001	,044	,002	,001	,001	,000	,000
12. I suggest resources taken from the Internet	*Pearson Correlation*	,387**	,342**	,299**	,336**	,420**	,306**	,412**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000
13. I show videos, documentaries or movies	*Pearson Correlation*	,339**	,311**	,195**	,274**	,328**	,290**	,329**
	Sig. (2-tailed)	,000	,000	,006	,000	,000	,000	,000
14. I let students work with basic software	*Pearson Correlation*	,482**	,302**	,280**	,331**	,328**	,427**	,419**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000
15. I let students work with geographical software	*Pearson Correlation*	,433**	,161*	,279**	,316**	,284**	,524**	,499**
	Sig. (2-tailed)	,000	,023	,000	,000	,000	,000	,000
16. I let students search for online resources.	*Pearson Correlation*	,256**	,322**	,283**	,329**	,293**	,287**	,382**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

N = 200

The results presented in Table 25 of all the strategies included in the two indicators Strat_tea (items 8, 12 and 13) and Strat_stu (items 9, 10, 11, 14, 15 and 16) show a significant positive correlation with the great majority of domains of the TPACK the model. Compared instead to the first strategies presented in the questionnaire, it is curious to note that the only one that appears to have no kind of meaningful relationship with any of the TPACK domains is the use of the textbook (item 2). Few significant relationships are however marked by the strategies "I invite experts" (item 6) and "I suggest outdoor activities / investigations" (item 7). Furthermore, more stable the correlations are those highlighted by the application of cross-cutting strategies such as linking different topics and disciplines (item 3), promoting class discussion (item 5), using problem-solving (item 1) and working groups (item 4), are those more stable.

4.5 Brief discussion

'Geomedia@School' is an international research project that aims at providing a further understanding on European primary geography teachers' perspective and their use of digital technologies in primary geography lessons. In order to reach as many primary school teachers as possible, an online survey was created which was later translated into seven languages and made accessible to primary school teachers from Finland, Germany, Italy, Romania, Spain, Turkey and the United Kingdom. Two hundred teachers in total answered the survey from all selected countries (Finland 66, Germany 14, Italy 55, Spain 11, Turkey 34, United Kingdom 22) except from Romania, where to get in contact with primary school teachers was harder than expected. The most represented teacher profiles is that of a female, aged between 31 and 40 and with long experience in both teaching (over 16 years) and teaching geography (almost 13 years). The solid teaching experience shared by the respondents has an impact on their ability to adapt teaching styles to different learners by using a wide range of teaching approaches, thus clearly influencing their very positive perception of pedagogical knowledge (PK). Their technological knowledge (TK) also results as positive. It is agreeable that the online administration of the survey might have influenced the research randomness by favouring the participation of teachers with good technological skills; however, this hypothesis was not supported by the modest result of the British national groups in this particular TPACK concern. Therefore, the reasons why most of participants acknowledged good technological skills cannot be related only to the method used for surveying. The analysis found two main elements, which relate to the teachers' confidence in using technology: age and gender. Both males and 31-to-40 years old participants showed stronger confidence in using several software for different personal purposes (TK) compared to females and younger or older colleagues. Positive results in the TPACK subscale that refers to teachers' capability to employ educational technologies (TPK) confirm the presence of teachers with both positive PK and TK characters as well as their ability to combine them efficiently. In clear connection with TPK, it is interesting to observe how having the class equipped with an interactive whiteboard

or, as substitute, having a computer lab in satisfying condition in the school, affect teachers' perceptions. In particular, data shows how the presence of an IWB in class significantly influences teachers' personal perceptions regarding PCK, TCK, TPK and, to a greater extent, the most complex TPACK subscale itself. Teachers working in class equipped with interactive whiteboard felt more confident in including digital resources and geographical technology in their geography lesson. This makes sense because the environment in which they work is supportive and provides them with daily opportunities to include technologies in their teaching, thus improving their confidence, thanks to an effective approach of self-directed apprenticeship, which could be referred as learning by teaching.

However, besides a discrete experience in teaching geography and the fact that they are geography teachers, many respondents felt their own strategies for improving geographical understanding were weak, thus did not consider their own geographical knowledge adequate (CK). Such geographical fragility is diffused and it highlights the lack of determination of many teachers. This situation clearly affected the teachers' own perception of efficacy in teaching geography (PCK) and consequently their confidence in teaching geography with the use of technology (TPACK). Regardless the results of 'Geomedia@School' present a good level of technology integration in primary geography teaching in Europe and define a TPACK trend, which is slightly decreasing because affected by the low results in the CK construct. This situation, however, represented a privileged starting point for reflecting on what strategies and geographical resources are implemented in primary geography, on what benefits could they bring to students' geographical learning and how effective teaching approaches might be shared with other teachers in Europe.

Considering teaching strategies, the study reports that encouraging the discussion and linking different topics and subjects while teaching geography are the most common teaching strategies used in primary geography class, as well as including resources taken from the Internet (e.g. texts, pictures, animations, videos). These results prove that many European primary schools already employ geomedia, even though they still result as more of a support for teachers than to the learning process. Indeed, all teaching approaches described as 'I *[the teacher]* do' obtained higher points with respect to those referring in forms similar to 'I *[the teacher]* let students do'. Therefore, it is possible to affirm that even considering the growing presence and use of geomedia in European primary schools their application is preferably included in teacher-centred learning approaches.

To enhance student-centred geography lessons by using geomedia in class would definitely represents a challenging aim for any future professional development opportunity addressed to primary teachers. However, teachers affirm to be very interested in improving and strengthen their competences in all three pedagogical, content and technological areas and, by watching their skills, they seem ready to answer the challenge. How to engage them? By listening to their opinions, specific in-job trainings or workshops are the

most useful support they could receive, together with a list of online web pages and digital resources to explore, save and include, as they prefer in their lessons.

To recapitulate, 'Geomedia@School' collected personal and professional information from 200 European primary geography schoolteachers. Their answers supported the diffused perception that sees geomedia as already available and employed in many European primary schools. At the same time, the answers also describe European primary geography teachers as educators, with both good technological skills and a positive perception of confidence in using them to enhance their teaching and promote better learning. Concerning what and how to teach, the respondents show little self-perception of geographical knowledge and modest confidence in teaching it. These, and not the presence of ICTs in the school, nor the teachers' age and gender that anyway remain factors to consider, appear to be the main constraints to a positive use of technologies in teaching primary geography.

5 GEOGRAFI@SCUOLA

A continuous professional development (CPD) workshop for primary school teachers was ideated with the intent of supporting the teachers' familiarity with the use of geomedia in geography teaching. The workshop was organized in order to be at the same time a certified in-training CPD for primary school teachers and a research focus group.

However, during the research process internal and external factors have prevented the research from being scientifically relevant. Notwithstanding, given that interesting information was collected during the CPD, it was decided to still present the most interesting insights that emerged as possible suggestions for further research.

5.1 Research questions

The workshop was designed to meet primary geography teachers' needs, particularly for those teaching to 8-9 years old pupils. They were encouraged to attend and use the opportunity to immediately put into practice what had been learnt from the workshop (during the same school year or in the following one). The use of ICT to support primary geography in the last years of primary school is particularly suitable because students' skills allows them to get the best out of digital technologies, in autonomy. For the same reason, the use of softwares that are too complex or time demanding is not the right solution for primary education given that pupils need a direct approach to what they learn. Teachers are aware of it and that is why, if they do not perceive technology as useful, they are not interested in learning how to use it (Cox et al., 1999). This is also the main reason why in-job CPD for teachers often fail their attempts to improve teachers' use of technology. In fact, as highlighted by Veen in his report study (1993) CPD courses that lack pedagogical aspects are likely to be unsuccessful.

The idea of organizing a CPD shaped as a workshop originated from the fact that a workshop offers sharing spaces and times to the participants to promote their active and collaborative learning. Moreover, the network dimension that structures the relationships within a workshop brings to the enhancement of both subjectivity and creativity. Each participant is at the centre of the learning process regardless of the role he/she plays, and the overall involvement of people allows everyone's active participation (Donadelli, Rocca, 2012b).

The 'Geografi@Scuola' workshop was developed with the intent to offer an in-job subject-oriented training opportunity for teachers who have no particular skills for technology and wanted to further explore using ICT

within the teaching of primary geography. During the workshop teachers were asked to play with several geomedia and reflect on the possible impacts and uses they could have on teaching practices.

Inspired by the International Geographical Union chart (1992), the workshop aims are synthesized through the following grid:

Knowledge and understanding:

- Introducing participants to geomedia as the combination of geographical information, devices and applications;
- Introducing several powerful geomedia, free and easy to use;
- Presenting teaching strategies promoting real active participation while including geomedia;
- Offering opportunities to explore several geomedia;
- Improving the participants' knowledge on web based geomedia.

Skills:

- Improving the participants' knowledge and skills regarding the use of Internet and web based geomedia (Google Earth in particular);
- Developing teachers skills to research geographical resources (images, photos, videos, animations, sounds, maps) online;
- Supporting teachers implementation of geomedia in class thanks to a "safe" environment where there are no wrong strategies but only ideas to test;
- Proving that there is no need to be a computer expert to implement ICT in class.

Attitudes and values:

- Promoting positive experience in using ICT for teaching geography;
- Provoking discussions (continuing after the course) based both on why and how to use particular geomedia in class;
- Stimulating meta-reflection activities through which teachers are guided to highlight geomedia potentials and to think of possible ways to implement them in their teaching;
- Supporting the creation of a community of learners between the participants;
- Motivating teachers to consider geomedia for teaching primary geography;
- Introducing trustworthy resources to stimulate teachers' autonomous long life learning practices through the use of Internet;
- Influencing teachers' teaching practice or at least their perception regarding the use of ICT in primary geography.

5.2 Research context

The CPD workshop was named 'Geografi@Scuola' where "*geografia*" means geography and "*scuola*" means school. The title can both be read "geographers at school" as well as "digital geography at school". The workshop took place in Padova because the PhD program on which this research is based was funded by the University of Padova.

Before describing the research project and in order to better understand it, it is useful to start with a presentation of the Italian national context. The next paragraphs will therefore look at the Italian policy framework for teaching using technologies (5.2.1) and for supporting teachers continuing professional development (5.2.2).

5.2.1 Italian policy framework

In 2007 the Italian Ministry of Education launched a National Plan for Digital Schools (Piano Nazionale Scuola Digitale) "*to mainstream ICT in Italian classrooms and use technology as a catalyser of innovation in Italian education, hopefully leading to new teaching practices, new models of school organisation, new products and tools to support quality teaching"* (Avvisati et al, 2013, pg.1). This national plan was implemented in 2009 through one large-scale intervention (interactive whiteboards, Piano LIM) and three pilot projects (cl@sse 2.0, scuol@ 2.0, Editoria digitale). The aim of the plan, as suggested by the European Commission (2012b, p. 82) was to "*target students and teachers across all school levels (from ISCED 1 to ISCED 3) and promote educational innovation through the diffusion of technologies applied to* teaching. The urgency in establishing such a strategy had to do with the drastic difference between the familiar environment, where technologies are part of the daily lives of not only the parents but also the children, and the schools' obsolete educational instruments. As stressed by the OECD report on the Digital Strategy, "*today's youth lives in a connected world surrounded by digital technologies. Many Italian observers predict a growing distance between school lives and out-of-school experiences of children, unless schools update their instructional tools and methods"* (Avvisati et al., 2013, p. 27). Within the strategy, the only programme being widely implemented in primary schools is "Cl@sse 2.0" which intends to promote IT-rich learning environments (augmented classroom) and thereby identify effective approaches to embedding ICT in whole-class activities (MIUR, 2015). The collaboration of INDIRE, the Italian national board for educational research and teacher development that supports all initiatives in the digital school plan, is proving to be a very valuable asset, mostly thanks to their long experience with the use of new technologies for the in-service training of teaching staff, administrative, technical and auxiliary staff and school leaders. The main purpose of this 'digital strategy' is in fact to develop not only the pupils' ICT skills and habits, but also to support ICT familiarity and competences among teachers as well. This

specific objective is one of the strengths of the strategy, says the OECD report, as it creates teachers demand for training as well as for technology for the classrooms, and promotes the exchange of best practices among different schools (Avvisati et al., 2013, p. 28).

5.2.2 Continuing professional development in Italy

Continuing professional development (CPD) is considered a professional duty for teachers in twenty-eight European countries and regions (Eurydice, 2013, pp. 57). This is also the case for Italy, where the general principles for in-service teacher training are established by the national labour contract in force for the school sector (ARAN, 2006). Italian teachers have the right to participate to CDP as they contribute to the development of their professional life. Furthermore, teachers have the right to have five days with exemption from service during the school year to participate in training initiatives (ARAN, 2006, art. 63 and 64).

Comparing to other European countries where CPD is also prerequisite for career advancement and salary increases, the Italian educational system does not encourage teachers continuing professional development (Eurydice, 2013, pp. 58). Apart from newly appointed teachers who have definite obligation to take part in such training (Eurydice, 2008, p. 47), a system of rewards was missing until the recent education reform "La buona scuola" was introduced in Italy.

The recent introduction of many interactive whiteboard (IWB) at school due to the Digital Agenda policy (Tozza, Turchi, 2013) led in the last years to a proliferation of training courses regarding ICT. Such courses are abundant today but their efficacy is considered limited by the teachers who attended them, as the courses focused on IWB software effective uses (technological knowledge) more than teaching practices and educational strategies for teaching and learning with IWB (pedagogical content knowledge).

However, there are motivated self-directed teachers who decide to attend in service teacher training, particularly in primary school. They usually prefer CPD related to core subjects as for example Italian and mathematics. Minor subjects (in terms of teaching hours) usually offer only sporadic opportunities of trainings and this is the case for geography. In fact, in Italy a CPD aimed to support and improve geographical teaching in primary school does almost not exist.

It was also to partially fill this gap that the workshop 'Geografi@Scuola' was created.

5.3 Research method

The method of 'Geografi@Scuola' was based upon a robust inheritance of educational research practices. The observation of the teachers' participation and engagement was carried out adopting a mixed method consisting in the triangulation of the moderator-participant-observer standpoints (Varisco, 2002; Rocca, 2007; 2010). Triangulation is defined by Cohen and Manion (2000, p. 254) as an attempt to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint. Specifically, the method aimed at providing a comprehensive study of the workshop effects on the participants and therefore referred to the application and combination of several research methods (Bogdan, Biklen, 2006).

Knowledge stability through time was also considered. Therefore, observations were carried before the start of the workshop, during the workshop and after its conclusion (in short and long term period).

In the next sections, all the research tools implemented to investigate within the 'Geografi@Scuola' research module (Table 26) are briefly described.

Table 26 - Investigation tools used in 'Geografi@Scuola' research project.

PERIOD		#	INVESTIGATION TOOLS
PRE		1	Introductory online questionnaire (individual)
		2	Questionnaire on school equipment
		3	Exploratory personal interview
DURING THE WORKSHOP		4	Audio/video records
		5	Direct observation
		6	Facilitator self-evaluation
		7	Assessment questionnaire
POST	2 months	8	Activities form
		9	Short-term interview
	12 months	10	On-line questionnaire
		11	Long-term interview

5.3.1 Pre-workshop

Investigating the participants' background is fundamental in order to define the starting point of each: what knowledge and skills they have, what are their ideas on using ICT at school, what are their previous experiences and their level of motivation for attending the course. This information, compared with that collected at the end, will determine the efficacy of the workshop. Since the workshop dealt with several personal dimensions and the time was not enough to interview deeply each teacher many aspects of their professional and personal background were investigated through a very detailed online questionnaire.

5.3.1.1 Introductory online questionnaire (individual) (#1)

The first investigation tool employed in 'Geografi@Scuola' was an online questionnaire to be answered individually. This questionnaire (see Appendix C) counts 45 questions divided in ten sections. The selection of questions is the result of both the analysis of the literature and of similar research tools (Moè, Pazzaglia, Friso, 2010; Cavalli, Argentin, 2010; Donadelli et al. 2012). This questionnaire investigates personal opinions, perceptions, emotions, knowledge and skills. Particularly, the query investigates the following ten areas of research:

1. Demographical information,
2. Personal expectations and motivation,
3. Education,
4. Professional experiences and conditions,
5. Personal satisfaction as teacher and geography teacher,
6. Perceptions, emotions and memories about geography,
7. Teaching practices, activities and geographical curriculum,
8. Personal technological confidence and competence,
9. Personal opinion regarding the use of technology at school,
10. Questionnaire evaluation.

Published on Google Drive™ as a 'Module', the questionnaire was embedded in a web page through which participants could answer it online. The link was sent by email together with the confirmation of their participation at the workshop.

5.3.1.2 Questionnaire on school equipment (#2)

Teachers' possibilities to implement ICT in their classes are strongly linked to their school environment. Those without access to ICT in their class (IWB for examples) will unlikely use ICT in their lessons more intensively than those who have it. School environment and ICT infrastructure are therefore critical variables in the process of comprehension and use of technology for teaching. The questionnaire (Appendix D) aimed to measure schools technological equipment and was printed on paper to let teachers take it to school and ask for support to their colleagues in filling it (many teachers don't know in details what kind of technology their school offers). The choice to print the questionnaire also allowed teachers from the same school to work together in the module.

5.3.1.3 Exploratory personal interview (#3)

After the first online individual questionnaire and before the first meeting, the participants were interviewed. A face-to-face meeting makes sense as it helps both the researcher and the participants: the first has the opportunity to deepen and to better understand the participants' point of view; meanwhile the seconds has the opportunity to be explicit and to motivate some of the answers they gave in the questionnaire.

The interviews were semi structured. They all started from the same questions but were open ended to be able to follow the stream of the conversation. The guide questions were:

- What was your first thought when you found out about this workshop?
- What do you think about the idea of merging technology and geography at school?
- Have you ever taught geography at school? Did you ever use any kind of digital technology in your geography class?
- How do your students see the use of technology? What is, in your opinion, their digital literacy?
- What role do you see for technology at school? Do you see any constrains for its implementation at school?

All the interviews were video-recorded.

5.3.2 During the workshop

The choice of organizing the in-job training as a workshop comes from the conviction that participants are active subjects within the community of learners they join. Since the aim did not consider the quantity of geomedia experimented during the workshop, but instead the level of participation promoted, 'Geografi@Scuola' was conceived as an open-end experience. This means that during the workshop meetings, all teachers participated in deciding what was interesting to deepen and what could be just briefly mentioned. All comments and suggestion were collected during the workshop through audio/video records, participant observations, moderator' self-assessments and participants' assessment questionnaires. The same methods were also used to calibrate the offer of the workshop based on participants' expectations (Amplatz, 1999).

5.3.2.1 Audio/video records (#4)

All meetings were video-recorded integrally. The videos were used to recover participants' comments and questions, and helped to better understand their participation and proxemics.

5.3.2.2 Participant observation (#5)

One of the participants attended all workshop meetings as an observer. She is a primary school teacher interested in the topic and who accepted to assess each assembly by filling an observation grid. The observation was undisguised and participants were told that the observer was present with the purpose of collecting information about how the moderator would interact and propose the activities.

The observation grid (Appendix E) took inspiration from the observation grid edited by Prof. Felisatti, Dr. Rizzo, and dr. Salmaso for the University of Padua.

5.3.2.3 Moderator' self-assessment (#6)

Self-assessment is very important particularly in situations like a workshop, where the relations between the moderator/facilitator and the participants are close and reciprocal. The moderator's personal intuitions and understandings may result in very useful information to read reality. To this end, the self-assessment written by the facilitator was moved right after the end of each meeting.

The personal notes were organized in a simple and flexible structure that recalls the one used by the observing participant. Two main areas had to be discussed: the activities (space, time, fluency, flexibility) and the relations with the other participants (conversation style, personal perception, participants). The style of such notes was personal and reproduced the personal point of view of the facilitator (Appendix F).

5.3.2.4 Assessment questionnaire (#7)

At the end of each meeting all participants were asked to complete a short assessment questionnaire (Appendix G). The aim of this simple tool was to assess the activities and the media and geomedia presented as well as personal emotions and satisfaction.

The questionnaire is presented as an improvement assessment. Participants were free to express their opinions and encouraged to do so in all anonymity, in order to improve the following meetings. All questionnaires given after the four meeting included items on the topic shown in Table 27.

Table 27 - Composition of the assessment questionnaires.

Topic	# Items	Structure
Perceptions about the meeting	6	Likert scale on 7
Activities, spaces and conduction	7	Likert scale on 7
Facilitator	5	Likert scale on 7
Times	1	Multiple choice
Media and geomedia	5	Likert scale on 7
Future implications	1	Multiple choice
Assessment	1	Multiple choice plus space for comments
Satisfaction	1 + (1*)	Likert scale on 7
Early implementation at home or school	1*	Yes / No

* Questions included only in the questionnaire given after the last meeting.

5.3.3 Post-workshop (short-term)

Workshops as well as seminars, training courses and many other formative experiences have at least two kinds of outcomes depending on the time they are made. Short-term outcomes usually are significant and show the participants' progress regarding what have been previously discussed, in our case during the course. Short-term evaluations can be done right at the end of the last meeting up to few months after it, depending by the aims of the research. In this case, the last meeting took place at the end of March and the short-term

evaluation was done between the end of May and the end of June. The long-term evaluation came 13-15 months after the workshop conclusion.

5.3.3.1 Geomedia log (#8)

During the last meeting of the workshop, every participant received two geomedia logs (Table 28) to note all the lessons they would do with the use of one of the geomedia introduced in the workshop. What kind of geomedia and how it is used in a lesson are the main information researchers planned to gain from the form. Teachers, if they wanted so, could leave the form in class or even ask students to help them keep it updated. The form was sent by email to each participant to enable those who prefer to fill it digitally.

Table 28 – The structure of geomedia log.

DATE	**Digital Maps and Globes** *(Google Earth, Google Maps, Bing, Mapquest, ecc)*	**Games and geographical software**	**Geoinformation research on the Internet** *(Google, Wikipedia, ecc..)*	**Work and /or research of images**	**Work and /or research of sounds**	**Work and /or research of videos**	**Digital presentations** *(PowerPoint, Prezi, SlideShare, ecc..)*	**Writing texts and hypertext** *(Word, NotePad, Write, ecc..)*	**Charts and graphs** *(Excel, ecc..)*	**E-mail**	**Digital Communication** *(Skype, Messenger, Chat, ecc..)*	**Social Network** *(Facebook, Twitter, ecc..)*	**Other**
Day	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**	**X (if used)**
	Short description of how the media and geomedia were used in the class activities.												

Initially the idea was to ask teachers to annotate in the school register when ICT were used in class, but privacy issues prevented from carrying out the research this way. This geomedia log was thought out so that it could be used also after the workshop throughout the school year. The low efficacy of the tool limited its' use to the short term period.

5.3.3.2 Short-term interview (#9)

At the end of the school year, approximately two months after the conclusion of the workshop, short-term interviews were made. They were carried out in person, online or via telephone depending on the availability of both the participant and the facilitator/moderator.

The aim of these interviews was to discuss, two months after its conclusion, the impact of the activities proposed and the geomedia presented during the workshop. The teachers' motivations behind geomedia uptake and use were investigated to clarify what reasons convinced them to use that particular geomedia in geography class. During the interviews, difficulties and constraints to the implementation of ICT in class were also analysed.

5.3.4 Post-workshop (long-term)

School policies, scarce funding and poor environments makes particularly slow the process through which considerable changes happen in class. Teachers are free to change their teaching strategies but often this is not enough to make it happen rapidly. In Italy, big changes are usually introduced when a new school year starts. All teachers are asked to prepare a plan for the upcoming year where, among other things, they need to include the projects they want to take part in with their classes, the teaching strategies they want to put into effect and the tools they think they will need to achieve their objectives. It is at this moment, when the school year has not started yet, that primary school teachers in Italy eventually plan to include the use of geomedia in their geography classes.

By considering this, a short-term investigation would have been ineffective for the purpose of researching the uptake and use of geomedia by the teachers. Aware of the necessity of the authors to conclude the research before the end of 2013, a twelve months period had been considered a fair amount of time for teachers to start any implementation of geomedia in their teaching.

Fourteen months after the workshop all the participants were invited to complete a long-term questionnaire and to do a final interview.

5.3.4.1 Long-term questionnaire (#10)

The final questionnaire (Appendix H), consisting in 20 questions and counting in total almost 80 items, was online-based and sent to the participants by email. The main investigated areas concerned emotions in teaching geography and using technology, teaching strategies, self-confidence and skills in using technology, experiences of using technology at school during the year and perceptions on geography and ICT.

This questionnaire investigated one year later how the workshop affected the participants' perceptions of geography, teaching geography and the use of geomedia at school. This was made possible by using the same items given in the introductory online questionnaire, though making the answers comparable. All items referring to the emotions recalled the intuition that beliefs are invisible but still drive a person's actions. It was interesting to see if any change in the felt emotion occurred.

5.3.4.2 Long-term interview (#11)

The workshop 'Geografi@Scuola' was concluded with a long-term interview, done in person, during which the teachers were asked to reflect about their experience with the workshop and with all those contents and information it promoted. The interviews started from exploring the actual work conditions of the teacher and her (eventual) uses of geomedia at school during the year. The difficulties related to the uptake and use of geomedia at school was also discussed. Moreover, participants were guided by the moderator to make a SWOT analysis of the workshop considering its strengths, weaknesses, opportunities and limitations (Hill, Westbrook, 1997; Jackson, Joshi, Erhardt, 2003). In conclusion, teachers were asked if the workshop, for them personally, had prompted any change.

The guidelines for the interview are the following questions:

- Comparing to the last year did you encounter significant changes in terms of technology availability at school? Of what kind?
- During the workshop we explored many geomedia. Did you use any of them in any of yours geography lessons? What geomedia? What activity? For which objectives? How long did the activity last? Did you produce any material from the activity? How would you assess the activity?
- What kind of difficulty (if any) did you encounter in planning or doing these activities?
- Think about the workshop. Can you point out and name its strengths, weaknesses, opportunities and limits?

- Do you think that your participation in the workshop has in any way promoted a change? If yes, what kind of change?

5.3.5 Workshop organisation and contents

The workshop consisted of four meetings done in person. Each meeting consisted in group work and exercitations aimed at introducing several geomedia and different teaching strategies. Most of the contents were presented as if participants were their own students, with several moments dedicated to discussion. Each meeting lasted 2 and a half hours and was divided in two periods by an important moment of the workshop: the break. Those 15 minutes offered the participants time to socialize, relax and have a look at the books and materials presented during the first part of the workshop. The break served also as time for moving the activities from one room to another. Three different locations (Figure 24) were employed for 'Geografi@Scuola':

- the assembly room, where the workshop would start and where all participants had the chance meet each other the first time;
- the computer lab, where the participant would have the opportunity to experiment by themselves different topics, sharing a computer in pairs;
- the classroom, where working groups could be done easily thanks to the bigger space and the data projector which allowed all resources to be introduced without big problems.

At the end of each meeting, participants received the complete list of all resources (books, articles, web sites, materials, etc.) introduced during the activities (Appendix I) and a short individual evaluation questionnaire to fill in (Appendix G).

Figure 24 – The assembly room, the computer laboratory and the classroom where 'Geografi@Scuola' took place.

All activities proposed during the four meetings were thought of while considering learning a social and active process; and teachers were addressed as students and guided through student-centred teaching strategies

(Prosser, Trigwell, 1999) which made them real protagonists of their own learning. The facilitator/moderator engaged with them during the activities as a support figure, as student-centred teaching and constructivist and sociocultural theories request (Kolb, 1984; Rogoff, 1994). Each activity sought to engage multiple interests by stimulating different intelligences (Gardner, 1993) and aimed at offering strategies and activities that would help teachers to support 'deep and not surface approaches' to geography education (Higgs, McCarthy, 2005). In all four meetings, the facilitator was invited to gradually talk less and teach more (Biggs, 2003), therefore enabling the participants to learn by doing and by imitation. As teaching geography using technology was one of the main workshop's aims, an element of ICT skills training needed to be included (Preston et al., 2000), given that no particular computer skills were among the requirements for attending the workshop.

Aware of the low level of penetration of ICT at primary school level (European Commission, 2013), 'Geografi@Scuola' preferred not to present software demanding high-performance devices to run. The workshop plan took into consideration that very often schools have obsolete computers in their computer lab, no IWB in their classes and lack of experience in teaching with ICT. In order to make it easier for teachers to put into action what they would learn during the training in class, the workshop mainly promoted simple online freeware and "flexible" resources.

All geomedia presented had been collected throughout the two years before the implementation of the workshop, from professional associations, websites and journals, educational journals and blogs, forums and books, meetings and conferences. Every resource had been tested in primary school classes by the author or by other teachers, members of the Italian Association of Geography Teachers (AIIG). Furthermore, their implementation strategies and their efficacy were discussed with Dr. Lorena Rocca (University of Padua) and other colleagues from both university and school.

All activities and teaching strategies included in the workshop 'Geografi@Scuola' refer at least to one geomedia (Table 29). During the four meetings, a wide vision on the use of geomedia in primary geography education was also provided. In particular, teachers were guided through carefully chosen geo-resources and geo-application, which were selected by their feasibility in geography class.

Table 29 - Media and Geomedia presented during the four meetings of Geografi@Scuola.

Meeting	Media and geomedia presented *(links are available on the Appendix A)*
I	• Off/on-line presentation (MS PowerPoint™, Impress™, Prezi™) • Mind maps and words maps applications (Tagxedo™, Wordle™, Bubbl.us™, CMaps™) • Shared documents and files on-line (Google Drive™, Dropbox™, SugarSync™) • Social networks (Facebook™, LinkedIn™, Twitter™) • On-line research engines (Google™, Yahoo™, Bing™)
II	• On-line maps (Bing Maps™, Google Maps™, Yahoo! Maps™, ViaMichelin™, OpenStreetMaps™, MapMachine™) • Maps as presentations (GapMinder™, Wordlmapper™, Target Map™) • Digital globes (Google Earth™, Nasa World Wind™, Earth Atlas™) • Digital cartography editors (MapMaker™, Open MapQuest™, Target Map™, MapBox™, Google Maps™, OpenStreetMaps™, ArcGis Online™)
III	• On-line research of images and pictures (Google Images™, Microsoft Images™, Classroom Clipart™, Cepolina™, Flickr™, Panoramio™) • Pictures collections and database (National Geographic™, Flickr™, Google Images™, The Big Picture™, News in pictures™, Reuters™, FreePixels, Image After™, Panoramio™, Gigapan™, Windows On Our World™) • Off/on-line pictures editing software (Gimp™, Photo Filter™, Picasa™, Pixir™, BeFunky™, Photo505™) • On-line translators (Word Reference™, Google Translator™) • Wiki and on-line encyclopaedias (Wikipedia™, Encyclopedia Britannica™, Treccani™) • Off/on-line geographical games (Agenzia viaggi Italia, Italia Politica, Salva il bosco, Seterra™, Mr. Green and Friends™, GranPremio™, Geographical Games™, Didattica.org, Quia, The geography QUIZ)
IV	• On-line research of video (YouTube™, Vimeo™, TED™, KahnAcademy™, National Geographic™) • Off/on-line audio and video editing software (Windows Movie Maker™, Virtualdub™, VideoSpin™, YouTube Video Editor™, Loopster™, Magisto™, Audacity™) • Sounds and video downloading applications (KeepVid™, Deturl™, SaveVideo.me™, VidToMp3™) • Instant messaging (Skype™, Facebook™, Hang-out™, Whats'app™, Viber™) • Instant video communication (Skype™, Hang-out™) • On-line research of sounds and music (Aporee™, GrooveShark™, Spotify™, Stereomood™, Freesound, Grsites™) • On-line recording software (Vacaroo™, Spreaker™)

5.3.6 Participants

The workshop 'Geografi@Scuola' was advertised via the regional section of the Italian Association of Geography Teachers and via the regional office committed to teachers' continuous professional development (Ufficio Scolastico Regionale, http://www.istruzioneveneto.it/). Moreover, the provincial offices responsible of continuous development for teachers were also contacted directly by email, with the request to forward the news to all primary schools in Veneto. This last methods, turned out to be the most effective one, since most of the participants became aware of the workshop thanks to their schools.

5.4 Analysis and results

The workshop was held in March 2012 and consisted of two and a half hours meetings (from 16:00 to 18:30) that took place on four Thursdays (the 8th, 15th, 22nd, 29th) at the Department of Geography of the University of Padova.

Twenty-two primary school teachers registered initially to participate at the workshop. One teacher dropped out of the workshop before it started, and another one, the youngest of the group (aged 35), abandoned after the first meeting for medical reasons.

Twenty teachers (1 male) coming from six out of the seven provinces of Veneto attended 'Geografi@Scuola'. The average age of the participants was 47.8, the younger being 38 years old and the older 61 years old.

In order to guarantee the anonymity to all participants during the analysis, teachers will be named by a combination of a "T-" and a number (from T-1, teacher 1 to T-20, teacher 20). Moreover, since 19 out of 20 of the participants were female, they all will be addressed using female pronouns.

Even if the duration of the workshop was not very long, many investigative tools were employed for its analysis. Aiming for an efficient research of the effects of 'Geografi@Scuola', both quantitative and qualitative methods were considered. The high number of different tools employed allowed the author to gather a lot of information, while requiring longer time for analysis.

In the next paragraphs, results from each research tool are reported.

5.4.1 Pre workshop

Thanks to the introductory online questionnaire (#1) a lot of information was collected from the teachers. The first step required analysing all data collected, followed by a group analysis to understand what kind of participants were going to attend the workshop, what was their personal and professional backgrounds, their motivations and their expectations. A brief summary of these analysis, organized upon several areas of interest, will follow.

Educational background

All participant teachers had a diploma. Three of them had a teaching degree; one had a scientific diploma and the rest (16) had a diploma in liberal arts. Almost half of the participants (9) had a university degree (or equivalent degree) and six attended a master or specialization courses (English, special needs, speech therapy). Among the participants, 11 people had already taken part in an in-training regarding ICT and school. None had ever participated in a geography-focused continuous professional development training before.

Professional experience

All participants had a solid experience in teaching. Nineteen of them had been teaching for at least 10 years, nine of them from 20 years or more and three of them had already 30 or more years of teaching experience. Among the participants only one teacher did not have a permanent position at school (she got it at the end of the year), the rest were all civil servants regularly employed in school when the workshop started. As for their focus subject, only one participant was not teaching primary geography at all. Sixteen teachers were teaching geography to 10 or 11 years old pupils and three were teaching to younger students. Among the participants, four were not teaching geography in the fourth grade of primary school (the workshop was planned for that specific target age); their motivation for wanting to participate was their interest in the program and their intention to start using ICT in classes with pupils younger than those considered as a target. Since these teachers experienced teaching geography at the fourth grade before, it was decided to allow them to take part in the workshop.

Personal satisfaction related to the job and to geography

Seven teachers considered positively their teaching condition, only two were not happy about them.

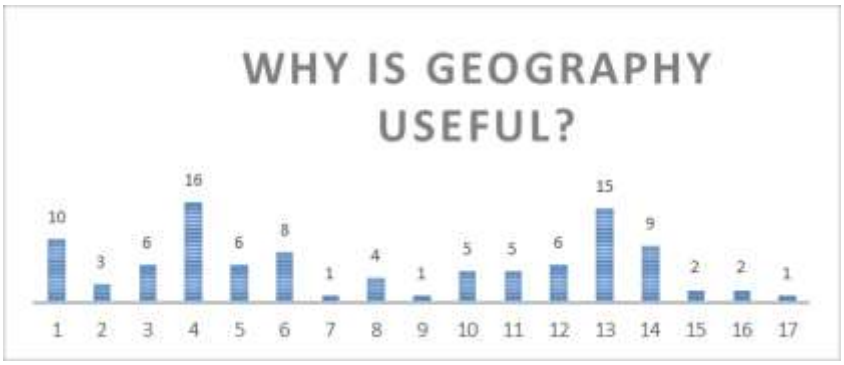
Perceptions about geography

All participants considered Geography a subject that requires ability to make connections and reflections (*answers from "1" to "5"; mean:* 4.60). In their opinions, geography has many links to science (M = 4.25) and even more with history (M = 4.45); it is very useful in life (M = 4.50) and visible/tangible in daily activities (M =

4.35). Its' presence in schools is considered very important as well (M = 4.25) and important is also the role of geographical education played in their personal and professional development (M = 4.00).

Experience in studying geography and emotions in teaching geography

Before the workshop, participants were asked to recall and measure their experiences as geography students. Half of them referred of a pleasant (7) or very pleasant (3) experience, some (4) participants recalled unpleasant experiences, while the rest (6) could not give a positive or negative connotation to their experience in studying geography. Very similar answers were collected regarding their memories about geography: nine teachers recalled positive or very positive memories and only three considered theirs as negative. Nobody accounted as very boring the geography lessons they attended as students, while only two perceived them as difficult. In addition, the specific language of geography was not a problem for the majority of participants (15 teachers and only one said the opposite).



1. To travel and know how to orient; 2. To know where a certain river, a nation or a city; 3. To learn about the cultures of the peoples; 4. To know the environment around us; 5. To become more responsible citizens; 6. To learn to identify local problems and think about solutions; 7. To better understand current events; 8. To understand and respect different cultures and mentalities; 9. To know and understand our roots; 10. To compare the present with the past; 11. To encourage and promote sustainable development; 12. To raise awareness for the protection of landscape and cultural heritage; 13. To develop the ability to ask questions to the complexity of the area and look for answers; 14. To develop the spatial orientation; 15. To experience and promote the territory; 16. To explore the territory and do field research; 17. To investigate local laws addressing the space.

Figure 25 - Answers to the question "Why is geography useful?".

Aims of geography

Participants had different opinions regarding what are the aims of geography. Thanks to the question "*In your opinion, what is geography useful for?*" their professional understanding had been investigated. Since the opinions are influenced by the educational background of teachers, their understanding of the discipline and their professional experiences, most of the answers considered primary geography rather than just geography.

Participants had to pick the five answers (out of seventeen) that in their opinions described better what kind of issues is geography addressing. The collection system did not take into account which answers were picked first, so the analysis processed all choices equally.

What emerged clearly from the results (Figure 25) is that most of the participants considered geography crucial to understand the local environment (item 4) and to develop the ability to investigate the complexity of the world (item 13). About half of the participants believed that geography is also useful to travel and to improve

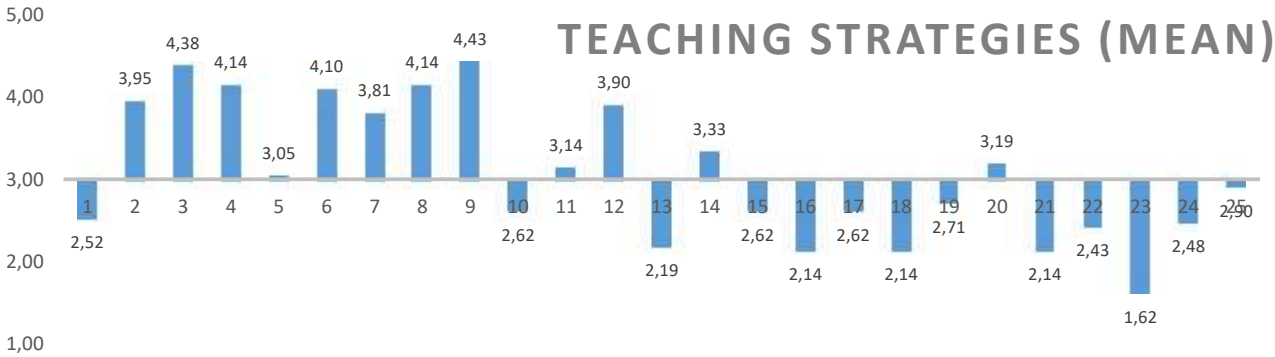
personal orientation within a space (M = 1.14). To learn to find and solve spatial problems (item 6), was also a popular answer.

All answers had been picked up by at least one teacher. Among the less common answers chosen (with only one choice) we found "*to better understand current events*" (item 7), "*to learn and understand our roots*" (item 9) and "*to investigate local laws addressing the space*" (item 17).

The image of geography that arises from these answers brings out both the dimensions of local and global (travel) and enhances crucial competences for any geographers such as investigation, reflection and orientation. It also shows that geography is not just useful for learning names and positions of rivers, states and cities (item 2). What is curious, however, is seeing that outdoor experiences (item 15) and field-work (item 16) have not received many preferences, as well as sustainable development (item 11) and citizenship (item 5). The reasons might be found in a primary curriculum (not only for geography) quite "classroom oriented" and not very open to the local environment.

Geography teaching strategies

Most of the teachers who attended 'Geografi@Scuola' had a very little previous experience in using technology to teach geography. Only four of them, before the workshop, affirmed to having included technology "*often*" in their geography lessons. It is not surprising to discover that the teaching strategy that received the lower rate of implementation is the lesson done on specific geographical software (item 23). Very limited in their



1. Dictate a number of definitions; 2. Represent with drawings, diagrams, tables, the subject being treated; 3. Invite students to ask questions during and at the end of the explanations; 4. Propose in a problematic ground to cover, in a question-stimulus; 5. Ask pupils to read aloud from the textbook; 6. Call to students who already possess the information on a topic and let them share their ideas and / or knowledge; 7. Developing an argument referring to experiences and examples of current and / or family; 8. Create links between different topics and subjects them; 9. Integrating the proposed subsidiary with depth charts; 10. Making use of multimedia technologies, visual aids, web browsing; 11. Organize group work takes place during the lesson time; 12. Resorting to images that show a theoretical argument (slides, drawings, maps, artwork, etc. ..); 13. Organize field trips; 14. Provide an outline prepared by the teacher or synthetic materials (resume, curriculum) and / or depth; 15. Making use of CDs, DVDs, audiovisual, film; 16. Making use of drama and practical experiences; 17. Organize guided tours; 18. Making use of the programs available on the Web; 19. Propose geographical activities from reading a story; 20. Propose fun activities to explore space; 21. Propose activities workshops given by experts; 22. Making use of basic software (Word, PowerPoint, Excel ...); 23. Making use of specific software related to geography; 24. Making use of online resources available for research and a comprehensive geographic; 25. When possible explanations integrate with field experience.

Figure 26 - All the answers regarding the geography teaching strategies.

uptake are also the uses of online software in class (item 18), of dramatization and practical experiences in class (item 16) and the offer of workshop activities held by experts (item 21).

Among the most used strategies in geography we found many of the basic strategies used by teachers in any subjects (Figure 26). The majority of them recalled also the constructivist model of education, considered positively, because of the interaction it promotes. The most used strategies include encouraging the students to ask questions (item 3), promoting problem solving (item 4), asking students to participate and connect to their knowledge (item 6) and creating and making connection between different topic and subjects (item 8).

National Curriculum

All participants were asked to tell if they knew the geographical curriculum (MIUR, 2012) and what they thought about it. Twelve teachers out of twenty affirmed to having read it and knowing what the national curriculum said about teaching geography in primary school. Four teachers said they knew little or nothing about it. The participants' opinions on the geographical curriculum were overall generally positive (9 on 20 said it was fair).

Technological competence

The workshop participants had heterogeneous technological competences. Seven teachers affirmed to be autonomous computer users, while three other defined their own confidence with computer very low.

Despite their level of experience (only four teachers had less than 5 years' experience in using computer, and most of them used it daily) their confidence with some of the basic software and tool was quite low (Figure 27). The most familiar activities for the participant were: "*Searching the web*" (item 7), "*Checking, sending and receiving email*" (item 6) and the "*Use of software for writing texts*" (item 1). The "*Use of wikis*", in particular of Wikipedia, was the only other item that received a positive feedback (even if very tiny one). On the other side, teachers did not feel confident with Social Networks (item 8), Instant Messaging platforms (item 9) and blogs (item 10). Their knowledge in spread-sheets (item 2), presentations (item 3), graphics (item 4) and educational software (item 5) was also not positive. This was unfortunately true also for geographical software as digital maps and globes (item 12): only two participants affirmed to be confident in using them.

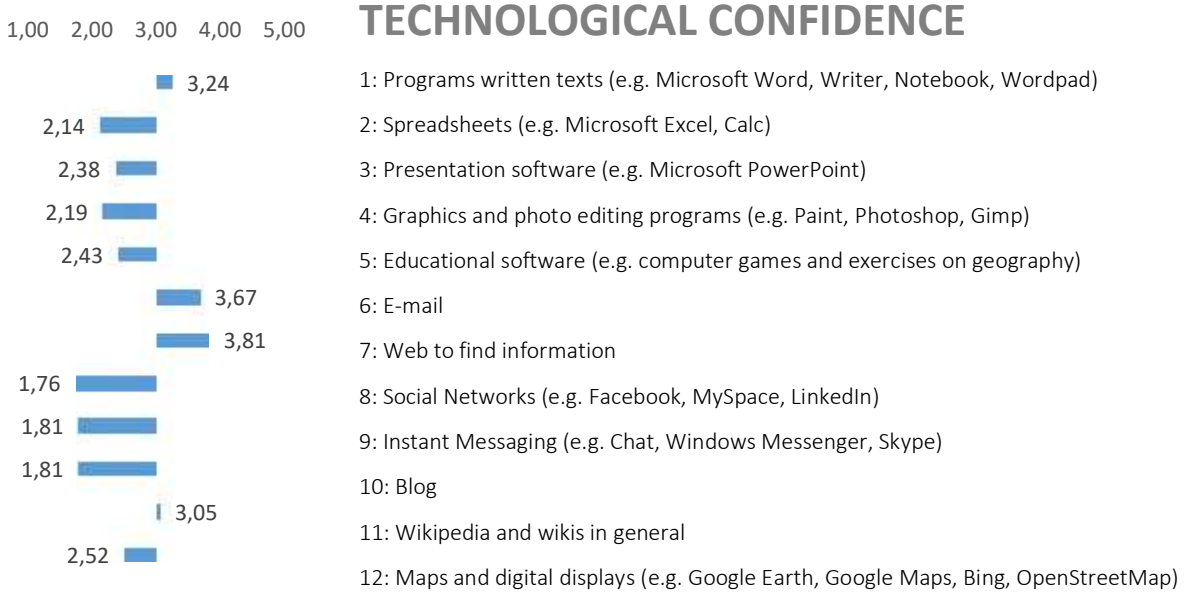


Figure 27 - Participants' technological confidence.

It is clear that participants made a limited use of these technologies. They all had computer at home, but only to use them to make simple operations such as writing texts and surfing the Internet. In particular, the answers to the question "Technology at school" clarified what kind of activity they did with technology regarding their lessons. The most used operations done with technology were "*Research the web to find materials for the lesson*" (item 7), "*Prepare worksheets and materials for the students*" (item 2) and "*Get information from Internet and consult organizational issues*" (item 5). What was not done was to "*Participate in on-line professional development trainings*" (item 6) and "*Use technology to communicate with colleagues and students*" (item 4). A basic use of technology made by the majority of participants (only two of them seemed to be confident in handling technology out of and in class) was described not only from questionnaires data but also from the explorative interviews done before the workshop.

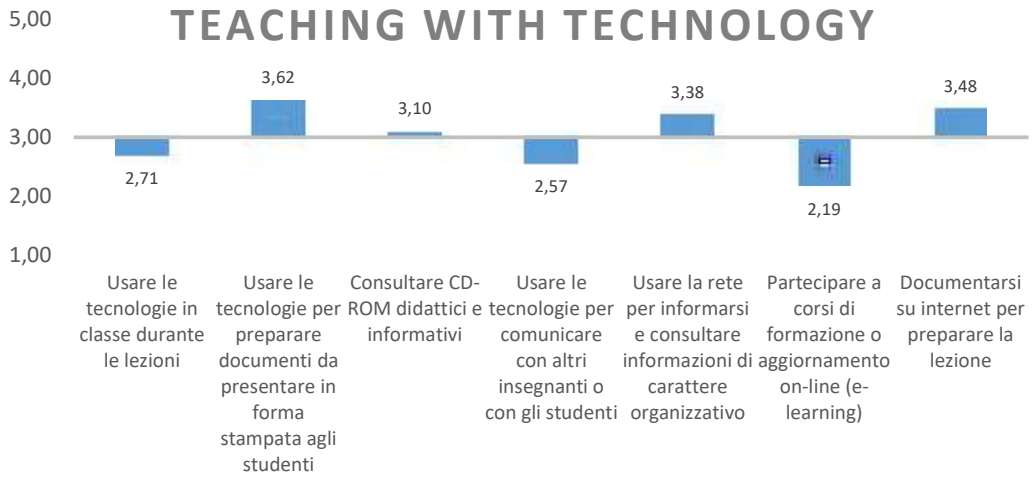


Figure 28 - Teaching with technology.

Personal opinions on implementation of ICT at school

Teachers decided to attend 'Geografi@Scuola' because they believed the uptake and use of technology an important element of modern teaching, something relevant for the future of their students and for their profession. They had different opinions regarding how hard and demanding the implementation of digital media would be in their classes probably because of their different working conditions. Those teachers who could count on an Interactive Whiteboard connected to the Internet in their own class, showed to judged it easier than those who worked in schools where there was not even a decent computer lab.

Motivation and expectations

The motivations given by the participants' in the questionnaire and during the exploratory interview highlighted the opportunities teacher professional development trainings had to offer. All participants mentioned that their choice to take part in the workshop was linked with their hope to improve and enhance their teaching practices. Six participants also mentioned that their choice was driven by the fact that it was a workshop and not a traditional in service training, where notoriously there is low participation and no "hands on" activity. The participants' motivation was also strongly linked to the topic of the course: geography and technology at school. Thirteen teachers mentioned the fact that they decided to attend because they considered a workshop in geography very interesting and something they had not taught before; would that be because they did not feel very confident teaching it or because they were looking for some new ideas on how to do it. It has already been mentioned that it is not very common to find an in service training in geography for primary school (in Italy). Another incentive to personal motivation came from the combination of geography and technology; eight participants in fact mentioned the intention to enhance personal knowledge and use of technology in class as an important factor for their participation to the workshop.

Motivations are also translated in expectations. The majority of teachers expected the workshop to contribute significantly to their knowledge of technology (item 16) as well as to their skills (item 7). They expected to learn how to teach better geography, to make it relevant for the children thanks by using ICT (item 13). They would have liked to "do" more and "talk" less in order to be able to take as many strategies and tools as possible directly in their classes (item 13). The social dimension is also part of the expectations for 'Geografi@Scuola': five teachers hoped to share knowledge and experiences with motivated colleagues.

Teacher's profiles

The huge amount of data collected for each participant through the introductory questionnaire provided much useful information to the author/study. However, humans (teachers) and learning (improvements) are both very challenging subjects to research, therefore a big amount of data and clear strategies were required.

Many indicators could be measured starting from the collected data. The choice was made to follow as closer as possible the guidelines given by the objectives of the research module. Teachers' emotions about teaching geography and using computer were chosen as functional indicators of their psychological engagement in the workshop topic. On the other hand, their technological competences, their confidence in using technologies at home as well as in school, and their ability to use the Internet as support tool for teachers were the indicators extrapolated from the questionnaire. That, together with the information collected from the interviews, also helped to better understand both teachers' experiences and needs.

The result of the analysis is a table where for each of the participants a few indicators are provided to help clarifying their professional and personal profile. The table presents six independent indicators and two additional ones that intend to summarize the teachers' profiles (Table 30). Both '*Teaching Geography – Positive Emotions'* and '*Computer – Positive Emotions'* show the answers' mean to the items that investigated emotions (negative values were turned). The index '*Use of resources for teaching*' was built as the mean of all answers given to the questions investigating the use of any tool (both analogical or digital) as a teaching resource in class (items number 9, 10, 12, 15, 18, 22, 23 and 24; question 'La geografia a Scuola', Appendix C). The indicator '*Competence and autonomy in using ICTs*' is the result of combining teachers' personal perception of competence and autonomy in using technology. The indicator '*Use of ICTs in class*' reports directly the answers of teachers to that precise request. Finally, the last indicator ('*Use of Internet*') combines the answers collected from both the question '*Use of the Internet for the research of additional informations for the lesson*' and the question '*Use of the Internet for the preparation of teaching materials*' ('Le tecnologie a Scuola', Appendix C).

The two conclusive indexes are: '*Emotions – MEAN*', which is the mean of the two previous indicators on emotions; and, '*Using media* – MEAN', which is the mean of the rest of the indicators, presented in the previous paragraph.

All indicators together offer a visual representation (and of course numerical) of teachers' emotions, confidences and competences in teaching geography using technology before the workshop started.

Initially, the analysis of the introductory interviews was supposed to be carried out by using texts analyses software (such as MAXQDA or ATLAS), but after some consideration, it was decided to use interviews only as support for the interpretation and reading of the introductory questionnaire. This decision was supported by the fact that most of the information agreed on the profiles emerged from the analysis of their questionnaires and therefore did not require any logical or syntactical analysis that could motivate the use of such software.

Table 30 - Teachers' profiles indicators PRE workshop.

Teacher	Teaching Geography - Positive Emotions	Use of resources for teaching	Competence and autonomy in using ICTs	Computer - Positive Emotions	Use of ICTs in class	Use of Internet	Emotions - MEAN	Using media - MEAN
T-1	3,38	2,67	2,50	3,77	3	4	3,58	3,04
T-2	4,00	2,44	4,29	3,46	3	4,5	3,73	3,56
T-3	3,85	4,22	2,86	4,00	3	4	3,92	3,52
T-4	5,00	2,44	2,86	3,62	2	3,5	4,31	2,70
T-5	4,62	2,78	1,07	1,85	2	3	3,23	2,21
T-6	3,46	3,00	3,21	3,54	3	4	3,50	3,30
T-7	3,69	3,11	3,57	3,38	2	3,5	3,54	3,05
T-8	3,69	4,44	5,00	4,62	4	5	4,15	4,61
T-9	4,69	3,89	3,93	4,31	5	5	4,50	4,45
T-10	4,00	2,22	2,86	4,00	2	4	4,00	2,77
T-11	4,31	3,56	3,57	3,38	3	3,5	3,85	3,41
T-12	4,31	2,11	1,79	3,31	3	1	3,81	1,97
T-13	3,85	3,00	2,50	4,00	5	4	3,92	3,63
T-14	4,46	2,67	3,93	4,31	2	4,5	4,38	3,27
T-15	3,92	3,11	2,86	3,62	3	3,5	3,77	3,12
T-16	3,77	3,33	1,43	2,23	3	3	3,00	2,69
T-17	3,54	2,67	2,50	3,46	2	3	3,50	2,54
T-18	3,62	2,89	3,57	4,31	2	4	3,96	3,12
T-19	4,08	2,78	2,86	3,77	5	2,5	3,92	3,28
T-20	4,15	2,78	2,14	4,31	3	3,5	4,23	2,86
Mean	4,02	3,01	2,96	3,66	3,00	3,65	3,84	3,15

By reading Table 30 some considerations can be made without describing each of the personal profile of the participants. Two things can be assumed from this data, and particularly from that referring to emotions: all participants feel positive emotions concerning the teaching of geography (ten of them have strong positive feelings about it) and they also have a positive emotional approach to the use of computer. The indicator 'Use of Internet' shows in fact high levels of confidence with the use of Internet among the participants, while their

self-perceived competence and autonomy in using ICTs and their uses in class are very heterogeneous, with only few positive exceptions.

Four main groups of teachers can be seen if based on the participants' backgrounds and technological skills for using ICTs at school. The most represented one, counting ten teachers, includes teachers that have neither strong competence nor experience in using technology at school. There are autonomous computer users but they use only the few functions they know. Five teachers have similar competences to the previous group, but have more experience in using technology for preparing lessons and teaching. They do not feel autonomous but they have a positive approach to technology that pushes them to try to use it more. The last five people make the last two groups. Two teachers with experience in using several technologies in different situations at home as well as at home are in one group. The second is composed of the other three who had very little or no experience at all of using ICTs in teaching, as well as low skills and experience in using technology at all.

Regarding the emotions, we have a group of teachers where only two are not feeling positive emotions about using technologies in their geography lessons. This result is supported by the fact that teachers joined voluntarily 'Geografi@Scuola', thus being aware of what to expect and perceived with positive attitude.

From this first analysis it can be seen that there are only two teachers who have both strong confidence and a very positive approach to using media in teaching (T8 and T9), and only one teacher who did not express positive emotion and very low confidence with technology (T5).

Even if positive emotions seems to be quite a good starting point for the workshop, it is only with further analyses that we could confirm if the low technological competence of the participants had somehow affected their participations to the activities.

5.4.2 During the workshop

The workshop consisted of four meetings during which many activities would be performed and numerous materials presented. The moderator had the demanding role to guide the discussions and adapt the contents depending on the teachers' interests. Choices and adaptations had to be taken and done instantaneously during the workshop, but were also object of discussion and reflection at the end of each meeting. The video recordings (#4) and the comments of the observing participant (#5) are two tools that allowed and empowered such reflections as they gave the opportunity to meditate and understand singular situations by watching them as many times as needed on the computer screen, and enriching them with the perspective of somebody who participated in those moments.

Video recordings mainly helped in recovering participants' opinions and interventions, but were also used to detect the activities that created more problems or those moments when the attenders' attention decreased. Video-recordings helped also a lot to analyse the participation of all teachers, since they enabled the researcher to focus on just one subject at the time. All the research activities carried out using these videos were done using the freeware VLC Media Player (http://www.videolan.org/vlc/). Direct observation was the other investigation tool that contributed to the evaluation of the workshop. The grid deputed as observation tool was adapted from an existing evaluation form created by Costoldi (2002) but this tool happen to be too structured for the observing participant, who decided to fill in only the open questions included in it. Her decision was taken after the first meeting, during which she had some difficulties in assessing the workshop as specifically as the grid requested. The possibility to count on a very precise observation tool would have been very useful indeed, notwithstanding that, her work has been considerable and her comments valuable.

At the end of each meeting, the moderator was asked to write down his perceptions of how the meeting had gone, following few key questions. The self-evaluation document format (#6) was inspired by few of the many self-evaluation tools teachers are suggested to use in their classes. It included questions provoking reflections on the use of time and spaces, on the efficacy of the methodological choices taken, on the teachers' participation and on the professional relation with each other. This tool turned to be one of the most valuable for the moderator as it helped him to express his opinions and perceptions right after the conclusion of each meeting, as well as record them for future reflections. These documents gave a clear idea of how the meeting went: the enthusiasm and the delusion the moderator felt. It appeared clearly how positive the feeling was right after the first, the third and the fourth meetings; in the same way was clear how less enthusiastic was the tone after the second performance. In the second self-evaluation document, in fact, it can be read:

> "*This time I don't think I gave clear impression of my expertise. Probably because I was not as ready as the previous meeting, when the activities and all the examples were defined. I should be aware of where I am leading the discussion if I decide to show one example instead of another. This situation occurred today, showing the example of the virtual visit to Rome and the participants got confused by the example instead of clarify their doubts*" (Appendix F, personal translation).

By reading the self-evaluation reports, the workshop appears as a very rich opportunity of continuous professional training as well as a positive format for learning. These intuitions are supported by the answers collected from the assessment questionnaires (#7) that every participant had to fill anonymously at the end of each meeting. The analysis of that data (see Table 31), besides a general positive feedback shared by the participants, highlights few interesting information.

Table 31 – Participants' evaluation of the four 'Geografi@Scuola' meetings.

# Meeting	1	2	3	4	Mean
Date	08/03	15/03	22/03	29/03	
# Participants	21	17	13	16	16.75

1 - Overall this meeting was

1 - Challenging	3.21	3.50	2.60	2.81	3.03
2 - Stimulating	6.40	6.59	6.33	6.47	6.45
3 - Useful	6.43	6.63	6.73	6.60	6.60
4 - Boring	1.15	1.13	1.00	1.19	1.12
5 - Enjoyable	6.25	6.63	6.36	6.56	6.45
6 - As expected	6.00	6.69	6.45	6.50	6.41

7-point Likert scale (1=Strongly disagree; 7= Strongly agree).

2 - Organization and carrying out of the meeting

1- The atmosphere of the event was pleasant	6.52	6.59	6.69	6.73	6.63
2- The proposals were equilibrated between theory and practice	6.48	6.65	6.54	6.50	6.54
3- The objectives were clearly defined	6.48	6.59	6.62	6.40	6.52
4- The fundamental concepts were communicated with clarity	6.62	6.59	6.54	6.33	6.52
5- The working structure was understandable	6.57	6.41	6.38	6.47	6.46
6- The location for the meeting was appropriate	5.45	6.47	6.23	6.13	6.07
7- The camera influenced the way I took part in the activities	2.33	2.18	1.77	2.20	2.12

7-point Likert scale (1=Strongly disagree; 7= Strongly agree).

3 - Which of the following roles do you believe the tutor had? And to which degree of presence?

1- Clarification	6.38	6.69	6.69	6.53	6.57
2- Guidance	6.10	6.71	6.62	6.53	6.49
3- Support	6.33	6.63	6.54	6.53	6.51
4- Motivation	6.43	6.63	6.69	6.67	6.60
5- Consultation	6.38	6.53	6.62	6.47	6.50

7-point Likert scale (1=Never; 7= Always).

4 - How did you consider the working pace?

1- Too slow	0%	0%	0%	0%	0%
2- Slow	0%	0%	0%	0%	0%
3- Adequate	65%	88%	85%	82%	80%
4- Quick	35%	12%	15%	18%	20%
5- Too fast	0%	0%	0%	0%	0%

Single answer question.

5 - How do you consider the technological tools introduced during this meeting?

1- Hard to include in teaching	3.44	3.19	3.00	4.25	3.47
2- Useful with my 4th year class (8-9 years old)	6.06	5.40	5.25	5.06	5.44
3- Pertinent for my teaching of geography	6.30	6.19	6.08	5.81	6.10
4- A novelty (compared to those tools I already knew of)	5.21	6.00	6.25	5.88	5.83
5- As anticipated (those I had hoped to find)	6.05	6.60	6.58	5.94	6.29

7-point Likert scale (1=Strongly disagree; 7= Strongly agree).

6 - Are you planning to try out the tools presented during the meeting?

1- Yes, all of them	35%	12%	8%	0%	14%
2- Yes	30%	24%	38%	63%	39%
3- I will try	35%	65%	54%	31%	46%
4 - I don't think I will have the time	0%	0%	0%	6%	2%
5 - No	0%	0%	0%	0%	0%

Single answer question.

7 - Would you replicate a similar experience as the one you had today?

No	0%	0%	0%	0%	0%
Yes, exactly like I experienced it	95%	94%	100%	94%	96%
Yes, with some modifications	5%	6%	0%	6%	4%
Yes, adjusted	0%	0%	0%	0%	0%

Single answer question.

8 - Are you pleased to have participated at this event?

Not at all	0%	0%	0%	0%	0%
2	0%	0%	0%	0%	0%
3	0%	0%	0%	0%	0%
4	0%	6%	0%	0%	1%
5	10%	0%	0%	0%	3%
6	30%	29%	31%	31%	30%
Very much	60%	65%	69%	69%	66%

Single answer question.

9 - Are you pleased to have taken part in the workshop?

Not at all	0,00%
2	0,00%
3	0,00%
4	0,00%
5	0,00%
6	0,18%
Very much	0,82%

This question was asked only at the end of the last meeting. Single answer question

10 - Have you already had the chance to try at home or school some of the things we experienced in the workshop?

Yes	0.94%
No	0.06%

This question was asked only at the end of the last meeting. Single answer question.

Primarily, from the first question (Table 31, item 1) is clear that all four meetings were engaging, useful, nice to follow and not boring. The participants agreed in defining the meetings not too difficult to follow (3.03 on a 1 to 7 scale) and found the 'rhythm' of the meetings usually adequate to their need (Table 31, item 4). Even more important, is that they all believed what they attended was coherently fitting to their expectations (6.41 mean on 7-point scale). Teachers expressed their satisfaction of having attended the meetings (see Table 31, item 8 and 9) and considered it a positive experience for their colleagues to attend (Table 31, item 7). The second questions, in the assessment questionnaires investigated the workshop structure, its' contents, the strategies put into effects as well as the physical and social environment in which the workshop had taken place (Table 31, item 2). All results indicated a situation of harmony where all participants agreed on defining all categories very positively. The only note made was to comment the role of the video camera as external influence for teachers. Around 75% of the participants affirmed after each meeting that being video-recorded did not interfere with their participation in the workshop in any way (their answers were ones, the lower rate of the 7-point scale). Few participants, furthermore, felt the presence of the video camera as a limit for their natural participation in the activities. This negative factor, however, affected less people in the last two meetings than the first two, meaning that participants got slowly used to it. The third asset of questions referred to the moderator and registered full positive feedback regarding his role and his methods (Table 31, item 3). Real interesting information emerged from the answers to question five, teachers who attended the workshop considered the geomedia presented during each meeting new and relevant even if they were close to what they expected to find by attending 'Geografi@Scuola'. The very interesting news was, anyway, that the geomedia introduced to the teachers were both considered not difficult to be implemented as teaching tools and feasible tools for their own students (Table 31, item 5). Paired to these informations, the positive answers given to question number six seem to suggest that the more difficult geomedia were considered the less chances they had to be included in the teaching (Table 31, item 6). Following this logical connection, the

fact that at the end of the last meeting 15 teachers out of 16 affirmed they already experiment for some of the geomedia presented in the workshop at school or at home, represented an extremely positive data.

5.4.3 Post-workshop: 2 months later

The workshop concluded on Thursday the 29th of March, about two months earlier than the end of the school year, which gave all participants the opportunity to go back to their classes and teach geography at least for eight lessons.

A short-term evaluation at the end of the school year aimed at investigating if the attenders had the opportunity to use any of the geomedia or the teaching strategies introduced during the workshop and to what purpose in particular.

During the planning phase of this research, it was not clear if teachers would use more frequently geomedia during the two months after the end of the course or the following year. Usually participants' enthusiasm and motivation would be high right after the conclusion of any positive CPD training or professional rich experience to decrease later, slowly, with time. This was the hypothesis made also for this study, even if it was not fully shared because of some considerations about time and school environments. First, time: mostly the lack of it is what teachers often believe to be one of the biggest limits to their job. In addition to this, the last two months of schools in Italy are always very hurried because of the poor continuity given by many short holiday breaks (Carnival and Easter) that usually come between the end of February and the end of March. This situation may also influence the possibility for the participants of 'Geografi@Scuola' to be able to create the ideal conditions to include geomedia in their lessons in such short time. Similar situation were raised also by the fact that several schools offered no condition for the implementation of geomedia or strategies introduced during the workshop. These considerations appeared to weaken the hypothesis of a substantial use of geomedia by the teachers during the period between the end of the workshop and the end of the school.

The investigation tools arranged to study this particular phase of the research were in particular geomedia logs (#8) and short-term interviews (#9). The forms were created in order to allow teachers to register all the activities they would do using geomedia in their lessons (read more in Section 5.3.3.1). Aware of the high commitment of primary school teachers to their job and convinced that all participants might have had many issues to deal with during the last months of school; the idea that this kind of tool could not have been particularly easy for them to keep updated was considered. Alternatives like short personal diaries or the use of the class registers were initially taken into consideration to be later discarded because of their high demands in terms of time or because of privacy issues. The activity form appeared to be the easier and lighter solution

for a regular update on the use of geomedia in the classroom. Each participant received one geomedia log printed on paper (on both sides) during the last meeting of the workshop and the explanation on how it had to be filled in. The form and the instructions were also sent by email the day after and uploaded online in the repository web page of the workshop (http://donadelli.it/geoascuola/).

The school year ended for the students on the 8th of June 2012. Starting from the week afterward, all participants were reached by phone calls and Skype™ calls or met personally in order to record their short-term interviews and collect their activities logs.

Among twenty participants, only six teachers managed to fill in their activities logs (Table 32). For the majority of those who did not complete this task (8 teachers) it was a matter of lack of time for doing it, for the others it depended on them not having anything to register in their log (6 teachers). If the activities log had been used alone, this result would have been quite complex to understand. Luckily, at the same time, short-interviews were carried out, allowing the researcher to foresee the reasons standing behind the poor efficacy of the investigation tool. During the short-term interviews, teachers described their experiences using geomedia in class, their attempts or their impossibility to implement such resources in their geography lessons, motivated their reasons and supported their reflections. Fifteen teachers affirmed they used at least once geomedia in their geography lessons. Five of them used them several times. Besides the frequent use of geomedia or not, it was interesting to see that many teachers considered what they had done with geomedia as a small result or a 'first step', something that had to be improved. In particular, the fact that half of the teachers mentioned in their interviews (without any reference from any of the questions asked) that they hoped to do better or use more such technologies the following year was very attention grabbing. A notable explanation of this common feeling seemed to be the need for teachers to plan as much as possible all activities where geomedia were to be used. Teacher-11 clearly explained this need in her short-term interview by affirming: "*Mi ripropongo […] per l'estate di riguardare i materiali che ci hai dato perché erano tanti e molto densi. Io avevo provato, anche sull'onda dell'entusiasmo, ad inserirli subito nella lezione ma ho visto che avevo bisogno di programmare bene la lezione. Spero dunque l'anno prossimo di riuscire a fare di più*" (T11).

Table 32 – The geomedia log filled in by teacher T4.

DATE	**Digital Maps and Globes** *(Google Earth, Google Maps, Bing, Mapquest, ecc)*	**Games and geographical software**	**Geoinformation research on the Internet** *(Google, Wikipedia, ecc..)*	**Work and /or research of images**	**Work and /or research of sounds**	**Work and /or research of videos**	**Digital presentations** *(PowerPoint, Prezi, SlideShare, ecc..)*	**Writing texts and hypertext** *(Word, NotePad, Write, ecc..)*	**Charts and graphs** *(Excel, ecc..)*	**E-mail**	**Digital Communication** *(Skype, Messenger, Chat, ecc..)*	**Social Network** *(Facebook, Twitter, ecc..)*	**Other**
/2012 14/04	X												
	Today we played Google Earth in the laboratory, to localize children' homes, our school and our town.												
/2012 21/04			X										
	Today we browsed the Internet to look for some information on how to save energy and alternative energy resources.												

The use of geomedia by 'Geografi@Scuola' attenders, two months after the conclusion of the workshop, can be considered neither excellent nor insignificant. Almost half of the teachers tried to teach geography including Google Earth in their lessons; many of them browsed the Internet looking for informations or downloaded pictures to use in class. One of them (T14) even succeeded in downloading two videos from YouTube at home and showing them to the class (where they had no Internet). Considering the teachers' contexts and previous experiences, these results appeared as positive short-term effects of the workshop.

Keeping in mind the teachers' low use of activities plans and the strong efficacy of short-term interviews, it was decided not to ask teachers to record all the lessons where geomedia are used throughout the following school year in a new activities log. It was instead chosen to leave teachers free of any duty and to appraise long-term interviews by preparing them meticulously.

5.4.4 Post-workshop: 14 months after

Twelve months after the conclusion of 'Geografi@Scuola' all participants received by email the request to fill in the final questionnaire and to define a date for the conclusive interview. Only few participants answered the questionnaire right away, many asked instead to wait the end of the school in order for them to have more time for both the questionnaire and the interview. The majority of the answers and interviews were therefore collected between June and July 2012. Three participants did not answer emails and phone calls even the next September, which is why their questionnaires and interviews are missing.

To describe the data collected during the last phase of investigation the same method of the pre workshop phase, when indicators were adopted, was used. The same indicators were calculated on the data collected with the last questionnaires thus making possible to compare them from before and after 'Geografi@Scuola'. Through this analysis other reflections became also possible like for example those regarding the use of teachers groups with similar characteristics. The analysis examined in particular the role of teachers' emotions in teaching geography and in using computer and the teachers' competence, autonomy and skills in using media for personal or professional purposes (Table 33 on emotions and Table 34 on ICTs).

Table 33 describes the teachers' emotions about teaching geography and using technology. As seen before (Table 30 of pre-workshop indicators), all participants recalled positive emotions referring to both the teaching of geography and the use of computer. What emerged after the workshop substantially confirmed this positive scenario registering also some small improvements that interested the vast majority of the participants (see the means in Table 33).

Table 33 – Emotions' indicators comparison between PRE and POST workshop.

(The arrows are just a visual support, grey cells where emotions improved).

	PRE	POST	PRE	POST	PRE	POST
Teacher	Teaching Geography - Positive Emotions		Computer - Positive Emotions		Emotions - MEAN	
T-1	3,38	4,08	3,77	3,46	3,58	3,77
T-2	4,00	4,46	3,46	3,69	3,73	4,08
T-3	3,85		4,00		3,92	
T-4	5,00	4,92	3,62	3,85	4,31	4,38
T-5	4,62	4,15	1,85	2,31	3,23	3,23
T-6	3,46	3,54	3,54	3,38	3,50	3,46
T-7	3,69	3,77	3,38	3,23	3,54	3,50
T-8	3,69	3,75	4,62	4,00	4,15	3,88
T-9	4,69	5,00	4,31	5,00	4,50	5,00
T-10	4,00	4,08	4,00	4,38	4,00	4,23
T-11	4,31	4,54	3,38	3,62	3,85	4,08
T-12	4,31	4,23	3,31	3,50	3,81	3,87
T-13	3,85	4,08	4,00		3,92	
T-14	4,46	4,08	4,31	4,23	4,38	4,15
T-15	3,92	3,50	3,62	3,75	3,77	3,63
T-16	3,77		2,23		3,00	
T-17	3,54	3,77	3,46	3,54	3,50	3,65
T-18	3,62	4,67	4,31	4,50	3,96	4,58
T-19	4,08		3,77		3,92	
T-20	4,15	3,92	4,31	4,00	4,23	3,96
Mean	4,02	4,15	3,66	3,78	3,84	3,97

The table that refers to the teachers' competence, autonomy and ability to use technology (Table 34) is considerably more eloquent and the interviews helped giving meaning to almost all the information it contains. The first analysis consisted in evidencing the changes among individual teachers, in order to start investigating the effects 'Geografi@Scuola' had on each one of them. By watching the indicator '*Using media'* we saw that if before the workshop we only had two teachers in the group with high confidence in using geomedia, after the workshop the teachers were three (T18 joined T8 and T9), and two more were very close to join (T1 and T7). T18 was an interesting subject because though not much change was reported in her working conditions at school, she improved a lot. Given that she did work with an IWB in class, which usually makes a difference,

it was evident that the workshop played a fundamental role in her professional development. After the workshop, she used technology in class twice as much as she did before (from 2.00 to 4.00) and used the Internet at her best (5.00). The implementation of resources in her lessons improved significantly, one year after the first questionnaire her perception of competence and autonomy reached 4.29 points (out of 5, and she had started from 3.57). Teachers T8 and T9 were the only two who started with an already high level of confidence and competence in using technology but experienced different situations. T8 had a strong pedagogical technological competence; she was the person in charge of technologies in her school and he was the class teacher of a 'Classe 2.0' where all the students had an individual notebook. Her classroom did not have an IWB but was equipped with a data projector instead. By taking a closer look to her indicators, we found interesting that her level of perceived competence and autonomy had decreased in the most recent measure. This happened, as explained by the teacher T8 during her final interview; because thanks to the workshop she had realized that there were so many resources and applications that she still did not know. She knew of a lot of software, but not many could improve her teaching of geography. Different case is the one of teacher T9, whose scores had been great since before the workshop, and had gotten even better one year later. The teaching conditions of T9 were very different from all the others as she was an autonomous teacher who utilized her own notebook and her Internet data connection for teaching. Thanks to a data projector, she succeeded in using media and geomedia in her geographical classes. For teacher T9 major improvements were registered in using resources in class (meaningful increase from 3.89 to 4.56) and in her perception of competence. Her participation to 'Geografi@Scuola' seemed to be the missing piece in her great puzzle of competences.

We also mentioned teachers T1 and T7, who both improved a lot in one year. Indicators showed that Teacher T1 benefited from the workshop in all areas. She was very motivated to attend the workshop, which probably made the difference, given that she had no changes in terms of technology equipment in her school. In the final interview, she referred of having made a better use of the school's computer laboratory and continuing to use her personal computer to retrieve from the Internet what she needed. After the workshop, and thanks to the lists of geo-resources and geo-application she had received, she also noticed she had become better at collecting quality resources for her geography lessons. Teacher T7 also improved a lot, but the reason was that during the school year her class had been equipped with an Interactive White Board with Internet connection. In her interview she mentioned that she had been trying her best to use the knowledge learned during 'Geografi@Scuola' into her teaching, but it was only after the IWB had been installed that she could really put most of what she had learnt into action. She did not feel confident enough though (the IWB entered her class only two months before the end of the school) but she was already convinced that IWB would be helpful in developing her teaching, not only in geography.

Keeping in consideration the indicators, we saw that also teacher T10 and T12 benefited from the workshop. They both improved on all indicators with the exception of the use of ICT in class. If this was very understandable for teacher T12, who had to move from her class equipped with the IWB to another class that had only two old computers in the back, it was not for teacher T10 who remained in the same class with IWB. The reason for the change notices for T12 was, in the teacher opinion, the fact that before she had not included as many strategies, geo-resources or geo-application in her lessons as after she had come to the workshop; therefore noticing how poorly she had previously used ICTs in class.

Not all teachers anyway seemed to have taken advantage from the workshop. Among the attenders there were teachers who did not change much from one year to the other (see teachers T2, T6, T11, T15 and T17) and there were some who even showed some worsening.

Teachers T4 and T5 had similar situations. They were both not so confident with technology for neither personal nor professional uses, but teacher T4 attended the workshop with more passion comparing to T5 who, in the end, resulted being the teacher with less positive emotions and technological confidence of all the participants. Emotions and motivation could have made the difference in terms of values if only the equipment of T4 and T5 had been the same. This had not been the case because T5 taught using an Interactive Whiteboard while T4 could only rely on a poor laboratory. The two situations had therefore been described similarly by the indicators but were indeed quite different.

We concluded the analysis by describing the case of teacher T20, whose indicators described a teacher with poor confidence in using technology on both personal and professional level. This was not very far from the reality but did not tell all the truth. Teacher T20, as it can be seen in Table 33, was highly motivated before and after the workshop. She enjoyed it very much, learnt many interesting things for her job and put them into practice after the training. Nevertheless, there are two main constraints in this situation. The first is the fact that she worked in the poorest of all schools involved in this workshop, with a computer lab that had very few old and slow computers (without USB ports), no local network, no internet access and only one data projector that could not be moved. The only computer that had Internet access in the whole school was located in the teachers' room where students could not go in. All teachers of that school had already asked several times for improvements but nothing had happened yet. The second impediment was unfortunately represented by the parents of teacher T20's students, to whom she taught geography using the computer and made them create text files as well as presentations. Carry out these tasks using computers took long time because it was the first experience working with computer at school for both teacher and students. The parents had complained because of the few activities their children had written in their exercise book, and, even if at the end of the geography activity (it was about exploring different administrative Italian regions) they received a CD with all the materials done, they were disappointed and affirmed the teacher had not done

enough in class. Besides all this, teacher T20 was still enthusiastic about the work her students had done and decided she would repeat the experience the following year. Another thing indicators cannot say about teacher T20 is that she was one of the few teachers who also attended other workshops, lectures and seminars promoted by the Italian Association of Geography Teachers after the conclusion of 'Geografi@Scuola'.

Table 34 – ICT's indicators comparison between PRE and POST workshop.

(The arrows are just a visual support, grey cells highlight where the use and the competence improved).

	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Teacher	Use of ICTs in class		Use of Internet for preparing the lesson and brows informations		Use of resources for teaching		Competence and autonomy in using ICTs		Using media - MEAN	
T-1	3	4,00	4	4,50	2,67	3,56	2,50	3,57	3,04	3,91
T-2	3	3,00	4,5	4,00	2,44	2,88	4,29	3,57	3,56	3,36
T-3	3		4		4,22		2,86		3,52	
T-4	2	2,00	3,5	2,50	2,44	3,33	2,86	2,14	2,70	2,49
T-5	2	1,00	3	2,50	2,78		1,07	1,43	2,21	1,64
T-6	3	2,00	4	4,00	3,00	3,00	3,21	4,29	3,30	3,32
T-7	2	4,00	3,5	4,50	3,11	3,67	3,57	3,57	3,05	3,93
T-8	4	5,00	5	5,00	4,44	4,11	5,00	4,29	4,61	4,60
T-9	5	5,00	5	5,00	3,89	4,56	3,93	4,64	4,45	4,80
T-10	2	1,00	4	4,50	2,22	3,44	2,86	3,57	2,77	3,13
T-11	3	3,00	3,5	4,00	3,56	3,56	3,57	3,93	3,41	3,62
T-12	3	2,00	1	3,00	2,11	2,56	1,79	2,86	1,97	2,60
T-13	5		4		3,00		2,50		3,63	
T-14	2	4,00	4,5	4,00	2,67	3,22	3,93	3,57	3,27	3,70
T-15	3	3,00	3,5	3,00	3,11	3,44	2,86	3,57	3,12	3,25
T-16	3		3		3,33		1,43		2,69	
T-17	2	1,00	3	2,50	2,67	2,56	2,50	2,86	2,54	2,23
T-18	2	4,00	4	5,00	2,89	4,33	3,57	4,29	3,12	4,40
T-19	5		2,5		2,78		2,86		3,28	
T-20	3	2,00	3,5	2,50	2,78	2,78	2,14	2,50	2,86	2,44
Mean	3,00	2,88	3,65	3,78	3,01	3,40	2,96	3,42	3,15	3,34

The analysis of 'Geografi@Scuola' continues by focusing on some other data collected in the questionnaires, which were not included in the indicators discussed above. The use of geomedia in class was definitely

something that 'Geografi@Scuola' wanted to promote. Results from the comparison between the data collected before the workshop and after it, showed a general improvement of their use in teaching geography (Figure 29). The most significant increase was registered in the use of online applications for teaching (#28) and of geographical applications (#23). Less evident but still important results of the workshop were the growing use of visual as supports for teaching resources (#12 and #15) and the tendency of connecting different contents and disciplines while teaching (#8).

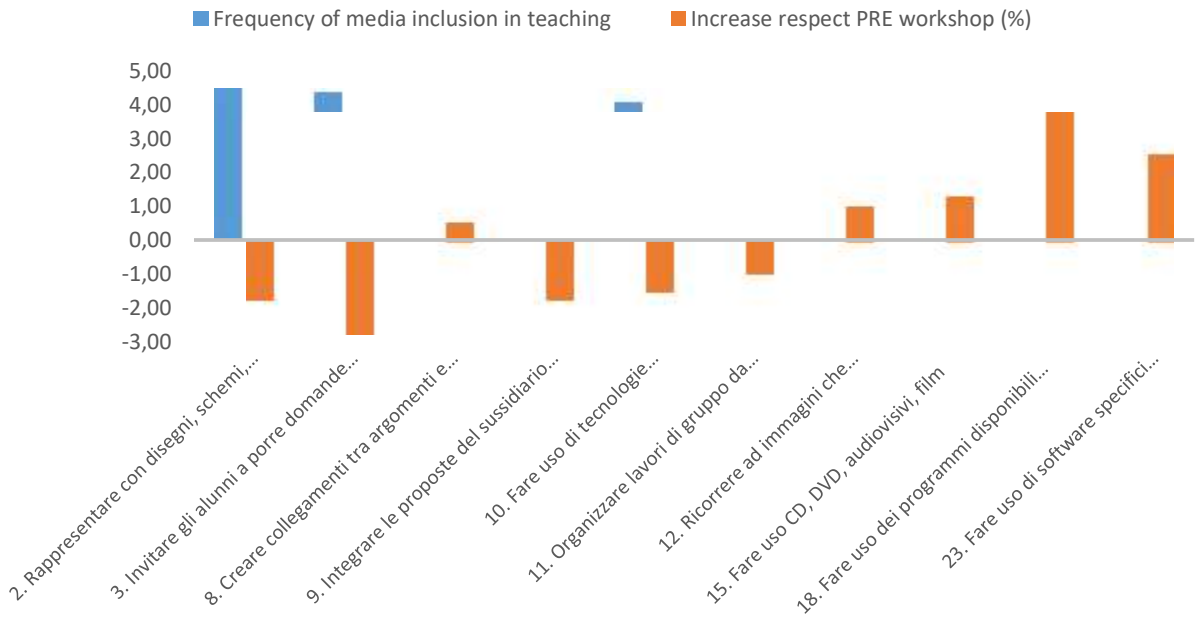


Figure 29 - Frequency of media inclusion in teaching and its % increase

Some more information worth to be mentioned were extracted from the final interviews whose analysis showed that 'Geografi@Scuola' had been useful for both the teachers that had low and high technological and content knowledge. Three teachers (T3, T9, T13) mentioned that 'Geografi@Scuola' had been the most useful and enjoyable continuous professional development training they had ever attended. Teacher T20 on this matter affirmed that attending the workshop had changed her own perspective on teaching because the letting of multimedia technologies in aside analogical ones did change her own way of teaching (T20). Teachers T4 and T12 agreed on considering the quality and the quantity of materials provided during the workshop its biggest strength. In teacher T1's opinion, anyway, it was the opportunity to explore and experiment the use of geomedia in teaching geography in a relaxed environment that made it helpful beyond expectations (T1). Teacher T17 found very useful having received hints on several teaching strategies as well as collected plenty of web addresses of different geographical resources ready to be included in the lessons.

The final interviews were not only considered individually, but a general analysis was also done through the investigation of similar concepts expressed from different participants. From this analysis, two concepts resulted crucial: enthusiasm and change.

Enthusiasm is a key word that transpired from several interviews, spontaneously, under three different forms. The first time it referred to the discipline: enthusiasm regarding geography as some of the participants shared the opinion that geography results had improved in terms of appeal and potentials thanks to the use in their teaching strategies of digital technologies (T3, T7, T17). The second form referred to the teachers' enthusiasm. Teachers felt they attained new strategies, new resources and new applications for leading their students to learn geography and this feeling motivated them to improve their teaching (T8, T9, T14). The third mention referred to the students' enthusiasm; thanks to the fact that their teachers attended a training course on teaching geography using geomedia, they got to know a discipline even more fascinating, accessible and alive than the one they already knew (T2, T11, T15).

The other crucial concept was change and all teachers had been asked to reflect on their involvement in the workshop and if their participation had promoted any sort of change for them. All teachers interviewed answered positively. Teacher T13 believed her participation enhanced her knowledge and that lead her to new educational and didactical praxis. The teacher T3 thanks to the workshop realized that she had gotten accustomed to teach mediocre geography; therefore participating in 'Geografi@Scuola' helped her greatly in evaluating, before teaching a geography class, if the strategy and materials she decided to use are appropriate for her audience. Teacher T14 gave another very interesting answer. She always loved geography and she was used to hang from the class walls every sort of maps or geographical drawing. Thanks to 'Geografi@Scuola', her perspective changed. She did not see only analogical resources anymore but started to consider digital media and particularly geomedia for supporting her lessons as well. Teacher T18 offered another reflection on the change encouraged by the workshop. She was not a technology geek, but tried her best and developed a new way of teaching geography, and not only that. Similar to T18's reflection, the one given by T4 had a different final consideration, which will also conclude this paragraph: she did not perceive herself confident enough to use technology in her class to teach any discipline, geography included, but she participated with such enthusiasm to the workshop that triggered constant personal reflections. Furthermore, she felt richer than before, she knew and understood more than she did before taking part in the workshop on why technologies should enter education and how it could be made possible, even from primary school teachers. From her participation at 'Geografi@Scuola', she had received a new outlook on teaching, which (she was sure about it) would also change her teaching style.

5.5 Brief discussion

'Geografi@Scuola' is a continuous professional development workshop on teaching geography with geomedia addressed to primary school teachers. Twenty experienced primary geography teachers from six Veneto's provinces attended the workshop. 'Geografi@Scuola' consisted of four meetings where attenders actively participated to several activities promoting the use of media and geomedia in teaching primary geography. The workshop was evaluated by individual participants, a direct observer and by the moderator himself. In order to be able to prove eventual benefit activated by the workshop an online questionnaire and individual interviews were administrated before the workshop and one year after its conclusion. Two months after the workshop and few weeks after the last day of the school year in-between interviews were also registered. 'Geografi@Scuola' efficiency emerged from the comparison of the answers given by the participants in the questionnaires and interviews that were carried out before, during and after the workshop.

This research project included eleven investigation tools. Quantitative and qualitative methods were combined together in order to offer a clearer understanding of both the learning and the changing processes that might have occurred during and thanks to the workshop. This high number of research tools, combined with the twenty participants and the four meetings, made more complicated for the researcher to follow and organize all the data acquired. However, different tools offered different views that in the end found the right balance in the analysis of the workshop as one single event.

Complexity defines perfectly what continuous professional training is today. From the twenty teachers who attended, there were not similar situations, background, competences or motivations. Each participant was different because of the reasons that took him to attend, the equipment they could count on and the students they taught to. 'Geografi@Scuola' candidate itself as a valid tool for training all teachers whatever their pedagogical, content or technological knowledge might be. Teachers from several different starting points showed the workshop efficiency in empowering their lessons and enriching their practice and strategies. All participants had perceived the attention to the individuals, before that to the group of teachers, positively, and this had played an important role in building the right social environment for a community of learners to work. Collaboration and participation were crucial elements indicated by the teachers as motivational factors for them to come back to the meetings. They had liked being engaged in the activities and asked to explore and experiment the practices instead of just noting them down.

The decision of offering a workshop on teaching primary geography was very unpopular. Few participants mentioned in their first interview that 'Geografi@Scuola' was the first continuous professional training designed for geography they had ever heard about and that also is one reason why it sounded interesting to them. To their standpoint, both the appeal of geomedia and the dynamic advertisement sent in almost every

school in the region have contributed to convince teachers to book their participation in the workshop. Participants with their unanimously positive feedback also confirmed the great potentials of geography as a primary subject and as a life passion. At the same time, they highlighted geomedia as astonishing gift for empowering geography lessons.

Besides the positive things 'Geografi@Scuola' confirmed of both geography and geomedia, there are also some other issues that need to be discussed. Internet is a great resource and having access to it is more and more important every day. 'Geografi@Scuola' investigation report is in this sense still dramatic news. Too many teachers still do not have the possibility to choose between using a map or a digital globe and too many pupils do not have access to decent computer laboratories where they could improve their digital skills. As stated by teacher T20, without Internet at school it is very hard to start a transformation. It is not impossible (teachers surely can make the impossible become true) but it is not easy neither. It is therefore clear how equipment (in this case geomedia) is an essential component in the development of practices for teaching geography today. Next to the equipment however, emotions also play an important role. Data collected form several teachers confirmed that emotions and motivation had indeed played a critical role in their work. Emotions influenced their learning and supported their experiments as the positive sentiments strengthened and enabled changes.

'Geografi@Scuola', in conclusion, confirmed that both personal theories of teaching and the level of competence with ICT play a major role in how teachers implement ICT and in their perception of their own motivation (Gobbo, Girardi, 2001), moreover, it succeeded to contribute to the participants' positive emotions towards teaching geography and using technology.

THIRD PART

6 CONCLUSIONS

The practical part of this PhD research aimed at exploring teachers' familiarity with geomedia, through the investigation of teachers' personal perceptions of their technological, pedagogical and geographical knowledge. In order to realize both a large and a small-scale research, two distinct projects were developed.

The first was aimed at studying European primary geography schoolteachers' perceptions of ability and confidence in teaching geography using any sort of geomedia. For this international project, called 'Geomedia@School', an online survey was expressly designed, which collected answers from 200 primary geography school teachers from Finland, Germany, Italy, Spain, Turkey and the United Kingdom. In order to provide sufficient information to support teachers' self-perceptions of knowledge, the survey was not limited to an exploration of their opinions. Data was also collected on the demographic characteristics of the teachers, their professional background, class and school equipment, as well as their teaching strategies. Moreover, with the intent of providing useful information to both national and international professional development agencies, the survey also investigated what type of professional support primary geography teachers consider more useful to the improvement of their practice.

The second project, named 'Geografi@Scuola', consisted in a professional development workshop aimed at enhancing primary geography schoolteachers' knowledge and confidence in using geomedia. Twenty Italian primary geography teachers attended the four workshop meetings. During these meetings, held in a constructive atmosphere of a non-formal environment, the teachers had the opportunity to experiment with several geo-applications and geo-resources and to discuss both the possibility of applications in their schools and their efficacy in fostering pupils' geographical understanding. In addition, during the meetings the geomedia and their in-depth analysis were flexibly directed on the basis of the participants' interests and requests.

The two projects required independent design processes and led to autonomous results. Both studies, however, shared the core aim of understanding and promoting teachers' self-confidence in using geomedia. For this reason, the results are here presented and discussed together. This chapter tries to answer the research questions of the practical component of the study by summarizing what was learned from the data collected in the sub-research projects.

The dissertation findings can be summarized in the following four main research areas: (1) introducing geomedia; (2) using geomedia; (3) teachers' knowledge and confidence in using geomedia; (4) supporting the use of geomedia. In the sections below, each area is presented.

6.1 Introducing geomedia

Geomedia is defined as any form of media which incorporates or portrays geographical information (Digital-Earth.eu, 2012). Geomedia in this dissertation are presented as the combination of three key elements: digital geo-resources, geo-devices and geo-applications. Originating from a definition of media given by Galliani (2002), this conceptualization was established in order to offer teachers a clear understanding of what geomedia are and, more importantly, how geomedia can help them improve their geographical teaching. Within this framework, geo-resources (Section 2.8.1) refer to both the different forms of geographical languages - which include digital data, texts, images, videos, sounds etc. - as well as any geographical information -materials of any form that offer implicit or explicit spatial references. All digital devices that make possible working with geo-information of whatever geo-language are defined geo-devices (Section 2.8.2). They are the hardware solution that provides the users with the opportunity to work with geographical resources in many ways and in different contexts. Geo-applications (Section 2.8.3) include specific software or applications that enable both teachers and students to work with geo-resources in different geo-devices. Geo-applications range from complex map personalization platforms to simple geographical games and, depending on their characteristics, can represent a valuable alternative or support to traditional teaching tools. The 'Geografi@Scuola' project (Chapter 5) was intentionally limited to promote knowledge and confidence about geo-resources and geo-applications. Geo-devices, on the other hand, were briefly presented because they were not considered to be cogent for a group of teachers who had low technological knowledge. The participants in the study appreciated being introduced to resourceful geographical websites where they found selected, organized, authentic, information-rich geographical resources.

The reactions that followed the presentation of geo-applications were diverse. Not all the applications drew the teachers' attention and, more interestingly, teachers generally showed interest to different geo-applications. Aside from Google Earth™ and few other resources commonly used and known by most of primary geography around Europe, those geo-applications were mostly unknown by the majority of participants. Some characteristics of the presented geo-applications, as for example the information clearness and trustworthiness of the applications, the ability to personalise content and to save and/or export what is produced, the presence of clear links with the curriculum, and the absence of advertisements/authentication, were particularly appreciated by the teachers.

The introduction of geomedia to primary geography teachers with solid teaching experience during the sub-research project named 'Geografi@Scuola' provided many insights. Teachers demonstrated a particular ability to understand technologies' aptitudes and were attracted mainly by those that Dron would defines "soft technologies" (2013) because dynamic, allowing personalization and promoting complex activities. Teachers reported to have found in the geographical websites presented precious resources for their work, and considered basic research strategies a great support for their practice. However, the low rate of geomedia

introduction in short-time period suggests that teachers need time to practice with the use of new tools and this time is related, as confirmed in others studies as for example in An and Reigeluth (2012) and Kopcha (2012), on the equipment they have in their schools and the quality of the support they receive. Additionally, the results suggest that teachers who are used to include different type of analogic materials in their teaching practices are also inclined to include digital resources and applications.

The findings of this study indicate that it is not the nature of the resource (digital or analogical) that makes the difference in class. From the 'Geomedia@School' project clearly emerged a lack of awareness of the potential of geomedia in primary geography teachers, however the experiences researched in 'Geografi@School' show how once teachers are made aware of these resources they quickly begin to ask themselves if, why and how they should include them in their geography classes. Once teachers find convincing personal answers to these three professional questions, it is fair to believe that any technological constraints to the presence of geomedia in their lessons will not be unsurmountable anymore.

6.2 Geomedia in primary geography classes

With the intent of contributing to the international debate in geographical education, this dissertation aimed to examine the kinds of teaching strategies commonly included in primary geography school lessons. The research focus, in particular, was directed towards the investigation of teachers' pedagogical approaches as well as their teaching practices. Analysis of the results from the 'Geomedia@School' research project (Section 4.4) suggests that many teachers support constructive learning process by encouraging discussion, proposing work in groups and by often linking different topics and subjects. However, the findings also indicate that problem-based learning activities are uncommon in primary geography lessons and outdoor learning experiences are still very sporadic. Considering the presence and use of geomedia in primary geography, it has to be said that geo-devices attract little interest from teachers. Mobile devices such as smartphones, tablets and GPS receivers are sporadically used in primary geography (while commonly used in private lives), the reason seems connected with both the schools' lack of funds, and the teachers' reluctance to adopt these technologies with children aged under 12. The greater use of geomedia in class refers to geo-resources. The majority of the respondents use in class geo-resources taken from the Internet. If this, on one side looks very positive indeed, on the other, connected to the fact that the same teachers affirm they do not know where to look for new/additional digital resource for geography, suggests that they are not understanding thus capitalizing geomedia potentials fully yet. The limited use of geographical software is correlated with low teacher awareness of the existence of these resources and their educational possibilities. It is clear however that geomedia are considered useful in enhancing geographical understanding even if they are mainly employed as additional resources and not like new strategies themselves. In conclusion, within this general

framework, the data suggest that European primary school teachers are more confident in using geomedia, rather than letting their students use them. Finally, while data indicates there is a growing presence of geomedia in European primary schools, these technologies are mainly used in teacher-centred instructional contexts.

6.3 Teachers' knowledge and confidence in using geomedia

Another challenging aim of this dissertation was to investigate primary school teachers' level of confidence in teaching geography using geomedia. The research conducted within the 'Geomedia@School' project (Chapter 4) tried to meet the challenge by creating an online survey developed on the theoretic TPACK framework proposed by Mishra and Koehler (Mishra, Koehler, 2006; Koehler, Mishra, 2008). Based on 200 responses collected from European primary geography schoolteachers, its results indicate that these teachers have good technological skills as well as positive perceptions of confidence in using geomedia resources to enhance their geographical teaching. However, the same results present a group of teachers that share weak geographical knowledge and modest confidence in teaching it. This dissertation, therefore, reveals that, amongst this sample of 200 European primary teachers, technological knowledge is not the main construct influencing their ability and confidence in teaching geography with geomedia. It is instead the lack in geographical knowledge the key TPACK subscale that limits their comprehension and use of geomedia while teaching geography. Within this framework, however, school's ICT equipment - and the presence in class of the interactive whiteboard in particular - confirms to be a significant factor, able to support teachers' perception of confidence in teaching geography with geomedia. Interestingly, the teachers' age (between 31 and 40) and gender (male) are also important factors correlated to higher self-efficacy perceptions of teaching with geomedia.

6.4 Support

From its first conceptualization, this PhD research wanted to offer support for primary school teachers. This goal was addressed mainly identifying the type of support teachers prefer and offering them professional development in this area. In order to identify the type of support preferred by the teachers, the international survey 'Geomedia@School' asked European primary geography teachers to give their personal opinion concerning the utility of several types of professional supports. It has been a very interesting to discover that, among the most useful supports, teachers indicated '*in-job trainings or workshops*'.

The reasons why it was decided to propose a workshop for in-service teachers were essentially linked to the fact that these workshops offer participants the opportunity to engage with other colleagues, to experiment by themselves while having an expert close by, to engage in a non-formal environment and to experiment with geomedia as if they were pupils. The workshop was designed to take into account the numerous factors influencing the learning process as well as adult education. During the four meetings, participants were guided using several geo-applications and engaged in discussions about the efficacy of geo-applications. Both the

positive experiences using geomedia and the rich pedagogical discussions had positive impacts on the teachers' appreciation of the workshop. This experience confirmed that professional development courses based only on technology are unlikely to be authentic, relevant and retained (Sutton, 2011). The 'Geografi@Scuola' project confirmed once more that even teachers with little technological knowledge, if supported during their phase of exploration, could perceive geomedia potentials and start using these tools with efficacy in their primary geography lessons. In addition, this research project showed the importance that both the presence of technology equipment at school and the teachers' positive emotions toward technology play in the introduction of geomedia at school.

7 DISCUSSION

In light of the results of the researches described in this dissertation, this chapter wants to discuss the implications of the outcomes of this research, reflect on the research approach, and present some recommendations for further research.

7.1 Implications of the outcomes

As seen from the analysis of 'Geomedia@School', European primary geography teachers share a fragile confidence in geographical knowledge. Many of them consider their own strategies for improving geographical understanding weak, thus considering their own geographical knowledge not adequate. This information should be of concern to both researchers in geographical education and teachers. If geography teachers are weak in the knowledge of their subject's domain, something is going very wrong. Others have already noted this trend (see Lambert, 2013) and the hope is that no so many other studies with similar conclusions need to be carried out, before action is taken. This dissertation offers a new confirmation that in-job professional development trainings and workshop are one of the solution teachers' consider most useful. Geographical associations and universities should believe if not this dissertation at least the voices of their members and of teachers and proceed to improve their offers in terms of continued professional trainings.

In the theoretical part of this dissertation, the reader was introduced to the difference Dron (2012) sees between hard and soft technologies (Chapter 1). In the second part, and particularly within the 'Geografi@Scuola' project, it became clear that primary school teachers are able to implement easily hard technologies because of their efficiency, lower complexity and consistency, but are also interested in soft technologies. However, letting children use soft technologies might result in counter-productive learning experiences given that the technology may be too complex for the pupils to manage. Thus, the availability of suitable hard and soft technologies for primary geography teachers represents a key issue that needs to be considered. This is particularly true for countries not English speaking countries and for all those that want to promote student-centred teaching where not only teachers, but also students, are "allowed" to work with technology. It is with the intent of contributing to this body of knowledge that the list of geomedia (geo-resources and geo-applications) presented in this dissertation (Appendix A) will be shared online with teachers and colleagues. Participants in 'Geografi@Scuola' appreciated very much receiving a similar list of Italian geo-resources. This is something that all professional development trainings should do: collect, organize, present

and share knowledge on evidence-based effective geomedia. Social network are, and will continue, helping in this for a long time.

7.2 Reflections on the research approach

Researching teachers' perceptions on TPACK has been much more demanding than expected.

First of all, the decision to include two independent projects inside the same research study has turned to be a not so wise choice. This was taken in order to enhance the investigation by adopting a multilevel methodological approach (Olofsson et al., 2011) able to include both quantitative and qualitative methods. As suspected, such decision demanded significant effort in terms of planning and data analysis as well as, of course, carrying out the research. In addition, two diverse methods were used to examine two groups very different in size and respondent profiles generating information that does not show explicit relations between the samples. However, the sub-researches offered a wider perspective on the phenomenon of geomedia use in primary geography teaching and in this sense the effort was not vane.

Individually, the research methods employed in the two practical components of the dissertation also need some reflections. The 'Geomedia@School' project addressed a number of challenging goals. The online survey proved to be an efficient investigative tool reaching a number of teachers that would have been otherwise difficult to touch. The survey itself also did a good job in allowing many data analysis for almost any topic investigated. However, as affirmed by Graham, Borup and Smith in their TPACK investigation method review (2012), each method provides different insights into the cognitive decision-making process but ultimately comes short of a full understanding of the process. In this case, it was evident that motivation-related items included in the survey were not efficient enough to offer a clear vision on the teachers' personal motivations and that the use of TPACK related questions alone was not sufficient to give meaning to the teachers' answers. The TPACK, with its three domains of teacher knowledge however, was a research-friendly model to work with that translated well into professional development (Doering et al., 2009b).

A key concern with the 'Geografi@Scuola' research project was that the assessment phases were complex. The analysis of the results from 11 different investigation methods, used in four different stages of the workshop for 20 participants was definitely a demanding exercise. It is likely that an alternative assessment strategy implemented in the same methodological structure might have increased the project efficacy. However, the feedback on the contents and conduct of the methodology were very positive. As suggested by An and Reigeluth (2012) the workshop was organized to take into account the teachers' needs; to provide active, hands-on, and learner-centred learning experiences; and to provide personalized support.

Furthermore, the workshop 'Geografi@Scuola' also focused on building a community of practice amongst the participating teachers. This, as explained by Attwell and Pumilia (2007), was done in order to enhance their adoption of new technologies and new teaching strategies. Considering finally, as suggested by Trinchero (2002), the research efficiency (congruence between research objectives and methods implemented), its efficacy (reach the goals) as well as its social impacts on participants (psychological aspects such as satisfaction of working in a better way, for example) makes the final evaluation of Geografi@Scuola quite positive.

7.3 Recommendations for further research

This study does make an important contribution as it is one of the first studies to focus on technologies included in primary geography lessons in Europe. At the same time, it is probably one of the first studies to also have investigated European primary geography teachers' perceptions of knowledge using the TPACK subscale and including both large-scale and a small-scale research approaches. The study provides new insights into the complexity of these educational frameworks. In the discussion that follows, a number of recommendations for further research are outlined.

First, there is very little evidence of ICT being used or evaluated in primary schools for the teaching of geography. This was true in 2004 for the United Kingdom, as affirmed by Cox et al. (2004), and remains true for Europe today. Greater research is needed in Europe to explore the use of geo-resources, geo-applications and geo-devices. The development of a set of criteria for defining quality geographical resources could lead to the identification of trustworthy geomedia for each language and for each level of school, which might result very useful to schoolteachers.

Second, the study brings additional confirmation regarding the fact that technical competences are not sufficient for good teachers in geography. Additionally, the dissertation reveals that the main problem for primary geography teachers in Europe is not related to their technological knowledge but instead to their lack of content knowledge in this domain. Therefore, innovative and dynamic continued professional developments, which consider both emotional and motivational factors, are desirable; as well as future research on strategies for enhancing the depth and accuracy of geography teachers' substantive (content) knowledge (see Lane, 2011).

Third, multilevel methodology, even if demanding, represented an effective approach for addressing the research questions. Since similar issues in geographical education are found in many countries, such methodological approach should be considered more often in both national and international research, in order to promote a global view of any phenomenon investigated.

7.4 Some final thoughts

In the past few years, the use of geomedia has increased significantly in European primary schools. Despite the growing complexity of teaching using digital technologies, many teachers have experimented enthusiastically with these tools in their lessons. Their experiences and enthusiasm should be not lost, but shared with all those teachers working in primary schools where technology is already implemented or where it will arrive in the next few years. So, as long as these reflections and these experiences on improving emotional and practical approaches to geographical, pedagogical and technological knowledge are kept into consideration, primary geographical education should be able to look positively to a future where the use of geomedia will become an expression of the teachers' confidence in their geographical knowledge.

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APPENDICES

Appendix A - List of geo-resource and geo-applications for primary geography education.

The selection of geo-applications took into account the following variables: contents, presence of advertisements, usability of the application, functions, language (English), level of competence needed by the teachers/pupils to use it, and quality in terms of affordability, design and maintenance (being up to date). All the geo-applications are then organized in the following "topics" depending on what kind of geo-resources they work with:

- Geographical websites and applications useful to geography teachers (1)
- Images, pictures and visual representations (2)
- Maps and cartography (3)
- Audio and sounds (4)
- Videos, documentaries and graphic models (5)
- Exercises and games (6)

Topic	Name and URL	Brief description (part of the text are taken from the Internet)
6	**Ace of Space** http://www.solarsystemscope.com/aceofspace/	Based on the graphic model "Solar System Mode" this game offers a space race through the planets of the Solar System. Easy but nice.
2 3	**Animaps** http://www.animaps.com/	Create and view beautifully informative animated maps, for free! Animaps extends the My Maps feature of Google Maps by letting you create maps with markers that move, images and text that pop up on cue, and lines and shapes that change over time. When you send your Animap to friends it appears like a video - they can play, pause, slow and speed up the action!
3	**ArcGis** http://www.arcgis.com/home/	È possibile creare una mappa che può essere visualizzata in un browser, su un desktop o in un dispositivo mobile, quindi condividerla in un blog o via e-mail oppure incorporarla in un sito Web.
1	**Awwapp** http://awwapp.com/draw.html	Online free drawing tool.
6	**Bhoogolviya** http://bhoogolvidya.appspot.com/	Geography quiz.
1 5	**Bing Maps** http://www.bing.com/maps/	Bing Maps is a web mapping service provided as a part of Microsoft's Bing suite of search engines. Bing Maps offers satellite imagery, aerial views and road views. It also give transit directions and monitor the traffic of the most used roads. All register users can personalize their maps by adding waypoints, tracks and polygons that can also be exported as file .gpx and .kml. It allows to add waypoints, tracks and polygons on the map and export them in Google Earth or directly to GPS. Print your maps or researches and insert them in almost any web site.
1	**Bubbl.us** https://bubbl.us/	Easy web application that allows to create conceptual maps. It makes brainstorming digital.

1	**David Rogers** http://daviderogers.blogspot.it/	David Rogers' blog on fieldwork e geography education.
1	**Digital Explorer** http://digitalexplorer.com/	Digital Explorer is a research project aimed to provide a world-class global citizenship education for young people. Linking frontiers of knowledge with schools, Digital Explorer brings real science and exploration live to the classroom through: inspiring and spirited youth expeditions, which are curriculum-linked and facilitate peer-to-peer learning; in-field education support for research, scientific and exploratory expeditions; robust and engaging curriculum-based resources, for use inside and outside the classroom; linking expeditions in the field live with classrooms; face-to-face visits with explorers and scientists, talks and engagement days; practical training sessions for teachers and educators led by leaders in appropriate fields.
12 5	**Documentary Platform** http://www.documentaryplatform.com/wp/	Documentary Platform is an Italian project aimed to construct a visual collection through which it will be possible to create crossed readings, establish a series of relations, and delineate correspondences, which will permit us to define complex characteristics, as well as instigate reflections on our society. Interesting tool.
13	**EarthBrowser** http://www.earthbrowser.com/	EarthBrowser is an innovative earth simulation that combines an easy to navigate 3 dimensional virtual globe with real-time weather conditions and 7 day forecasts for thousands of locations worldwide. Live earthquakes, hurricanes, webcams, volcanoes and cloud animations are just some of data that is available in an instant. A great aid to teachers for visualizing earth and space with their students.
1	**Edudemic** http://www.edudemic.com	Great blog with thousands of useful news and link for teachers. Its aims is connecting education with technology. Worth a visit.
13	**Eye on Earth** http://www.eyeonearth.org/en-us/pages/home.aspx	Explore environmental maps and apps. Contribute your observations. Create and share. Project of the European Environment Agency.
1	***FactMonster*** http://www.factmonster.com	Nice kids game with a lot of geographical facts.
12	**Fotopedia Reporter** http://www.fotopedia.com/	Fotopedia is a web geo-application based on geo-referenced pictures and stories. Is possible to browse pictures by location and see what the community has rated highest. It is very useful place where to look for great pictures. Its best is the fact that every photo have a description.
12	**FREE** http://free.ed.gov	FREE is the Federal Registry for Educational Excellence. The project was conceived in 1997 and today allows to research more than 180.000 digital teaching and learning resources created by the federal government and public and private organizations. Starting from FREE is very easy to end up discovering many useful websites related to geography.

4	**Free Sounds** http://www.freesound.org/	Huge resource where you can find tons of sounds for free. Super.
6	***FunBrain*** http://www.funbrain.com	*FunBrain* is a web site for kids owned and run by Pearson Education. Many educational games aimed to develop skills in math, reading, and literacy can be found here as well as some with geographical contents (i.e. Weather Dog, http://www.funbrain.com/cgi-bin/weather.cgi).
2	**Fusion Table by google** http://tables.googlelabs.com	Fusion Tables is an experimental data visualization web application to gather, visualize, and share larger data tables. It allows to visualize, filter and summarize across hundreds of thousands of rows; and create charts, maps, network graphs, or custom layouts and embed or share them. Great tool!
2 5 6	**Gapminder** www.gapminder.org	The information visualization technique used by Gapminder is an interactive bubble chart. By default it shows five variables: Two numeric variables on the X and Y axes, bubble size and colour, and a time variable that may be manipulated with a slider. The software uses brushing and linking techniques for displaying the numeric value of a highlighted country. Great visualization tool. Very effective.
2	**Geo Image Library** http://www.sln.org.uk/geography/Images.htm	Geo Image Library contains tons of pictures taken all around the world. It is a great free resource.
3 6	**Geocaching** www.geocaching.com	Cult phenomenon Geocaching sees you hunting down real objects hidden by players at locations all over the world. We published an introduction to the game earlier this year. In its ten-year history, over 3 million participants have hidden and searched for almost a million items around the globe. You can play the game with any GPS-enabled device using information from the website, and there are iPhone and Android apps to help you too.
1 2 3	**GeoDia** http://geodia.laits.utexas.edu/timemap.html	GeoDia is meant to be a teaching and learning tool for anyone interested in the material culture of the ancient Mediterranean world. It seeks to represent the spatial and temporal distribution of human activity in that area, roughly from the emergence of complex literate societies in the Middle East to the foundation of Constantinople as the eastern capital of the Roman Empire (so from the fourth millennium BC to ca. 330 AD, though a few sites have information from earlier or later periods). Its dataset consists of two basic elements: sites (defined as geographic points where long-term human activity has left visible remains) and events (defined as things that happened at a specific geographic location and at a single point in time in the past). To avoid visual confusion, the two units are viewed separately. Sites appear in the timeline as bars, events as points. You can use this site as an interactive textbook, heavy on facts and light on interpretation. You can search or view material remains as they're usually presented in textbooks for archaeology and art-history classes, grouped together by culture or region. You can move back and forth between images, events and sites to see how those three things are related in time and space.
6	**Geography for kids** http://www.sciencekids.co.nz/geography.html	Interesting web site with many resources on oceans, volcanoes, dust storms, glaciers, earthquakes and all kinds of interesting geography topics. As well as activities for children, there are also lesson plans and worksheets for teachers, ideas for experiments and a whole host of free teaching resources (images, video, etc.) for anyone interested in the subject of geography and learning about science online.

1	**Geography on About.com** http://geography.about.com/	Geography section of the famous web site About.com.
2	**Geography Photos** http://www.geographyphotos.com/	Geography Photos is an award winning site with 23,000 professional quality images for education use and publishing. Images for education however are not free.
1	**Geography teacher 2.0** http://geographyteacher2point0.blogspot.co.uk/	Alan Parkinson's blog. Always looking forward. http://geographyteacher2point0.blogspot.co.uk/
1	**Geographyalltheway** www.geographyalltheway.com	geographyalltheway.com is the continually developing online repository of Richard Allaway's teaching resources. Geographyalltheway.com provides online Geography and Humanities resources, for Geography and Humanities teachers and students at Key Stage 3 (11-14 yrs), MYP Humanities (11-16 yrs), GCSE (14-16 yrs), IGCSE (14-16 yrs), AS (16-18 yrs), A2 (16-18 yrs) and IB Geography (16-18 yrs) level.
1 6	**Geography-Map-Games** http://www.geography-map-games.com/	Nice web sites that includes many different geographical games with an high appealing graphics. Probably the best games of their kinds. They ask to locate in the map continents, nations, cities, flags and also rivers. Great tool for children to play with.
6	**Geography-map-games** http://www.geography-map-games.com/	Geography Map Games (GMG) is a web site that offers free geographical flash games. The kind of games is mainly the kind of games where the user is asked to point the city/river/province/region/state/capitals in a country or world map. The smooth design of each games makes this web site one of the best of its kind. The same authors made personalized partner web sites for many other languages such as Spanish, German, Italian, Portuguese and Japanese. The main web site however is French. Geography Map Games are an excellent tool for students to practice and for teachers to engage their students. No registration is required to play the games but only registered members can save results and be included in the web site rankings.
2 3 6	**Geogreetings** http://www.geogreeting.com/main.html	Nice icebreaker for geography lessons.
3 6	**GeoGuessr** http://www.geoguessr.com/	GeoGuessr is a web-based geographic discovery game. The game utilizes random Google Street View locations and requires players to guess their location in the world using only the clues visible in Street View.
1 2	**Geology by Christy Pratt** http://geology.com/teacher/map.shtml	Maps and Geography Classroom Activities and Lesson Plans, compiled by Christy Pratt.
1	**Geonames** www.geonames.org/	The GeoNames geographical database covers all countries and contains over eight million placenames that are available for download free of charge. The GeoNames geographical database is available for download free of charge under a creative commons attribution license. All features are categorized into one out of nine feature classes and further subcategorized into one out of 645 feature codes. The data is accessible free of charge through a number of webservices

		and a daily database export. GeoNames is already serving up to over 30 million web service requests per day.
6	**Geosense** www.geosense.net/	Test your knowledge of world geography alone or against another online player.
2 3 5 6	**Geteach** http://geteach.com/	Free site dedicated to help teachers educate and engage students using Google Earth. Great graphic.
2	**Gigapan** http://www.gigapan.com/gigapans?order=most_popular	Gigapan offers huge pictures to explore to great detail.
1 2 3 4 5 6	**Google Earth** www.google.co.uk/earth/	Google Earth (GE) is a virtual globe, map and geographical information program owned by Google™. It maps the Earth (but not only) by the superimposition of images obtained from satellite imagery, aerial photography and GIS 3D globe. It is available in a free version with limited function and a professional edition to pay, intended for commercial use. Both versions allow in addition to what Google Maps already do, to measure lines, create videos and enable infinite layers on the map. Layers are what makes Google Earth probably the most powerful and rich tool freely available for teachers today. To use this software it is enough to download and install it: the log in is optional. Google Earth allows also importing, visualizing and exporting GPS traces and singular elements of the cartography (place marks, lines, polygons, etc.). With GE it is also possible to save the images we are seeing in our screen. Thanks to its' safe environment it is the ideal application to work with in class. The only advertisings are coming out as result of the researches because of the integration with Google Locals (shops and local activities). This tool with more than one billion downloads and 46 translations is the most widely known geographical software. Thanks to its huge versatility Google Earth suite indiscriminately all the six topics. Texts, images, maps, videos and games in fact can all be found in Google Earth environment.
1 2 3	**Google Earth Blog** http://www.gearthblog.com/about.html	This blog is not officially affiliated with Google. Google Earth Blog is dedicated to sharing the best news, interesting sights, technology, and happenings for Google Earth. You will find the most amazing and interesting Google Earth news stories and content you can download right off the site. Learn how to take data from your GPS, map it into Google Earth, and share it with friends or the world. Learn when new releases of Google Earth come out, hear about new technologies and features, or check out the links to dozens of other Google Earth web sites.
3	**Google Maps** www.maps.google.com	Google Maps is a web mapping service application provided by Google that powers many map-based services and maps embedded on third-party websites via the Google Maps API. It offers street maps and a route planner for traveling by foot, car or with public transportation. It also includes a locator for urban businesses in numerous countries around the world. Google Maps satellite images are updated on a regular basis and most of the images are no more than 3 years old. Google Maps provides high-resolution aerial or satellite images for most urban areas of the world. However, all areas of the satellite imagery do not appear in the same resolution. In Google Maps, when authenticated users can personalize and create personal maps that include waypoints, tracks and polygons. Moreover, Google maps can be easily embedded in blogs, web sites and social networks. Teachers can use Google Maps to support their teaching action in several way. Search and edit maps together with obtain satellite images and street pictures are probably their most appreciated features of google maps.

1	**Google maps mania** http://googlemapsmania.blogspot.it/	Blog about Google Maps presents very frequently new maps and new mashup.
1	**IGU** http://www.igu-online.org/site/	Official web site of the International Geographical Union
1	**IGU-CGE** http://www.igu-cge.org/index.htm	Official web site of the International Geographical Union Commission Geographical Education.
1 2 3 6	***Infoplease*** http://www.infoplease.com/	Infoplease provides an online encyclopedia, dictionary, and atlas, as well as an almanac with up-to-date country and state profiles, statistics, quizzes, and biographies. Edit by Pearson Education. Its target is mainly 8+ children.
6	**Kids.gov** (http://kids.usa.gov/social-studies/index.shtml)	Games on social studies including Maps, Current Events, Countries and Cultures.
2 6	**Kidsgeo** http://www.kidsgeo.com/geography-games/	Fun and educational games developed by the KidsKnowIt Network to help students develop and sharpen their geography skills.
1 2 3 6	**Kmlfactbook** http://www.kmlfactbook.org/	kmlfactbook.org helps you create Google Earth KML files from your own custom data. kmlfactbook.org can use either Google Maps or the Google Earth browser plugin to preview the KML files that you create. Great tool for all geography teachers.
1 2	**Library Of Congress** http://www.loc.gov/teachers/index.html	The Library of Congress offers classroom materials and professional development to help teachers effectively use primary sources from the Library's vast digital collections in their teaching.
1	**Living geography** http://livinggeography.blogspot.co.uk/	Resources, lesson ideas and reflection on geography.
2 5	**Many Eyes** http://www-958.ibm.com/software/data/cognos/manyeyes/	The heart of the site is a collection of data visualizations. You may want to begin by browsing through these collections—if you'd rather explore than read directions, take a look!
2 3	**Map Maker** http://bighugelabs.com/map.php	Show off where you've been or where you're going. This geo-application create a map of places you've visited (or want to visit or dream about or know people from) and get HTML code that you can embed in your profile on Flickr, Facebook, My Space, your blog or any other web page. Just click your countries and the

		map will update itself automagically. Then paste the HTML code anywhere you'd like.
2 3	**Map of the World** http://www.aneki.com/map.php	Simple and useful geo-application that offers customizable map of the World and of each continent.
3	**Mapbox** https://www.mapbox.com/	Mapbox is an online service that makes easy for anyone to design and publish custom maps.
3	**MapQuest** http://www.mapquest.com/	MapQuest is an American free online web mapping service owned by AOL. MapQuest provides some extent of street-level detail and/or driving directions for a variety of countries.
1 2 5	**Maps in Literature** http://www.mapsinliterature.it/	Italian project that reflect on the frequent presence of "maps" in literature. The long-term aim of this project is to realize an open, cooperative and "in progress" database of quotations. The content is mainly made up of short or long quotations with an explicit, or sometimes not, reference to "maps". Most of them are short and often with a little importance within the text. Otherwise "maps" play a role of protagonist. Excluded on purpose to quote from contemporary scientific (geographic or cartographic) essays. The attention is mainly on written literature: prose or poetry.
2 3	**MapTiler - Map Tile Cutter** http://www.maptiler.org/	MapTiler is graphical application for online map publishing. Your map can create overlay of standard maps like Google Maps, Yahoo Maps, Microsoft VirtualEarth or OpenStreetMap and can be also visualized in 3D form by Google Earth. Only thing you have to do for publishing the map is to upload the automatically generated directory with tiles into your webserver. Supported files for conversion: TIFF/GeoTIFF, MrSID, ECW, JPEG2000, Erdas HFA, NOAA BSB, JPEG and more...
5	**Metta** http://www.metta.io/	Create quick movies out of videos, pictures, text and sounds that are already on the web or just upload your own material.
3 6	**MyHistro** http://www.myhistro.com/	MyHistro is a social memory-bank, created on the same foundation of combining maps and timelines as of the one-of-a-kind history site Histrodamus. Here is possible to map and record important moments of the class and share the timelines.
1	**National Geographic** http://ngm.nationalgeographic.com/	The website of the National Geographic.
1	**National Geographic Kids** http://kids.nationalgeographic.com/kids/	The kids section of the National Geography.
1 3	**National Geographic MapMaker Interactive** http://education.nationalgeographic.com/educatio	MapMaker Interactive allow to explore the world with map themes, data, and make possible to customize (drawing tool and markers) and save the maps. Nice design.

	n/mapping/interactive-map/	
1	**Nature Ranking and Records** http://www.aneki.com/nature_rankings.html	List of geographical facts on nature ranking and records.
4	**Nature Sounds** http://www.naturesoundmap.com/	A group of professional nature recordists from around the globe have collaborated to develop Nature Soundmap, an enjoyable and interactive way of exploring the natural sounds of our planet. Combining high-quality field recordings with the latest satellite imagery, the project brings together some of nature's most beautiful, interesting and inspiring sounds.
3 6	**Neatline** http://www.neatline.org	Neatline is a geotemporal exhibit-builder that allows you to create beautiful, complex maps, image annotations, and narrative sequences from Omeka collections of archives and artifacts, and to connect your maps and narratives with timelines that are more-than-usually sensitive to ambiguity and nuance. Neatline lets you make hand-crafted, interactive stories as interpretive expressions of a single document or a whole archival or cultural heritage collection. You can import these documents (georeferenced historical maps, manuscripts, high-res photographs, etc.) from an existing collection, or create a new digital archive, yourself. Every Neatline exhibit is your contribution to humanities scholarship, in the visual vernacular.
1 5	**OpenStreetMap** www.openstreetmap.org	OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world. Everybody can contribute, even primary school children if guided. All data and maps can be used in all school projects free. While contributing to the biggest free geographical database we are educating the students to proprietary and open source concepts within geographical applications. The application allow to share, embed and save your maps as pictures or .pdf.
1	**Pearltree** http://www.pearltrees.com/	Pearltrees is a visual and collaborative curation tool that allows users to collect, organize and share any URL they find online as well as to upload personal photos and notes. The product features a unique visual interface that allows users to drag and organize collected URLs into units called pearls that themselves can be further organized in a hierarchical structure with pearltrees, the company's nomenclature for customizable folders that contain pearls (URLs).
2 3 6	**Place Spotting** http://www.placespotting.com/	Google map quiz to solve.
1 2 3 6	**Primary Resources** http://www.primaryresources.co.uk/geography/geography.htm	Rich website dedicated to geography for children. Worth a visit.
1	**ProjectGeoSpatial** http://www.projectgeospatial.com/	Really active geography community. Many interesting ideas come from here.

1 6	**Quia Geography** http://www.quia.com/shared/geography/	Huge repository of geographical activities.
1 2 3 6	**Real World Math** http://www.realworldmath.org/	Real World Math is a collection of free math activities for Google Earth designed for students and educators. Mathematics is much more than a set of problems in a textbook. In the virtual world of Google Earth, concepts and challenges can be presented in a meaningful way that portray the usefulness of the ideas.
1 2 5 6	**Science from the Children's University of Manchester** http://www.childrensuniversity.manchester.ac.uk/interactives/science/	Great products of the Children's University of Manchester. The section dedicated to the science have also some very interesting resources for geography as well. Is this the case of the chapters "Energy and the environment" (http://www.childrensuniversity.manchester.ac.uk/interactives/science/energy/) and "The Earth and beyond" (http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/). Short texts with small games and nice animations are available.
2 3 5 6	**Science Kids** http://www.sciencekids.co.nz/geography.html	Explore the exciting subject of geography for kids with our range of fun facts, free games, interesting experiments, science fair projects, cool quizzes, amazing videos and more! Learn about oceans, volcanoes, dust storms, glaciers, earthquakes and all kinds of interesting geography topics. As well as activities for children, there are also lesson plans and worksheets for teachers, ideas for parents and a whole host of free teaching resources for anyone interested in the subject of geography and learning about science online.
2 3	**Scribblemaps** http://scribblemaps.com/	Easy service for Draw and Share Maps! With Scribble Maps you can: Add Custom Images / Overlays, Place Text, Place Markers, Draw Shapes, Draw Great Circle Lines, Create Custom widgets, Create Dynamic Images, Export to Google Earth, Save as KML/GPX/JPG, Create Images and Widgets and Send Maps to Friends. Registration required.
1	**Share Geography** http://sharegeography.co.uk/	A Geography teacher sharing his thoughts and ideas with the World.
6	**Sheppard Software** http://www.sheppardsoftware.com/Geography.htm	By playing Sheppard Software's geography games, you will gain a mental map of the world's continents, countries, capitals, and landscapes! usa | world | animals | language arts | health | science | math | preschool | brain geographygames
3	**Snazzy Maps** http://snazzymaps.com/	Snazzy Maps is a repository of different styles for Google Maps aimed towards web designers and developers. All styles are licensed under creative commons and are completely free to use.
2 5 6	**Solar System Scope** http://www.solarsystemscope.com/	Solar System Scope is an exceptional 3D model of the solar system. It is dynamic and has a clear and cured graphic. It offers three main modes of the solar system model. The first is the heliocentric (sun-centered) mode of the solar system. If, while in this mode a planet is double-clicked, the model takes on the perspective of the solar system as viewed from the planet. The second mode is the geocentric (Earth-centered) view of the solar system. The third and final mode is the panoramic view of the solar system. In this mode not only is the solar system viewed from the perspective of an observer in Greenwich, England, but also included are the constellations in their astronomically correct position in

		the sky. Each of these different modes may be accessed by clicking on the telescope found on the lefthand side of the model.
1	**Storify** http://storify.com/	Great tool that enable to collect media from across the web, to publish on Storify, embed anywhere and share it. Nice graphics. Log-in require.
2	**StratoCam** http://www.stratocam.com/s/443107	Browse within the best Google Maps satellite imagery around the world.
2 5 6	**Sun Moon Scope** http://www.solarsystemscope.com/sunaeon/	Sun Moon Scope is an interactive tool looking at the Sun and Moon from the makers of Solar System Scope. It allows you to show the positions of the Sun and the Moon relative to an observer on the Earth, plus show what the phase of the Moon will be. You can play the animation to show what the moon will look like on any date. It's possible to switch off the moon and/or the Sun, plus jump straight to certain dates such as the Summer Solstice or Vernal Equinox. For teachers there is also a version that includes data and information on the singular planets: sunaeon (http://www.solarsystemscope.com/sunaeon/)
1	**Tagul** http://tagul.com/	Tagul is a web service that allows you to create gorgeous word clouds for free.
1	**Tagxedo** http://www.tagxedo.com/app.html	Tagxedo turns words -- famous speeches, news articles, slogans and themes, even your love letters -- into a visually stunning word cloud, words individually sized appropriately to highlight the frequencies of occurrence within the body of text. It allows to download what you create in different formats, for free.
1 2 3	**Target Map** http://www.targetmap.com/	Great resource. Allows to create customized Data Maps, Locate and See your Excel data on OpenStreetMap, Share and Enrich your knowledge. Just choose a country and a way to create your map by color, type values or by uploading your excel files (you can even use your zip / postal code column to get the best and most accurate maps!). All maps are published and shared in the community, boosting everyone's knowledge! Once you've shared your map, you can also improve and compare it with other people's related maps and data and embed the maps in your blog or insert customized maps in your PowerPoint presentations. Very useful.
1 3 6	**Teaching with Google Earth** http://serc.carleton.edu/sp/library/google_earth/index.html	This material was originally created for On the Cutting Edge: Professional Development for Geoscience Faculty and is replicated here as part of the SERC Pedagogic Service. Created by Glenn A. Richard, Mineral Physics Institute, Stony Brook University. Includes a Complete Guide to Using Google Earth in the Geoscience Classroom and Ready-to-use Classroom Activities.
2	**The Big Picture** http://www.boston.com/bigpicture/	The Big Picture is a photo blog produced by a select group of picture editors of the American newspaper "The Boston Globe". Entries are posted every Monday, Wednesday, and Friday. The Big Picture is intended to highlight high-quality, amazing imagery, with a focus on current events. The majority of the images come from companies such as the Associated Press, Reuters, and Getty Images. Other photos come from public domain sources such as NASA, or from private photographers. Pictures tell a story and have captions to supplement them. They represents a great resource for teachers because of their great actuality and quality. Pictures and caption used in lessons let the children work with real contents.
1	**The Geographical Association Web Site**	The Geographical Association (GA) is a UK-based subject association with the charitable objective of furthering geographical knowledge and understanding

	http://www.geography.org.uk/	through education. They support teachers, students, tutors and academics at all levels of education through journals, publications, training events, projects and by lobbying government about the importance of geography. The GA web site offers many materials for teaching geography at primary level and have a section dedicated to ICT and geography. Registered members of the association have also the opportunity to read online GE journals and access members-only contents. Interesting news on geography education are often reported thanks to the constant update.
1 3	**The View from Above** http://sites.duke.edu/tlge/	This blog showcases the work done by students in Dr. Christine Erlien's writing course "The View from Above: Google Earth's Impact." We focus here on sharing our knowledge of how Google Earth can (and is) impacting society (e.g., education, research, security, privacy, humanitarian response, etc.).
1	**The World Factbook** https://www.cia.gov/library/publications/the-world-factbook/	The World Factbook provides information on the history, people, government, economy, geography, communications, transportation, military, and transnational issues for 267 world entities. Our Reference tab includes: maps of the major world regions, as well as Flags of the World, a Physical Map of the World, a Political Map of the World, a World Oceans map, and a Standard Time Zones of the World map.
1 3 6	**Thematic Mapping Engine** http://thematicmapping.org/engine/	Thematic Mapping Engine (TME) enables you to visualise global statistics on Google Earth. The primary data source is UNdata. The engine returns a KMZ file that you can open in Google Earth or download to your computer.
6	**Topography Games** http://games.co.za/topography	Topography, geography, maps. Topography isn't always as easy as it seems. Where is that country in Africa exactly? What's the capital of that Asian country again? Where was that river in Europe? Topography is about the description of geographic features and landmarks and the names of places. Topography games are difficult, but fun! Test your knowledge of topography here in one of our maps of the world games. Pinpoint the right country, city, state, river or mountain range on the map. Choose from maps of different parts of the world and improve your knowledge of them. Do you need an atlas, or can you do it by heart?
2 3 5 6	**TourBuilder** https://tourbuilder.withgoogle.com/	A simple and much cured tool for recording and sharing stories on a map. Based on Google Earth.
2 3	**TrailMeUp** http://www.trailmeup.com/home/index	Virtual tours on mountains trails. Great quality.
6	**TravelTip** http://www.traveltip.org/countries_visited.php	Select the countries you've visited (or studied) and produce a map of the world with those countries in red.
3	**Trip Geo** http://tripgeo.com/DirectionsMap.aspx	Great tool that allows to create Map with Route Directions and displaying Street View for any point along the route. It provide an animated Street View for all or part of the journey, and allow to set travel speed, update interval, zoom level. The map can be embed or linked. Great resource.

3 5	**Tripline** http://www.tripline.net/	Tripline is a web geo-application that allows to create itineraries on Google Maps. It is a great tool for teaching geography. It might be used as georgraphical slideshow.
6	**Uncharted** http://uncharted.fm/	Learn and explore the countries of the world with a system proven to help you learn faster and remember longer. Fun game. Require Sign up via Facebook.
4	**Vacaroo** http://vocaroo.com/	Online sound recorder. Allow to save and embed your registrations. Great tool, free.
4	**Vacaroo** http://vocaroo.com/	Vocaroo is a shiny new service for sending voice messages across the interwebs. It allows to record sounds and voices from the microphone storing them in the web site. Vacaroo enables to share and embed sounds and voices in web sites, blogs, social networks and in Google Earth. It is in this particular environment that Vacaroo can help describing place marks (as well as polygons, pictures, etc.) by recording their voices instead of using written texts. This simple and very engaging tool can support maps, pictures and videos. An additional value is that registration is not required.
2 3	**Vector World Maps** http://www.webresourcesdepot.com/all-free-vector-world-maps-ai-eps-svg/	Free vector world maps are must-haves of every designer's toolkit as there will be times when they are needed. Here there is an up-to-date collection of Free Vector World Maps Collection.
5	**Vimeo** https://vimeo.com/	Vimeo is a U.S.-based video-sharing website on which users can upload, share and view videos. Vimeo contains less videos than the much larger Youtube, but has a stronger focus on longer videos such as shorts or movies. Many professional video-makers as well as artists upload their videos in Vimeo and this allow teachers to find great geographical resources for their lesson (i.e. documentaries). It is possible to perform advanced researches upon quality, duration, license and download availability.
3	**WikiMapia** www.wikimapia.org/	Wikimapia is a multilingual open-content collaborative map, where anyone can create place tags and share their knowledge. Its goal is to describe the whole world by compiling as much useful information about all geographical objects as possible, organize it and provide free access to our data for public domain. Wikimapia data is wholly made by Internet volunteers, who contribute to the project on their free will. Marking places, adding descriptions provided with proof links, giving them appropriate categories and uploading photos to Wikimapia let people easily share information about the world with their friends or publicly. Registration required.
2	**Windows On Our World** http://woow.phil-sllvn.co.uk/windows/index.php?PageID=1	A unique online image library of royalty-free geographical photography. Downloading of finely detailed, high resolution pictures is free of charge. Windows On Our World has in the past received financial support from the Royal Geographical Society and other prestigious organisations. The website contains a powerful search facility, and many images are catalogued in multiple sections. There are currently over 5,600 images in the WOOW database, with new ones being added daily. Windows On Our World is an invaluable educational resource which accompanies its images with geographical facts
1	**WordItOut** http://worditout.com/	WordItOut is a word cloud generator that gives you control with many custom settings. Free to use and no sign up required!
1	**Wordle.net** http://www.wordle.net/	Wordle is a toy for generating "word clouds" from text that you provide. The clouds give greater prominence to words that appear more frequently in the

		source text. You can tweak your clouds with different fonts, layouts, and color schemes.
6	**World Geography Games** http://world-geography-games.com/	Can you point out Sudan on the map? How about the Strait of Hormuz? This website will bring you many entertaining and stimulating map games to improve your geographical knowledge. The quizzes include questions about countries, regions, bodies of water, mountains, deserts, metropolitan areas and other topics that will test and challenge your brain. For everyone who wants to explore and learn about the world, you've come to the right place! Facts and figures about places are kindly borrowed from Wikipedia and the CIA World Factbook. The Global Volcanism Program of the Smithsonian Institute is consulted for additional information on volcanoes. World Geography Games is also available in German, French, Dutch and Spanish.
6	**World Puzzle** http://earth-api-samples.googlecode.com/svn/trunk/demos/puzzler/index.html	World puzzle to play with.
3	**Yahoo Maps** http://maps.yahoo.com/	Yahoo! Maps is a free online mapping portal provided by Yahoo!. Very common in the United States. Its main services include Address Book, Live Traffic, Point of Interest Finder, Driving Directions. Maps can be edited if registered. Multilingual platform.

Appendix B - 'Geomedia@School': English survey.

Thank you for taking time to complete this questionnaire. Please answer each question to the best of your knowledge. Your thoughtfulness and candid responses will be greatly appreciated. The questionnaire is anonymous and your responses will be kept completely confidential.

* Required questions

DEMOGRAPHIC INFORMATION

1. Country*

2. Postal Code

3. Gender*
   - Female
   - Male

4. Age*
   - < 31
   - 31 – 40
   - 41 – 50
   - > 50

5. Was your training*
   - BA Honours degree with QTS (Qualified Teacher Status)
   - Postgraduate Certificate/Diploma in Education (PGCE/PGDE)
   - Other (e.g. Cert Ed.)

6. Which subjects received most teaching time?*

Multiple answers allowed.

- ☐ Art
- ☐ English
- ☐ Modern Foreign Language
- ☐ History
- ☐ Mathematics
- ☐ Geography
- ☐ Music
- ☐ Design and Technology
- ☐ Science
- ☐ Special Education
- ☐ Physical Education
- ☐ Early Years

7. Did Technology receive teaching time?
   - Yes
   - No

8. How many years have you taught in school?*

9. How many years have you taught geography in school?*

10. To which age are you teaching geography this year?*

- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 12
- ☐ None
- ☐ Other: _____

11. The school where you work is...*
    - in a city/town with less than 100.000 inhabitants
    - in a city/town with 100.000 inhabitants or more

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology. That is, the digital tools we use such as computers, laptops, tablets, smart phones, GPS, interactive whiteboards and also the software programs, apps, web pages, web tools and so on.

Please answer all of the questions and if you are uncertain of or neutral about your response you may always select "Neither Agree or Disagree"

Teaching style and skills	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I can adapt my teaching style to different learners.					
2. I can assess student learning in multiple ways.					
3. I know how to organize and maintain classroom management.					
4. I can use a wide range of teaching approaches in a classroom setting.					
5. I want to improve my teaching skills					
6. I believe that nowadays the introduction of multimedia technologies into teaching is a requirement for up-to-date teaching.					
7. I believe I don't need technologies to make a good lesson.					
8. I believe that the introduction into the teaching of multimedia technologies is a valuable support for the teacher's work.					
9. I can use technologies to improve the presentation of information to learners.					
10. I can use technologies to engage students in learning.					
11. I can help others to use technologies for teaching.					
12. I can use technologies to engage students in learning geography.					
13. I think geography is important in school.					
14. I think geography requires memory.					
15. I think geography requires reasoning skills.					
16. I can select effective teaching approaches to guide student thinking and learning geography.					
17. I feel confident in teaching geography.					
18. I have sufficient knowledge about geography.					
19. I know various ways and strategies of developing my geographical understanding.					
20. I can use a geographical way of thinking.					
21. I think geography is useful in real life.					
22. I want to improve my geographical competence					
23. I believe that the introduction into the geography teaching of multimedia technologies is a valuable support for the teacher's work.					
24. I feel confident in using every kind of technology.					
25. I can search the web to find current information on a topic that I need.					
26. I can create a presentation using PowerPoint or a similar program.					
27. I can create a document with text and graphics in a word processing program.					
28. I can learn how to use a new program on my own.					
29. I can solve my own technical problems.					
30. I can edit a digital photograph.					
31. I can use Web 2.0 technologies (e.g., blogs, social networking, podcasts, etc.).					
32. I feel confident in using digital maps (e.g. Bing, Yahoo or Google maps).					
33. I know how to use digital globes (e.g. Google Earth).					
34. I know about technologies that can be used in outdoor geography.					
35. I know where to look for new/additional digital/technological resources on geography.					
36. I know digital games with focus on geography.					
37. I can find online resources that effectively demonstrate a specific geographical process/content					
38. I can help students to use technologies for collecting and organizing information related to a specific geographical topic.					
39. I can teach lessons that appropriately combine geography, technologies and teaching approaches.					

40. I want to improve my skills on technologies					

Below is a list of strategies that can be used for teaching. How much do you use them while teaching geography?

SCHOOL

	Never	Rarely	Sometimes	Often	Always
In my geography lesson					
41. I start the lesson proposing a problem to solve or a question to answer.					
42. I use the textbook.					
43. I link different topics and subjects.					
44. I let students work in groups.					
45. I encourage discussion					
46. I invite experts.					
47. I suggest outdoor activities/investigations.					
48. I use digital technologies to improve geographical understanding.					
49. I let students use computers (in the classroom/computer lab)					
50. I let students use photo cameras or video cameras.					
51. I let students use GPS devices, smartphones or tablets.					
52. I suggest resources taken from the Internet (e.g. texts, pictures, animations, videos).					
53. I show videos, documentaries or movie from CD, DVD or VHS.					
54. I let students work with basic software (e.g. Word, PowerPoint, Excel).					
55. I let students work with geographical software (e.g. digital maps, digital globes, geographical games).					
56. I let students search for online resources.					

How would you personally value the following types of support regarding teaching geography with technologies?

	Very Useless	Useless	Neither Useless nor Useful	Useful	Very Useful
57. CD-Rom/DVD/USB Stick with selected multimedia materials.					
58. List of online resources for the teacher.					
59. List of trustworthy web pages where is possible to follow the on-going and up-to-date discussion.					
60. Ready material for the teacher (e.g. lesson plan).					
61. Ready material for the students (e.g. worksheets).					
62. New textbook with robust online resources included.					
63. In job training/workshop focused on geographical technologies and software.					
64. In job training/workshop focused on strategies for teaching geography with technologies.					
65. Lecture / Presentation.					
66. Online platform / Discussion forum.					
67. Other: _____					

68. If you would prefer other types of support feel free to tell us which one: _____ _____

TECHNOLOGIES

1. How many students in your school?*

   Around [ ] students

2. Is there at least one computer in every classroom of your school?
   - o Yes
   - o No

3. Do at least half of the classrooms in your school have an interactive whiteboard?
   - o Yes
   - o No

4. Does your classroom have an interactive whiteboard?*
    - Yes
    - No

5. Does your school have a computer lab?*
    - Yes
    - No *(end of the questionnaire)*

6. If yes, how many computers are in the laboratory?

7. How would you describe the computers?
    - Unreliable
    - Unsatisfactory
    - Poor reliability
    - Good
    - Excellent

8. Are the computers connected to the Internet?
    - Yes
    - Yes, some of them
    - Yes, but the connection is limited
    - No

9. Based on your experience how often the teachers in your school are using the computer lab?
    - Not at all
    - Rarely
    - Sometimes
    - Frequently
    - Regularly
    - I don't know

Thank you for your cooperation! You have answered all questions.

If we forgot something important from your point of view, or if you have some general comments to the questionnaire, please feel free to use the remaining space. We are grateful for all suggestions.

Appendix C - 'Geografi@Scuola': introductory online questionnaire (#1).

Ecco il questionario per gli iscritti al laboratorio Geografi@Scuola!

Il questionario è suddiviso in 10 "pagine" e richiede circa 25 minuti per essere completato.
ATTENZIONE: I dati verranno salvati solo se arriverete fino all'ultima pagina. Assicurarvi di arrivarci! (vi comparirà un messaggio di congratulazioni!)

Vi prego di essere sinceri nelle risposte e di considerare il fatto che i vostri dati non saranno diffusi e saranno trattati secondo le più stringenti norme sulla privacy.

Grazie per la collaborazione e la fiducia.
Giovanni
*Campo obbligatorio

Nome *

Congome *

Sesso *
Maschio

Età *

Motivazione *
Perché hai deciso di partecipare a questo laboratorio?

Aspettative *
Cosa ti aspetti da questo laboratorio?

Educazione

Formazione di base *

Quale di questi percorsi di formazione hai concluso?

- ○ Licenza di scuola media
- ○ Diploma in ambito umanistico
- ○ Diploma in ambito scientifico
- ○ Diploma in ambito linguistico/artistico
- ○ Diploma in ambito tecnologico
- ○ Altro: [ ]

Formazione superiore

Hai conseguito una laurea? Se sì, in quale ambito?

- ○ Laurea in ambito umanistico
- ○ Laurea in ambito scientifico
- ○ Laurea in ambito linguistico/artistico
- ○ Laurea in ambito tecnologico
- ○ Altro: [ ]

Altri titoli di studio

Hai conseguito altri titoli di studio? Se sì, quali?

- ☐ Abilitazione SSIS
- ☐ Master
- ☐ Dottorato
- ☐ Altro: [ ]

Corsi di aggiornamento e di formazione

Hai seguito corsi di aggiornamento e/o di formazione che ritieni attinenti/significativi per questo progetto (Es. ECDL, FORTIC, Corsi di informatica)? Quali?

[ ]

Professione

Anzianità di servizio *

Da quanti anni insegni?

- ○ Meno di 5 anni
- ○ Tra i 5 e i 9 anni
- ○ Tra i 10 e i 19 anni
- ○ Tra i 20 e i 30 anni
- ○ Oltre i 30 anni

Scuola *

In che scuola lavori attualmente?

[ ]

Anzianità di servizio - bis *

Da quanti anni insegni nella scuola in cui lavori adesso?

- ○ Meno di 5 anni
- ○ Tra i 5 e i 9 anni
- ○ Tra i 10 e i 19 anni
- ○ Tra i 20 e i 30 anni
- ○ Oltre i 30 anni

Contratto di lavoro *

In che posizione contrattuale ti trovi attualmente?

- ○ Docente Tempo Indeterminato
- ○ Docente Tempo Determinato (annuale, termine attività didattiche 30/6)
- ○ Docente Tempo Determinato (supplenza breve)
- ○ Altro: _____

Anzianità di servizio nell'insegnamento della geografia *

Da quanti anni insegni geografia a scuola?

- ○ Meno di 5 anni
- ○ Tra i 5 e i 9 anni
- ○ Tra i 10 e i 19 anni
- ○ Tra i 20 e i 30 anni
- ○ Oltre i 30 anni

In che classe insegni geografia quest'anno? *

- ☐ Prima
- ☐ Seconda
- ☐ Terza
- ☐ Quarta
- ☐ Quinta
- ☐ Altro: _____

Soddisfazione nel lavoro di insegnante

Per molti aspetti il mio lavoro attuale si avvicina al mio ideale *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Le mie condizioni di lavoro sono eccellenti *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Sono soddisfatto/a del mio lavoro *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Fino ad ora ho ottenuto ciò che volevo di importante nel mio lavoro *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Se tornassi indietro nel tempo, non cambierei le scelte fatte nell'ambito lavorativo *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Soddisfazione nell'insegnamento della geografia

Per molti aspetti il modo in cui insegno geografia si avvicina al mio ideale *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Le mie condizioni di lavoro, per quanto riguarda l'insegnamento della geografia, sono eccellenti *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Sono soddisfatto/a di come insegno geografia *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Fino ad ora, ho ottenuto ciò che volevo di importante nell'insegnamento della geografia *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Se tornassi indietro nel tempo, non cambierei le scelte fatte nell'ambito dell'insegnamento della geografia *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Percezioni sulla geografia

Di seguito troverai un elenco di affermazioni relative alla geografia.
Indica per ogni affermazione il tuo grado d'accordo.

La geografia è una materia ... *

Consideri le seguenti affermazioni ed indichi quanto sono vere per lei, dando un giudizio da 1(per niente) a 5 (del tutto).

	per niente	poco	mediamente	molto	del tutto
Importante a scuola	○	○	○	○	○
Utile nella vita concreta	○	○	○	○	○
Che ha molte cose in comune con Storia	○	○	○	○	○
Che ha molte cose in comune con Scienze	○	○	○	○	○
Che richiede capacità di fare collegamenti e ragionamenti	○	○	○	○	○
Che deve essere presente sin dalla scuola dell'infanzia	○	○	○	○	○
Che è stata importante per la mia formazione	○	○	○	○	○
Che è molto presente anche nelle mie attività quotidiane	○	○	○	○	○

Studiare geografia è stato ... *

Consideri le seguenti affermazioni ed indichi quanto sono vere per lei, dando un giudizio da 1(per niente) a 5 (del tutto).

	per niente	poco	mediamente	molto	del tutto
Noioso	○	○	○	○	○
Interessante, ne ho un bel ricordo	○	○	○	○	○
Piacevole	○	○	○	○	○
Difficile	○	○	○	○	○
Complicato a causa del linguaggio specifico della disciplina	○	○	○	○	○
Facile	○	○	○	○	○

Secondo te, a che cosa serve la Geografia? *

Scegli e seleziona tra queste SOLO CINQUE risposte

- [ ] 1. per viaggiare e sapersi orientare
- [ ] 2. per sapere dove si trova un certo fiume, una nazione o una città
- [ ] 3. per conoscere le culture dei popoli
- [ ] 4. per conoscere l'ambiente che ci circonda
- [ ] 5. per diventare cittadini più responsabili
- [ ] 6. per imparare ad individuare problemi territoriali e pensare soluzioni
- [ ] 7. per capire meglio l'attualità
- [ ] 8. per conoscere e rispettare le diverse mentalità e culture
- [ ] 9. per conoscere e comprendere le nostre radici
- [ ] 10. per confrontare il presente con il passato
- [ ] 11. per favorire e promuovere lo sviluppo sostenibile
- [ ] 12. per sensibilizzare alla tutela del paesaggio e dei beni culturali
- [ ] 13. per sviluppare la capacità di porsi domande rispetto alla complessità del territorio e cercare risposte
- [ ] 14. per sviluppare l'orientamento spaziale
- [ ] 15. per promuovere esperienze sul territorio
- [ ] 16. per esplorare il territori e fare ricerca sul campo
- [ ] 17. per ricercare le leggi che governano il territorio

Emozioni nell'insegnare geografia

Quando insegni geografia che emozioni provi? *

Indica con quale frequenza provi le emozioni sotto elencate

	Quasi mai	Di rado	Talvolta	Spesso	Quasi sempre
1. Gioia	○	○	○	○	○
2. Scoraggiamento	○	○	○	○	○
3. Esasperazione	○	○	○	○	○
4. Felicità	○	○	○	○	○
5. Piacere	○	○	○	○	○
6. Delusione	○	○	○	○	○
7. Entusiasmo	○	○	○	○	○
8. Soddisfazione	○	○	○	○	○
9. Rabbia	○	○	○	○	○
10. Tristezza	○	○	○	○	○
11. Arricchimento	○	○	○	○	○
12. Senso di realizzazione	○	○	○	○	○
13. Senso di fallimento	○	○	○	○	○

La geografia a scuola

Strategie di insegnamento della geografia *

Qui di seguito viene presentato un elenco di strategie che possono essere utilizzate per l'insegnamento della geografia. Passale in rassegna una alla volta e indica quanto le usi nelle tue lezioni di geografia.

	Mai	Raramente	Talvolta	Spesso	Sempre
1. Dettare un certo numero di definizioni.	○	○	○	○	○
2. Rappresentare con disegni, schemi, tabelle l'argomento da trattare.	○	○	○	○	○
3. Invitare gli alunni a porre domande durante ed alla fine delle spiegazioni	○	○	○	○	○
4. Proporre in forma problematica gli argomenti da affrontare, sotto forma di domanda-stimolo	○	○	○	○	○
5. Chiedere agli alunni di leggere a voce alta dal libro di testo.	○	○	○	○	○
6. Richiamare agli alunni le informazioni che già possiedono su un argomento e far loro esporre le proprie idee e/o conoscenze	○	○	○	○	○
7. Delineare un argomento rifacendosi ad esperienze ed esempi attuali e/o familiari	○	○	○	○	○
8. Creare collegamenti tra argomenti e materie diverse tra loro	○	○	○	○	○
9. Integrare le proposte del sussidiario con schede di approfondimento	○	○	○	○	○
10. Fare uso di tecnologie multimediali, supporti audiovisivi, navigazione in rete	○	○	○	○	○
11. Organizzare lavori di gruppo da svolgersi durante l'orario di lezione	○	○	○	○	○
12. Ricorrere ad immagini che riportano ad un argomento teorico (diapositive, disegni, carte, opere d'arte, ecc..)	○	○	○	○	○
13. Organizzare escursioni sul campo	○	○	○	○	○
14. Fornire uno schema redatto dall'insegnante o materiali di sintesi (riassunto, piano di studio) e/o di approfondimento	○	○	○	○	○
15. Fare uso CD, DVD, audiovisivi, film	○	○	○	○	○
16. Fare uso di drammatizzazione e esperienze pratiche, con momenti di operatività guidata	○	○	○	○	○

17. Organizzare visite guidate					
18. Fare uso dei programmi disponibili in rete					
19. Proporre attività geografiche a partire dalla lettura di un racconto					
20. Proporre attività ludiche di scoperta dello spazio					
21. Proporre attività laboratoriali tenute da esperti					
22. Fare uso dei software di base (Word, PowerPoint, Excel...)					
23. Fare uso di software specifici collegati alla geografia					
24. Fare uso delle risorse disponibili in rete per ricerche ed approfondimenti geografici					
25. Quando possibile integrare le spiegazioni con esperienze sul campo					

Attività specifiche nell'insegnamento della geografia *

Qui di seguito viene presentato un elenco di attività che possono essere proposte nell'insegnamento della geografia. Passale in rassegna una alla volta e indica la frequenza con cui le proponi nelle tue lezioni di geografia.

	Mai o quasi mai	Raramente	Talvolta	Spesso	Sempre o quasi
Percorsi didattici di rispetto e valorizzazione del mondo animato e inanimato					
Percorsi di orientamento personale volti ad interiorizzare l'ambiente					
Percorsi di conoscenza della realtà territoriale italiana, europea e mondiale					
Analisi delle origini della vita e del cosmo e del ruolo dell'uomo nell'universo					
Percorsi di movimento spontaneo e guidato, da soli e in gruppo, esprimendosi con indicazioni verbali o ricavate da carte geografiche, bussola e punti cardinali					
Percorsi o organizzazione di ambienti sulla base di indicazioni verbali e/o non verbali					
Registrazione dei cicli temporali e degli eventi atmosferici					
Disegno e costruzioni / plastici					
Localizzazione e collocazione di se stesso nello spazio, uso punti cardinali					
Ricordo e ricostruzione di quello che si è visto, fatto, sentito					
Consultazione di libri, riviste (Focus junior, Airone, ...)					
Consultazione dell'atlante					
Consultazione di carte geografiche					

Quanto ritieni di conoscere le indicazioni nazionali (Ministro Fioroni, 2007) sulla geografia?

Scegli l'affermazione che si avvicina di più alla tua posizione

- ○ Per nulla. Non le ho mai lette
- ○ Poco. Le ho lette molto tempo fa
- ○ Così e così. Le ho lette e vagamente mi ricordo
- ○ Abbastanza. Le ho lette e le ho abbastanza presenti
- ○ Molto. Le ho lette e le conosco bene

Ritieni stimolanti, lungimiranti e ben fatte le indicazioni nazionali (Ministro Fioroni, 2007) sulla geografia?

Scegli l'affermazione che si avvicina di più alla tua posizione

- ○ Per nulla
- ○ Poco
- ○ Mediamente
- ○ Abbastanza
- ○ Molto
- ○ Non so proprio esprimere un'opinione
- ○ Altro: _____

Competenze d'uso delle tecnologie

Da quanto tempo usi il computer? *

- ○ non lo uso
- ○ meno di 1 anno
- ○ da 1 a 3 anni
- ○ da 3 a 5 anni
- ○ da 5 a 10 anni
- ○ oltre 10 anni

PC e internet presso la propria abitazione *

Quale delle seguenti risposte rappresenta la dotazione che hai a casa?

- ○ PC con connessione ad internet a banda larga (ADSL, fibra ottica)
- ○ PC con connessione ad internet mediante modem tradizionale
- ○ PC con connessione ad internet, ma non so proprio di che tipo
- ○ PC ma senza connessione ad internet
- ○ Non ho il PC a casa (ma posso usarlo a scuola)
- ○ Non ho il PC a casa (e anche a scuola)

Che tipo di computer possiedi?

Rispondi solo se ne possiedi uno (sono ammesse risposte multiple)

- ☐ Portatile (Notebook, Netbook)
- ☐ Fisso (PC, Mac)
- ☐ Tablet (Ipad)
- ☐ Altro: _____

Frequenza d'uso del computer *

Quanto spesso usi il computer nel complesso (tra casa, scuola ed altri luoghi)?

- Quotidianamente
- Due o tre volte alla settimana
- Una volta alla settimana
- Una volta al mese
- Qualche volta all'anno
- Mai, ma lo so usare
- Mai e non lo so usare

Quanto ti senti competente nell'uso del computer? *

	1	2	3	4	5	6	7	
Per nulla								Moltissimo

Quanto ti senti autonomo nell'uso del computer? *

	1	2	3	4	5	6	7	
Per nulla								Moltissimo

Davanti al computer che emozioni provi? *

Indica con quale frequenza provi le emozioni sotto elencate

	Quasi mai	Di rado	Talvolta	Spesso	Quasi sempre
1. Gioia					
2. Scoraggiamento					
3. Esasperazione					
4. Felicità					
5. Piacere					
6. Delusione					
7. Entusiasmo					
8. Soddisfazione					
9. Rabbia					
10. Tristezza					
11. Arricchimento					
12. Senso di realizzazione					
13. Senso di fallimento					

Indica il tuo grado di familiarità con le seguenti tipologie di strumenti: *

	nullo	basso	medio	buono	elevato
1: Programmi di scrittura testi (es. Microsoft Word, Writer, Notebook, Wordpad)	○	○	○	○	○
2: Fogli di calcolo elettronico (es. Microsoft Excel, Calc)	○	○	○	○	○
3: Software per presentazioni (es. Microsoft Power Point)	○	○	○	○	○
4: Programmi di grafica e fotoritocco (es. Paint, Photoshop, Gimp)	○	○	○	○	○
5: Software didattico (Giochi ed esercizi per computer sulla geografia)	○	○	○	○	○
6: Posta elettronica	○	○	○	○	○
7: Web per cercare informazioni	○	○	○	○	○
8: Social network (es. Facebook, MySpace, LinkedIn)	○	○	○	○	○
9: Messaggistica istantanea (es. Chat, Windows Messenger, Skype)	○	○	○	○	○
10: Blog	○	○	○	○	○
11: Wikipedia e wiki in generale	○	○	○	○	○
12: Mappe o visualizzatori digitali (es. Google Earth, Google Maps, Bing, OpenStreetMap)	○	○	○	○	○

Le tecnologie a scuola

Tecnologia a scuola *

Indica con che frequenza fai le seguenti attività

	mai	raramente	talvolta	spesso	sempre o quasi
Usare le tecnologie in classe durante le lezioni	○	○	○	○	○
Usare le tecnologie per preparare documenti da presentare in forma stampata agli studenti	○	○	○	○	○
Consultare CD-ROM didattici e informativi	○	○	○	○	○
Usare le tecnologie per comunicare con altri insegnanti o con gli studenti	○	○	○	○	○
Usare la rete per informarsi e consultare informazioni di carattere organizzativo	○	○	○	○	○
Partecipare a corsi di formazione o aggiornamento on-line (e-learning)	○	○	○	○	○
Documentarsi su internet per preparare la lezione	○	○	○	○	○

Come consideri l'introduzione nella didattica della geografia di tecnologie e attrezzature multimediali? *

Indica la risposta per te più corretta

- Una moda passeggera che nella maggior parte dei casi, non cambia il modo di insegnare
- Un elemento importante della didattica moderna
- Un elemento di confusione per insegnanti e studenti
- Una condizione indispensabile per inserire gli studenti attivamente nella realtà contemporanea
- Un supporto insostituibile per il lavoro dell'insegnante
- Un intralcio alle già scarse possibilità di interazione tra l'insegnante e gli alunni

Secondo te, includere le tecnologie nella pratica didattica quotidiana è: *

Rispondi ripensando alla tua esperienza professionale

- Difficilissimo, quasi impossibile
- Molto difficile
- Abbastanza difficile
- Non è né facile né difficile
- Abbastanza semplice
- Molto facile
- E' banale, quasi naturale
- Non so proprio esprimere un'opinione

Come descriveresti il tuo atteggiamento rispetto all'uso di internet da parte dei tuoi studenti *

Indica la risposta che più si avvicina alla tua posizione

- Favorevole
- Favorevole ma solo se mediato dai genitori o da una figura adulta
- Più favorevole che contrario/a
- Indifferente
- Pià contrario/a che favorevole
- Contrario/a
- Non so proprio esprimere un'opinione

Ritieni che internet sia pericoloso? *

- Sì, certamente
- Sì, ma i pericoli possono essere evitati
- Solo in alcuni casi
- No, ma è comunque necessario educare gli studenti ad usarlo
- No, per nulla
- Non so proprio esprimere un'opinione

Appendix D - 'Geografi@Scuola': questionnaire on school equipment (#2).

Dotazioni tecnologiche della scuola

Premessa
Con il termine istituto si intende l'insieme delle scuole primarie del suo istituto comprensivo o della sua direzione didattica. Quando si parla invece di scuola si fa riferimento al plesso in cui lei insegna.

*Campo obbligatorio

Nome dell'istituto *

Nome della scuola *

Nella sua scuola è presente l'aula informatica? *

- Sì
- No

Quanti computer ci sono? *

- Meno di 5
- Da 6 a 10
- Da 11 a 15
- Da 16 a 20
- Più di 20

Tra questi ce ne sono di non funzionanti o inutilizzabili? *

- No, funzionano tutti
- Sì

Gli schermi dei computer sono piatti? *

- ◯ No
- ◯ Alcuni
- ◯ Si

Come definirebbe i computer sui quali lavorano i bambini? *

- ◯ Non funzionanti
- ◯ Obsoleti
- ◯ Poco adeguati
- ◯ Adeguati
- ◯ Abbastanza adeguati
- ◯ Efficienti
- ◯ All'avanguardia

I computer utilizzabili dai bambini hanno accesso ad internet? *

- ◯ No
- ◯ Alcuni
- ◯ Si
- ◯ Si ma l'accesso a internet è limitato

Quale sistema operativo è installato sui computer del laboratorio di informatica? *

- ☐ Windows XP, 2000, NT o precedenti
- ☐ Windows Vista o Windows 7
- ☐ Machintos (Mac)
- ☐ Linux (Obuntu, Mandriva, ecc_)
- ☐ Non lo so

Il computer sul quale lavora l'insegnante, in laboratorio, è collegato ad un videoproiettore? *

- ◯ No
- ◯ Talvolta
- ◯ Si
- ◯ Non lo so

In laboratorio sono presenti le seguenti tecnologie: *

(metti una crocetta su tutte le tecnologie presenti)

- ☐ Stampante
- ☐ Scanner
- ☐ Videoproiettore
- ☐ LIM
- ☐ Nessuna delle precedenti
- ☐ Altro:

Quanto viene sfruttata l'aula informatica della scuola? *

- ◯ Per nulla
- ◯ Molto poco
- ◯ Poco
- ◯ Adeguatamente
- ◯ Abbastanza
- ◯ Molto
- ◯ Sempre
- ◯ Non lo so

A scuola (magari in sala insegnanti) è presente un computer dedicato esclusivamente agli insegnanti? *

- ◯ No
- ◯ Si
- ◯ Si, più di uno.
- ◯ Altro:

Di che tipo è/sono il/i computer a disposizione degli insegnanti? *

Sono ammesse più risposte

- ☐ Fisso
- ☐ Portatile

Questo/i computer è/sono connesso/i ad internet? *

- ◯ No
- ◯ Si

Questo/i computer ha/hanno la possibilità di stampare? *

- ◯ No
- ◯ Si
- ◯ Si, anche a colori

In base alle prestazioni, come considereresti questo/i computer? *

- ◯ Non funzionanti
- ◯ Obsoleti
- ◯ Poco adeguati
- ◯ Adeguati
- ◯ Abbastanza adeguati
- ◯ Efficienti
- ◯ All'avanguardia

Quanto viene/vengono sfruttato/i questo/i computer? *

- ◯ Per nulla
- ◯ Molto poco
- ◯ Poco
- ◯ Adeguatamente
- ◯ Abbastanza
- ◯ Molto
- ◯ Sempre

Di che tipo di connessione internet è fornita la scuola? *

- ◯ Nessuna connessione
- ◯ Connessione normale (56 kbps)
- ◯ Connessione veloce (ADSL, Fibra ottica)
- ◯ Non lo so

A scuola è disponibile una connessione Wi-Fi? *

- ◯ No
- ◯ Si
- ◯ Non lo so

Altre tecnologie

Quali altre tecnologie sono disponibili a scuola? *

Sono accettate risposte multiple

- ☐ Stereo con lettore CD
- ☐ Lettore MP3
- ☐ Televisione
- ☐ Lettore di videocassette (VHS)
- ☐ Lettore di DVD
- ☐ Videoproiettore
- ☐ Lavagna luminosa
- ☐ Scanner
- ☐ GPS
- ☐ LIM
- ☐ Tablet
- ☐ Altro: _____

Quante LIM ci sono nel vostro Istituto? *

- ◯ Nessuna
- ◯ Una
- ◯ Due o tre

*

- ◯ Quattro o cinque
- ◯ Più di cinque
- ◯ Non lo so

Quante LIM ci sono nella vostra scuola? *

- ◯ Nessuna (salta pure le prossime domande)
- ◯ Nessuna, ma ci hanno promesso che arriverà presto (salta pure le prossime domande)
- ◯ Una
- ◯ Due o tre
- ◯ Quattro o cinque
- ◯ Più di cinque

Quanto tempo fa è stata installata la prima LIM?

- ◯ Quest'anno
- ◯ Da un anno
- ◯ Da due anni
- ◯ Da più di due anni
- ◯ Non lo so

Dov'è/Dove sono stata/e collocata/e la/e LIM?

- ☐ In un'aula dedicata
- ☐ In uno spazio comune
- ☐ Nell'aula informatica
- ☐ In una classe
- ☐ Altro:

La/e LIM è/sono connessa/e ad internet?

- ◯ Si
- ◯ Alcune
- ◯ Talvolta
- ◯ No

Quanto vengono sfruttate le potenzialità della/e LIM?

- ◯ Per nulla
- ◯ Molto poco
- ◯ Poco
- ◯ Adeguatamente
- ◯ Abbastanza
- ◯ Molto
- ◯ Al massimo

Con che frequenza viene/vengono utilizzata/e la/e LIM?

- ◯ Mai
- ◯ Molto poco
- ◯ Poco
- ◯ Ogni tanto
- ◯ Abbastanza
- ◯ Spesso
- ◯ Sempre

Invia

Non inviare mai le password tramite Moduli Google.

Appendix E - 'Geografi@Scuola': observation grid (#5).

Griglia di osservazione
focus sulle azioni dell'insegnante

Adattamento dello strumento della dimensione relazionale da:
M. Castoldi (a cura di), *L'efficacia dell'insegnamento*, Franco Angeli, Milano 2002

Indicatori	mai sempre
DA CHIARIMENTI, ESEMPLIFICAZIONI, SPIEGAZIONI, ARGOMENTAZIONI	0 1 2 3 4 5 6
SI SFORZA DI COMPRENDERE I SIGNIFICATI DELLE COMUNICAZIONI DEI CORSISTI	0 1 2 3 4 5 6
VALORIZZA I PUNTI DI VISTA DIVERSI	0 1 2 3 4 5 6
VALORIZZA GLI SPUNTI IDEATIVI E CREATIVI DAI PARTECIPANTI	0 1 2 3 4 5 6
SOLLECITA LA RIFLESSIONE	0 1 2 3 4 5 6
PROMUOVE L'ESPLICITAZIONE DEI PROCESSI UTILIZZATI	0 1 2 3 4 5 6
SOLLECITA ALL'IMPIEGO DI SPIEGAZIONI E VALUTAZIONI PERSONALI	0 1 2 3 4 5 6
ADOTTA STRATEGIE PER RINFORZARE L'ATTENZIONE	0 1 2 3 4 5 6
CONSIDERA E RIPRENDE GLI INTERVENTI DEI PARTECIPANTI	0 1 2 3 4 5 6
RISPONDE PUNTUALMENTE ALLE DOMANDE DEI PARTECIPANTI	0 1 2 3 4 5 6

NOTE:

Indicatori	mai sempre
FACILITA E INCORAGGIA GLI INTERVENTI	0 1 2 3 4 5 6
SA ASCOLTARE	0 1 2 3 4 5 6
VALORIZZA I CONTRIBUTI DEI PARTECIPANTI	0 1 2 3 4 5 6
FAVORISCE LA NEGOZIAZIONE	0 1 2 3 4 5 6
RISPETTA GLI IMPEGNI ASSUNTI NEI CONFRONTI DEI PARTECIPANTI	0 1 2 3 4 5 6
CONSIDERA LE DIFFICOLTÀ DEI PARTECIPANTI	0 1 2 3 4 5 6
INTERAGISCE CON LO SGUARDO	0 1 2 3 4 5 6
ACCETTA I TEMPI DI RIFLESSIONE/SILENZIO	0 1 2 3 4 5 6
INTERVIENE IN MODO DISTENSIVO	0 1 2 3 4 5 6
ESPLICITA LE PROOPRIE ESPERIENZE/VISSUTI	0 1 2 3 4 5 6
OFFRE LA POSSIBILITÀ DI ESTERNARE I PROPRI VISSUTI	0 1 2 3 4 5 6

NOTE:

Indicatori	mai sempre
USA UN LESSICO ADEGUATO	0 1 2 3 4 5 6
RIPRENDE E RIFORMULA I MESSAGGI DEI PARTECIPANTI, POCO COMPRENSIBILI	0 1 2 3 4 5 6
AMPLIA I MESSAGGI TROPPO SINTETICI DEI PARTECIPANTI	0 1 2 3 4 5 6
ESPLICITA GLI SCOPI DEL PERCORSO	0 1 2 3 4 5 6
E' ATTENTO ALLA COMPRENSIBILITÀ DEL PROPRIO LINGUAGGIO	0 1 2 3 4 5 6
USA UN LINGUAGGIO SPECIFICO ALLA DISCIPLINA	0 1 2 3 4 5 6
CONSIDERA LE PRECONOSCENZE E LE ASSUNZIONE DI BASE DEI PARTECIPANTI	0 1 2 3 4 5 6
FOCALIZZA I PROBLEMI	0 1 2 3 4 5 6
ALTERNA IN MODO CALIBRATO DOMANDE APERTE E CHIUSE	0 1 2 3 4 5 6
ELIMINA LE BARRIERE O/DISTURBI DELLA COMUNICAZIONE	0 1 2 3 4 5 6

NOTE:

Indicatori	mai sempre

MOSTRA COERENZA TRA LINGUAGGIO VERBALE E NON VERBALE	0 1 2 3 4 5 6
INTERROMPE LA COMUNICAZIONE DEI PARTECIPANTI	0 1 2 3 4 5 6
RECUPERA IN POSITIVO GLI ELEMENTI DI DISTURBO/IMPREVISTI	0 1 2 3 4 5 6
USA LA COMUNICAZIONE NON VERBALE IN FUNZIONE DISTENSIVA	0 1 2 3 4 5 6
PROPONE SPUNTI DISCORSIVI DA SVILUPPARE	0 1 2 3 4 5 6
ESPLICITA LE NORME CHE REGOLANO LA VITA COMUNE	0 1 2 3 4 5 6
UTILIZZA MESSAGGI IN PRIMA PERSONA (SECONDO ME)	0 1 2 3 4 5 6
PROMUOVE COMPORTAMENTI COOPERATIVI	0 1 2 3 4 5 6
MEDIA I CONFLITTI	0 1 2 3 4 5 6
PROMUOVE SCAMBI COMUNICATIVI TRA I PARTECIPANTI	0 1 2 3 4 5 6

NOTE:

Momenti della dimensione relazionale (e conseguenti azioni dell'insegnante)

Quali momenti sono stati particolarmente significativi?

Quali hanno creato difficoltà?

Quali azioni dell'insegnante sono state particolarmente funzionali in relazione a una particolare situazione relazionale?

Cosa aggiungerei/cambierei io, se dovessi riproporre questo intervento ad un gruppo simile a questo?

Cosa mi ha colpito:

POSITIVAMENTE

NEGATIVAMENTE

Appendix F - 'Geografi@Scuola': moderator's self-assessment (#6).

SCHEDA DI MONITORAGGIO

Data: 8 marzo 2012 - Incontro n° 1 - Informatica/geografia

ATTIVITA'

e' piaciuto di più

difficile da dire. Credo abbiano molto apprezzato la carrellata di strumenti che ho dato all'inizio perché vedevo che tutti volevano annotarsi gli strumenti. Quelli sono utili e loro lo sanno. Credo sia anche piaciuta la mia presentazione iniziale. Sono sembrate colpite del mio background e questo mi ha fatto piacere (ci chiedavamo quanti anni avesse per avere fatto tutte queste cose =)
Anche su con Google Earth ho sentito più di qualche sospiro stupito. Ahhh…. Ohh… Buoni segnali

I tempi sono stati stretti soprattutto in laboratorio perché la mia voce non è alta e perché lo strumento attira molto l'attenzione dei partecipanti. Stretti ma tutto sommato ben calibrati il sala riunioni dove i partecipanti sono stati molto bravi e anche io nella presentazione sono stato abbastanza in linea con le mie previsioni.

Gli spazi

La sala riunioni è stretta per 20 persone. Qualcuno è stato relegato in seconda fila e mi è dispiaciuto ma grazie anche alla pianta aveva un fascino tutto particolare. I gigli d'oro illuminati dal tramonto hanno dato un che di romantico all'aula. Il video proiettava molto bene e la vicinanza costretta credo abbia creato un clima anche più familiare.

ho dimostrato padronanza dei contenuti?

Credo di sì. Ho sbagliato una cosa sull'altitudine e l'altezza su Google Earth ma sembrano avermela perdonata (anche se gli ho creato confusione). Per il resto mi sembra di non aver dubitato o detto scemenze.

METODOLOGIA

Ho ottenuto risultati migliori con

Il confronto aperto in sala riunioni. Vedevo le persone, c'era più dialogo e l'attenzione era a me e non ai computer. Questo sembra essere un elemento fondamentale anche nell'insegnamento con i bambini. Avere la loro attenzione.

RELAZIONE CON I PARTECIPANTI

Mi sono sentito

Inizialmente un po' messo in dubbio da alcune insegnanti che sembravano diffidenti. Poi con il lavoro della conoscenza reciproca penso si sia disteso il clima. L'insegnante ha bisogno di giocarsi credo. Legittimato in seguito alla mia presentazione e ai vari spunti dati nella prima parte dell'incontro. Ottima l'idea di averlo fatto all'inizio dell'incontro.
Un po' più ignorato nella seconda parte per colpa del computer che attraeva anche troppo l'attenzione dei partecipanti.

ho utilizzato uno stile

Abbastanza informale. Ho fatto qualche battuta distensiva per sostenere il clima rilassato che alcuni partecipanti hanno cercato di instaurare. Sono stato allo scherzo ma ho cercato di non lasciare troppo spazio alle battute. Una ogni tanto per destare. Ho usato il LEI nelle situazioni di assemblea. Individualmente ho difficoltà a tenere il registro formale o informale. Tendo a tenere il formale anche se mi hanno chiesto di usare quello informale.

i partecipanti

Mi sono piaciuti. Dalle prime interviste e telefonate sapevo che c'era chi non vedeva l'ora di mettersi in gioco. Una garanzia della buona riuscita di un clima gioviale. Hanno partecipato, mi hanno sostenuto, hanno chiesto.

Gli aiutanti

Fondamentali! L'idea di chiedere a Carlotta e a Dania di aiutarmi è stata un'ottima idea. Tutto da solo non sarei riuscito a farlo. Carlotta fondamentale nell'attività dell'albero perché come avevo immaginato alcuni partecipanti hanno avuto bisogno di aiuto e lei mi ha permesso di mantenere il contatto visivo con i partecipanti. Dania invece, anche se non l'avevo considerato mi è stata utilissima in laboratorio, dove, seduta in mezzo ai partecipanti è andata più volte ad aiutare le partecipanti evitandomi lo spostamento e permettendomi di mantenere la rotta dell'intervento. Forse per la prossima volta potrei anche aggiungerne uno (esperto di Google Earth). Peccato che Lorena e/o Benedetta non siano riuscite a venire per fare i saluti e Lorena la parte di concettualizzazione dei concetti, avrebbe dato un pizzico di formalità / autorevolezza alla proposta.

RIFLESSIONE

IMPREVISTO	SOLUZIONE ATTUATA	SOLUZIONI DA ATTUARE (semi si ripresenta il problema)
Poco spazio	Ci siamo stretti	
La presentazione di ogni partecipante inizialmente ha preso più tempo del previsto.	Sono intervenuto due volte per dire che si doveva stringere.	Dovrò essere più stringente nella consegna o magari mettere una macchinetta che segni il tempo a loro disposizione.
Non avevo preparato durante la pausa il video del razzo insieme a google earth	Ho cominciato a spiegare mentre facevo ma non ho ottenuto grande attenzione	Piuttosto lascio il tempo morto ma sono pronto
Google Earth mi si è piantato perché non avevo la connessione appena arrivato il laboratorio. Questo ha impallato il computer	Ho colto l'occasione per chiedere se era il caso di cambiare l'orario del corso	
Chiacchiere delle insegnanti		

SCHEDA DI MONITORAGGIO

Data: 15 marzo 2012 - Incontro n° 2 - Informatica/geografia

ATTIVITA'

e' piaciuto di più

Non saprei. Oggi non ho lasciato molto spazio al divertimento. Credo sia piaciuta l'attività in cui ho chiesto di disegnare. Ho percepito forte la voglia di fare. La prima parte è stata godibile anche se ho voluto mostrare troppe cose e forse le ho mostrate male.

I tempi sono stati ben calcolati, soprattutto nella prima parte dell'incontro, in aula B. In laboratorio l'aver avuto meno attività strutturate ha influito negativamente sulla gestione dei tempi. Ad ogni modo sono riuscito a mostrare tutto quello che volevo sacrificando però forse un po' l'attenzione ai singoli partecipanti.

Gli spazi

La prima parte dell'incontro in aula B è andata abbastanza bene. Il lavoro di gruppo è stato facilitato dalla presenza di molte sedie e di tavoli lunghi in cui gli insegnanti si sono accoppiati (o messi in tre) tranquillamente. Ha permesso abbastanza bene la presentazione dei materiali anche se lo schermo scentrato nell'aula non è la cosa migliore. Lo spegnimento della prima fila di luci ha migliorato la visibilità.
Il laboratorio di computer mantiene invece tutti i limiti della organizzazione. Da seduto (sono costretto perché devo manovrare il computer) non riesco a vedere e ad essere visto da tutti i partecipanti. Un grosso limite a cui dovrò cercare di porre rimedio.

ho dimostrato padronanza dei contenuti?

Questa volta credo di non aver dato l'impressione di padroneggiare benissimo gli argomenti. Essenzialmente perché non mi ero preparato nei minimi dettagli l'attività e gli esempi da fare. Questo dovrebbe farmi riflettere. Dovrei saper con precisione cosa mostrare e cosa prendere per esempio per sapere già dove andare a parare. In alcuni casi questo non è stato tangibile e in uno o due casi si è visto come quello che dicevo non era seguito dal video (esempio di Roma virtuale, o del poligono sulla montagna che non aveva ben coperto la superficie). Non ho dimostrato molto la padronanza del corso e della didattica quando ci siamo spostati in sala computer perché ho lasciato troppa libertà ai partecipanti nonostante io avessi previsto delle attività passo passo. Quando ho visto che faticavo ad avere la loro attenzione (perché comunque già stavano facendo di loro proposito) ho pensato di limitare il mio intervento e di lasciarle sperimentare. Non sono convinto sia stata la scelta migliore. Google Earth ha grandi possibilità ma le istruzioni passo passo sono fondamentali (come mi ha fatto notare D. S.) soprattutto per chi non è molto abile.

METODOLOGIA

Ho ottenuto risultati migliori con

Il confronto aperto in sala riunioni. Vedevo le persone, c'era più dialogo e l'attenzione era a me e non ai computer. Questo sembra essere un elemento fondamentale anche nell'insegnamento con i bambini. Avere la loro attenzione. L'ho scritto nel primo incontro e lo confermo anche nel secondo. Devo cercare più momenti di contatto diretto visivo e verbale. Farle partecipare di più attivamente.

RELAZIONE CON I PARTECIPANTI

Mi sono sentito

Inizialmente sentivo che l'aspettativa era alta. Credo di essere partito bene per poi però perdere smalto e attenzione via via che mi addentravo in Google Earth. Mostrare tante cose così velocemente forse non ha reso l'idea e ha messo più confusione di prima. Mi sono sentito imbarazzato nel momento in cui mi hanno chiesto della Roma antica ma non sono riuscito a rispondere subito (non mi ero accordo che dovevo scaricare il kmz. Accaldato in alcune situazioni in cui avevo la percezione di averli persi. Dovevo forse fare meno e farli interagire di più. Mostrare tante cose è controproducente anche se in realtà bello perché mostra tutte le potenzialità!

ho utilizzato uno stile

Lo stile dell'incontro è stato abbastanza formale e freddo. Poche battute rispetto all'altra volta. Forse ho sentito di più la pressione del dover mostrare tante cose. Ero consapevole che avrei dovuto mostrare tante cose e mi sono concentrato tanto sul cercare di renderle chiare che ho perso la dimensione più scherzosa e gioviale (ma anche laboratoriale) che mi ero prefissato di dare

i partecipanti

Mi è spiaciuto ci fossero alcuni assenti (alcuni previsti altri no). Sono arrivati tutti abbastanza in ritardo e quindi dovrò considerare degli incontri più brevi o più attività pratiche (che aiutano sempre). Sono intervenuti poco e credo soprattutto perché io non ho dato loro modo di trovare lo spazio e il tempo di farlo. In aula ci sono stati due o tre interventi nei quali si sono dovuti praticamente lanciare per interrompermi. Attenti durante la prima parte si sono distratti molto di più in laboratorio per via del fatto che alcune già conoscevano queste potenzialità e che altre si perdevano nel seguire le istruzioni che ho dato.

Gli aiutanti

Molto utili anche oggi. Oltre a Dania ho chiesto a Carlotta di aiutarmi soprattutto nella seconda parte dell'incontro, dove sapevo avrei avuto più difficoltà. Il loro aiuto è stato importante anche se ho visto che non tutti i partecipanti hanno chiesto aiuto spontaneamente. Forse sono andati avanti più per tentativi. Dania e Carlotta comunque si sono comportate bene, erano presenti e disponibili.

RIFLESSIONE

IMPREVISTO	SOLUZIONE ATTUATA	SOLUZIONI DA ATTUARE (semi si ripresenta il problema)

Partecipanti in ritardo	Attività prevista cominciata in ritardo e conseguente velocizzazione della parte di presentazione degli strumenti del foglio.	Pensare ad un'attività introduttiva più lunga.
Domanda a cui non ho saputo rispondere subito (quella su roma)	Per tentativi ho cercato far vedere quel che mi chiedevano per poter rispondere.	Forse era meglio se rispondevo a voce che l'avrei mostrata la volta prossima.
Ho visto poca attenzione mentre presentavo tutti i livelli	nessuna	Fare più esempi PRATICI! Esperienze dirette! Leggere quelle che avevo scritto!
Appena aperto google earth tante chiacchiere	Ho dato una consegna chiara (che però poi è stata un po' persa)	Dare consegne brevi, verificabili, in continuità l'una con l'altra. Un percorso senza che sappiano la fine può stimolare
Uscite molto anticipate	Ho consegnato subito i moduli per la valutazione dell'incontro	Ok

SCHEDA DI MONITORAGGIO

Data: 22 marzo 2012 - Incontro n° 3 - Informatica/geografia

ATTIVITA'

e' piaciuto di più

Le attività fatte da loro con le immagini sono state ben apprezzate, hanno partecipato attivamente e si sono divertite. Ha molto interessato l'uso di PowerPoint per creare i giochi in classe con le immagini, hanno chiesto e mi hanno interrotto. Un buon segno! Anche nella presentazione sui tipi di punto di vista dell'immagine mi è parso sia stata apprezzata anche se qualcuno ancora non aveva ancora preso posto (mi davano quasi le spalle). La ricerca delle immagini è andata bene, tutte hanno partecipato e hanno provato siti diversi. Quando ho richiesto attenzione l'ho avuta

I tempi sono stati stretti ma ben calcolati. Nella presentazione dei siti di ricerca per le immagini, in particolare, ho mostrato tutto in fretta e forse con un po' troppo superficialità. Bene invece il tempo in laboratorio dove finalmente mi hanno seguito passo passo.

Gli spazi

La prima parte dell'incontro in aula B è andata bene. Il lavoro di gruppo avrebbe forse goduto di più del tavolo della sala riunioni ma è comunque andata bene

Il laboratorio di computer mantiene i limiti della organizzazione quali non riuscire ad andare affianco a tutti i partecipanti perché magari nella seconda fila nel posto vicino al muro. Grazie all'aiuto di Dania, ad ogni modo, siamo riusciti a seguire tutti abbastanza bene. Meglio dell'ultima volta perché non ero costretto a stare seduto (dove non mi avrebbero visto). Avevo già impostato l'attività prima della pausa.

Ho dimostrato padronanza dei contenuti?

Credo di aver dimostrato la padronanza nel breve discorso teorico che ho fatto all'inizio anche se ancora ho peccato nel voler mostrare troppe cose (e che ne ho saltate diverse). Quando una o due pagine non sono andate dritte non si fa bella figura (la traduzione del New York Times, la ricerca per colore non ha dato grandi risultati,

METODOLOGIA

Ho ottenuto risultati migliori della volta scorsa sicuramente perché ho provato tutte le ricerche che ho poi presentato e fatto vedere. Ci sono stati alcuni imprevisti ma è andato tutto sommato bene. Meglio anche nell'attività proposta in laboratorio. Sapevano cosa dovevano fare e l'hanno fatto con serenità e tranquillità. Chiedevano se avevano dubbi e non si sono persi in chiacchiere. Presentare l'attività prima per poi farla fare ha forse chiarito meglio e ben disposto i partecipanti

RELAZIONE CON I PARTECIPANTI

Mi sono sentito

Tranquillo. Mi piace proporre loro delle attività pratiche ed entrare in relazione con loro. Non temo ma cerco il confronto e mi fa piacere il loro intervento. Ho fatto delle battute quando è stata ora di presentare il questionario sulle tecnologie e forse averlo fatto ha contribuito gli insegnanti a decidere di collaborare all'ennesima richiesta di questionario (ho forse esagerato). Significativo che tutti abbiano deciso di farlo in carta, subito, per non doverlo fare dopo a casa. Le ho stremate con i questionari.

ho utilizzato uno stile

Abbastanza colloquiale, non formale. Una citazione o due solo all'inizio. Gioco iniziale, poi con il Power Point. Poi la ricerca autonoma delle immagini.

i partecipanti

Buona partecipazione. Due assenti giustificate (V.A. per collegio didattico e C.P. per malattia). L'unica altra assente è stata M. G. per malattia. Il clima è ancora più informale, si stanno conoscendo di più. Emergono i leader e gli scambi di cortesie (ho visto chi si alzava al posto di altri per prendere le dispense) e di confidenze (chi per passare in mezzo a tre colleghe ha praticamente abbracciato una delle altre, proprio come se fossero colleghe da tempo). Mi ha fatto piacere.

Gli aiutanti

Dania lavora quasi da infiltrata. Si è integrata bene nel gruppo e mi sta aiutando molto nell'attività del laboratorio. Oggi ho iniziato l'incontro senza far partire la videocamera. Poi per fortuna è arrivata Carlotta che ha fatto partire la registrazione. Gestire tutto non è facile. La prossima volta chiedo a Dania di aiutarmi.

RIFLESSIONE

IMPREVISTO	SOLUZIONE ATTUATA	SOLUZIONI DA ATTUARE (semi si ripresenta il problema)
Google Translator non ha tradotto il New York Times (perché questo mi sono dimenticato di provarlo!!)	Ho provato un'altra pagina più semplice	PROVARLO PRIMA!
Sul sito delle immagini/disegni per bambini non sono riuscito a mostrare la raccolta di immagini clip-art perché non ho più trovato il link	L'ho abbandonato dopo alcuni tentativi. Pessima figura, seguita dal silenzio	MEMORIA!!
Non ho acceso la telecamera all'inizio	Per fortuna è arrivata carlotta	Magari lasciare l'impegno a Dania?

Per migliorare
Presentare i siti per cercare le immagini suddivisi per metodo di ricerca (nome, categoria, geografica, colore, ecc).

SCHEDA DI MONITORAGGIO

Data: 29 marzo 2012 - Incontro n° 4 - Informatica/geografia

ATTIVITA'

e' piaciuto di più

I video hanno emozionato, stupito e divertito, proprio come volevo che fosse. L'attività sulla programmazione è sembrata molto partecipata anche se fatta in piedi o senza il tavolo davanti. Si vede che sono abituate. Pensavo meglio invece il gioco sui cartelli stradali. È andato bene però forse se avessi dato una consegna più semplice avrebbero reso di più. Forse.

I tempi sono stati stretti ma ben calcolati. Non ho mostrato Skype e ho interrotto a metà alcuni video ma cercando di non storpiarli. Bene anche le attività fatte in sala riunioni. Ho stretto i tempi sull'attività delle programmazioni ma con coscienza. L'esercizio è puramente esplicativo, come loro hanno ben colto. Peccato che diverse siano andate via prima. L'orario è rimasto un problema fino alla fine.

Gli spazi

L'unica cosa da migliorare era che forse l'attività sulla programmazione sarebbe stato meglio farla in aula B invece che giù. È stato un compromesso

Ho dimostrato padronanza dei contenuti?

Sì. Ho bleffato dove non ha funzionato ma ho dimostrato la padronanza. Forse un po' ripetitivo nel presentare la potenza dei video. Dovrei elaborare un linguaggio più informale.

METODOLOGIA

Il video cattura e coinvolge di per se stesso. Le ho rese più partecipi e le ho fatte parlare di più. È andato bene perché si vede che hanno molto da dire e che gli fa piacere condividere le cose.

RELAZIONE CON I PARTECIPANTI

Mi sono sentito

Bene. Quasi un amico. Si è creata una relazione. Abbiamo scherzato e il clima è sempre stato sereno e di partecipazione attiva, come il laboratorio voleva essere.

ho utilizzato uno stile

Abbastanza informale

i partecipanti

A parte che mi è dispiaciuto per chi andava via prima. Sono stati gentilissimi, hanno portato una focaccia e mi hanno comprato due regali. Gentilissimi davvero. Inaspettato e piacevolissimo. Abbiamo creato un rapporto che probabilmente non si concluderà qui.

Gli aiutanti

Grande Dania.

RIFLESSIONE

IMPREVISTO	SOLUZIONE ATTUATA	SOLUZIONI DA ATTUARE (semi si ripresenta il problema)
Il sito del download non ha funzionato	Ho sviato la loro attenzione su altro (ma dovrò mandargli un'email per spiegargli come fare).	Trovare più risorse ed elencargliele
Tanti sono andati via prima (mezz'ora prima!)	Ho invertito l'ordine delle attività previste	

Per migliorare

Allungare l'incontro a 3 ore. Diminuire i video (selezionarli meglio).

Appendix G - 'Geografi@Scuola': meeting assessment questionnaire (#7).

Valutiamo l'ultimo incontro di Geografi@Scuola

Questionario di valutazione anonimo

1. Nel suo complesso, questo ultimo incontro è stato:

(1=per niente 2=molto poco 3=poco 4=così e così 5=abbastanza 6=molto 7=moltissimo)

		Per niente						Moltissimo
1.	Impegnativo da seguire	1	2	3	4	5	6	7
2.	Stimolante	1	2	3	4	5	6	7
3.	Utile	1	2	3	4	5	6	7
4.	Noioso	1	2	3	4	5	6	7
5.	Piacevole da seguire	1	2	3	4	5	6	7
6.	In linea con le mie aspettative	1	2	3	4	5	6	7

2. Organizzazione e conduzione dell'incontro

Di seguito troverai un elenco di affermazioni relative all'organizzazione e alla conduzione di questo incontro. Indica il tuo grado di accordo su una scala da 1 a 7, ricordando che:

1 = fortemente in disaccordo; 2 = in disaccordo; 3 = abbastanza in disaccordo 4 = né in accordo né in disaccordo;
5 = abbastanza d'accordo; 6 = d'accordo 7 = fortemente d'accordo

		Disaccordo						Accordo
1.	Il clima in cui si è svolto l'incontro è stato piacevole	1	2	3	4	5	6	7
2.	Le proposte fatte sono state equilibrate tra teoria e pratica	1	2	3	4	5	6	7
3.	Gli obiettivi sono stati definiti con chiarezza	1	2	3	4	5	6	7
4.	I concetti fondamentali sono stati comunicati con chiarezza	1	2	3	4	5	6	7
5.	La struttura del lavoro è stata comprensibile	1	2	3	4	5	6	7
6.	Gli spazi in cui si è svolto l'incontro erano adeguati	1	2	3	4	5	6	7
7.	La presenza della telecamera ha influenzato il modo in cui ho partecipato alle attività	1	2	3	4	5	6	7

3. Quali delle seguenti funzioni ritieni che il tutor abbia svolto e con che grado di presenza?

(1=nulla 2=molto bassa 3=bassa 4=media 5=abbastanza presente 6=molto presente 7=continua)

		Nulla						Continua
1.	Chiarimento	1	2	3	4	5	6	7
2.	Guida	1	2	3	4	5	6	7
3.	Sostegno	1	2	3	4	5	6	7
4.	Motivazione	1	2	3	4	5	6	7
5.	Consulenza	1	2	3	4	5	6	7

4. Il ritmo dei lavori ti è sembrato:

- □ Troppo lento
- □ Lento
- □ Adeguato
- □ Sostenuto
- □ Troppo incalzante

5. Considero gli strumenti tecnologici presentati in questo incontro:

		Per niente						Moltissimo
1.	Difficili da includere nella didattica	1	2	3	4	5	6	7
2.	Utilizzabili con la mia classe quarta	1	2	3	4	5	6	7
3.	Rilevanti per il mio insegnamento di geografia	1	2	3	4	5	6	7
4.	Una novità (rispetto a quelli che già conoscevo)	1	2	3	4	5	6	7

5. In linea con le mie aspettative (erano quelli che speravo di trovare)	1	2	3	4	5	6	7

Prevedi di provare ad utilizzare gli strumenti presentati durante questo incontro?

Sì, tutti

- □ Sì
- □ Ci proverò
- □ Non credo ne avrò il tempo
- □ No

7. Riproporresti ad altri un'esperienza simile a quella da te vissuta oggi?

No

- □ Sì come si è svolta
- □ Sì con piccole modifiche (se vuoi specifica sotto quali)
- □ Sì con sostanziali modifiche (se vuoi specifica sotto quali)

.....

.....

.....

8. In conclusione…

|Per niente Moltissimo|

Sei soddisfatto/a di aver partecipato a questo ultimo incontro	1	2	3	4	5	6	7
Sei contento/a di aver partecipato a questo laboratorio	1	2	3	4	5	6	7

Hai già avuto modo di provare a casa o a scuola qualcosa di quello che abbiamo visto durante il laboratorio?	SI	NO

Grazie mille per la collaborazione e la pazienza!

Appendix H - 'Geografi@Scuola': long-term questionnaire (#10).

Post Geografi@Scuola

Cari colleghi,
ecco l'ultima fatica che vi chiedo. Ho snellito il questionario il più possibile. Non dovrebbe prendervi più di 10 minuti.

Vi prego di essere sinceri nelle risposte. I vostri dati non saranno diffusi.

Grazie per la collaborazione.
Giovanni

ATTENZIONE: Le vostre risposte verranno salvate solo se arriverete fino alla fine.
*Campo obbligatorio

Nome *

Congome *

Lavori nella stessa scuola dell'anno scorso? *

- ◯ Si
- ◯ No

In che classe insegni geografia quest'anno? *

- ☐ Prima
- ☐ Seconda
- ☐ Terza
- ☐ Quarta

☐ Quinta
☐ Nessuna
☐ Altro:

Soddisfazione nell'insegnamento della geografia

Di seguito troverai un elenco di affermazioni relative alla soddisfazione nell'insegnamento della geografia.
Indica per ogni affermazione il tuo grado di accordo.

Ricordati che:
1 = fortemente in disaccordo; 2 = in disaccordo; 3 = abbastanza in disaccordo; 4 = né in accordo né in disaccordo; 5 = abbastanza d'accordo; 6 = d'accordo; 7 = fortemente d'accordo

Sono soddisfatto/a di come insegno geografia *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Le mie condizioni di lavoro, per quanto riguarda l'insegnamento della geografia, sono eccellenti *

	1	2	3	4	5	6	7	
Fortemente in disaccordo	○	○	○	○	○	○	○	Fortemente d'accordo

Emozioni nell'insegnare geografia

Quando insegni geografia che emozioni provi?
Indica con quale frequenza provi le emozioni sotto elencate

	Quasi mai	Di rado	Talvolta	Spesso	Quasi sempre
1. Gioia	○	○	○	○	○
2. Scoraggiamento	○	○	○	○	○
3. Esasperazione	○	○	○	○	○
4. Felicità	○	○	○	○	○
5. Piacere	○	○	○	○	○
6. Delusione	○	○	○	○	○
7. Entusiasmo	○	○	○	○	○
8. Soddisfazione	○	○	○	○	○

9. Rabbia	○	○	○	○	○
10. Tristezza	○	○	○	○	○
11. Arricchimento	○	○	○	○	○
12. Senso di realizzazione	○	○	○	○	○
13. Senso di fallimento	○	○	○	○	○

Percezioni sulla geografia

Di seguito troverai un elenco di affermazioni relative alla geografia.
Indica per ogni affermazione il tuo grado d'accordo.

La geografia è una materia ... *

Consideri le seguenti affermazioni ed indichi quanto sono vere per lei, dando un giudizio da 1(per niente) a 5 (del tutto).

	per niente	poco	mediamente	molto	del tutto
Importante a scuola	○	○	○	○	○
Utile nella vita concreta	○	○	○	○	○
Che richiede capacità di fare collegamenti e ragionamenti	○	○	○	○	○
Che è molto presente anche nelle mie attività quotidiane	○	○	○	○	○

Strategie di insegnamento della geografia usate in questo anno scolastico

Passa in rassegna le seguenti strategie che possono essere utilizzate per l'insegnamento della geografia e indica quanto le hai usate/stai usando nelle tue lezioni di geografia in quest'anno scolastico.

	Mai	Raramente	Talvolta	Spesso	Sempre
1. Dettare un certo numero di definizioni.	○	○	○	○	○
2. Rappresentare con disegni, schemi, tabelle l'argomento da trattare.	○	○	○	○	○
3. Invitare gli alunni a porre domande durante ed alla fine delle spiegazioni	○	○	○	○	○
4. Proporre in forma problematica gli argomenti da affrontare, sotto forma di domanda-stimolo	○	○	○	○	○

5. Chiedere agli alunni di leggere a voce alta dal libro di testo.	○	○	○	○	○
6. Richiamare agli alunni le informazioni che già possiedono su un argomento e far loro esporre le proprie idee e/o conoscenze	○	○	○	○	○
7. Delineare un argomento rifacendosi ad esperienze ed esempi attuali e/o familiari	○	○	○	○	○
8. Creare collegamenti tra argomenti e materie diverse tra loro	○	○	○	○	○
9. Integrare le proposte del sussidiario con schede di approfondimento	○	○	○	○	○
10. Fare uso di tecnologie multimediali, supporti audiovisivi, navigazione in rete	○	○	○	○	○
11. Organizzare lavori di gruppo da svolgersi durante l'orario di lezione	○	○	○	○	○
12. Ricorrere ad immagini che riportano ad un argomento teorico (diapositive, disegni, carte, opere d'arte, ecc..)	○	○	○	○	○
13. Organizzare escursioni sul campo	○	○	○	○	○
14. Fornire uno schema redatto dall'insegnante o materiali di sintesi (riassunto, piano di studio) e/o di approfondimento	○	○	○	○	○
15. Fare uso CD, DVD, Videocassette VHS	○	○	○	○	○
16. Fare uso di drammatizzazione e					

esperienze pratiche, con momenti di operatività guidata	○	○	○	○	○
17. Organizzare visite guidate	○	○	○	○	○
18. Fare uso dei programmi disponibili in rete	○	○	○	○	○
19. Proporre attività geografiche a partire dalla lettura di un racconto	○	○	○	○	○
20. Proporre attività ludiche di scoperta dello spazio	○	○	○	○	○
21. Proporre attività laboratoriali tenute da esperti	○	○	○	○	○
22. Fare uso dei software di base (Word, PowerPoint, Excel...)	○	○	○	○	○
23. Fare uso di software specifici collegati alla geografia	○	○	○	○	○
24. Fare uso delle risorse disponibili in rete per ricerche ed approfondimenti geografici	○	○	○	○	○

Quanto ti senti competente nell'uso del computer? *

	1	2	3	4	5	6	7	
Per nulla	○	○	○	○	○	○	○	Moltissimo

Quanto ti senti autonomo nell'uso del computer? *

	1	2	3	4	5	6	7	
Per nulla	○	○	○	○	○	○	○	Moltissimo

Davanti al computer che emozioni provi?

Indica con quale frequenza provi le emozioni sotto elencate

	Quasi mai	Di rado	Talvolta	Spesso	Quasi sempre
1. Gioia	○	○	○	○	○
2. Scoraggiamento	○	○	○	○	○
3. Esasperazione	○	○	○	○	○

4. Felicità	○	○	○	○	○
5. Piacere	○	○	○	○	○
6. Delusione	○	○	○	○	○
7. Entusiasmo	○	○	○	○	○
8. Soddisfazione	○	○	○	○	○
9. Rabbia	○	○	○	○	○
10. Tristezza	○	○	○	○	○
11. Arricchimento	○	○	○	○	○
12. Senso di realizzazione	○	○	○	○	○
13. Senso di fallimento	○	○	○	○	○

Indica il tuo grado di familiarità con le seguenti tipologie di strumenti: *

	nullo	basso	medio	buono	elevato
1: Programmi di scrittura testi (es. Microsoft Word, Writer, Notebook, Wordpad)	○	○	○	○	○
2: Fogli di calcolo elettronico (es. Microsoft Excel, Calc)	○	○	○	○	○
3: Software per presentazioni (es. Microsoft Power Point, Prezi)	○	○	○	○	○
4: Programmi di grafica e fotoritocco (es. Paint, Photoshop, Gimp)	○	○	○	○	○
5: Software didattico (Giochi ed esercizi per computer sulla geografia)	○	○	○	○	○
6: Posta elettronica	○	○	○	○	○
7: Web per cercare informazioni	○	○	○	○	○
8: Social network (es. Facebook, Twitter, LinkedIn)	○	○	○	○	○
9: Mappe o visualizzatori digitali (es. Google Earth, Google Maps, Bing,	○	○	○	○	○

OpenStreetMap)

Come descriveresti il tuo atteggiamento rispetto all'uso di internet da parte dei tuoi studenti *

Indica la risposta che più si avvicina alla tua posizione

- ◯ Favorevole
- ◯ Favorevole ma solo se mediato dai genitori o da una figura adulta
- ◯ Più favorevole che contrario/a
- ◯ Indifferente
- ◯ Pià contrario/a che favorevole
- ◯ Contrario/a
- ◯ Non so proprio esprimere un'opinione

Ritieni che internet sia pericoloso? *

- ◯ Sì, certamente
- ◯ Sì, ma i pericoli possono essere evitati
- ◯ Solo in alcuni casi
- ◯ No, ma è comunque necessario educare gli studenti ad usarlo
- ◯ No, per nulla
- ◯ Non so proprio esprimere un'opinione

Le tecnologie a scuola

Tecnologia a scuola in quest'anno scolastico

Indica con che frequenza hai fatto / stai facendo le seguenti attività quest'anno

	mai	raramente	talvolta	spesso	sempre o quasi
Usare le tecnologie in classe durante le lezioni	◯	◯	◯	◯	◯
Usare le tecnologie per preparare documenti da presentare in forma stampata agli studenti	◯	◯	◯	◯	◯
Usare le tecnologie per comunicare con altri insegnanti o con gli studenti	◯	◯	◯	◯	◯
Documentarsi su internet per preparare la lezione	◯	◯	◯	◯	◯

Come consideri l'introduzione nella didattica della geografia di tecnologie e attrezzature multimediali? *

Indica la risposta per te più corretta

- ◯ Una moda passeggera che nella maggior parte dei casi, non cambia il modo di insegnare
- ◯ Un elemento importante della didattica moderna
- ◯ Un elemento di confusione per insegnanti e studenti

- ◯ Una condizione indispensabile per inserire gli studenti attivamente nella realtà contemporanea
- ◯ Un supporto insostituibile per il lavoro dell'insegnante
- ◯ Un intralcio alle già scarse possibilità di interazione tra l'insegnante e gli alunni

Secondo te, includere le tecnologie nella pratica didattica quotidiana è: *

Rispondi ripensando alla tua esperienza professionale

- ◯ Difficilissimo, quasi impossibile
- ◯ Molto difficile
- ◯ Abbastanza difficile
- ◯ Non è né facile né difficile
- ◯ Abbastanza semplice
- ◯ Molto facile
- ◯ E' banale, quasi naturale
- ◯ Non so proprio esprimere un'opinione

Invia

Appendix I - 'Geografi@Scuola': list of Italian resources for teachers.

Geografi@Scuola

Primo incontro (giovedì 8 marzo)

Risorse web

- **Il nostro spazio! Il Blog di Geografi@Scuola**
  QUI saranno inseriti tutti i materiali e gli avvisi del corso che si sta svolgendo.
  < *www.geoascuola.donadelli.it* >
- **AIIG – Associazione Italiana Insegnanti di Geografia**
  Sito ufficiale dell'Associazione con risorse disponibili per la didattica, l'aggiornamento e l'informazione geografica.
  < *www.aiig.it* >
- **AIIG Sez. Veneto**
  Il Blog dell'AIIG Veneto. Partito da poco sarà sempre più punto di riferimento per l'AIIG regionale.
  < *www.aiigveneto.wordpress.com* >
- **Facebook**
  Il Social Network più diffuso. Nasce per restare in contatto con le persone che conosci. Richiede l'iscrizione.
  < *www.facebook.com* >
- **LinkedIn**
  Social Network molto diffuso nell'ambito professionale. Usato per lavoro. Richiede l'iscrizione.
  < *www.linkedin.com* >
- **Microsoft PowerPoint**
  Software per la creazione di presentazioni (Slideshow).
- **SlideShare**
  Sito web che ti permette di condividere in internet e con gli amici le tue presentazioni. Richiede l'iscrizione.
  < *www.slideshare.net* >
- **Prezi**
  Sito internet per la creazione di presentazioni (Zoom). Richiede l'iscrizione.
  < *http://prezi.com* >
- **CMAP**
  Freeware per la costruzione di mappe concettuali. Richiede l'iscrizione.
  < *http://cmap.ihmc.us/* >
- **VLC**
  Freeware per riprodurre video e musica di ogni tipo.
  < *www.videolan.org/vlc/* >
- **Google Earth**
  Geobrowser per l'esplorazione digitale.
  < *http://www.google.com/intl/it/earth/index.html* >
- **Google Documenti**
  Programmi di editing ed elaborazione dati online. Permettono la scrittura contemporanea di più utenti. Necessitano di iscrizione.
  < *https://docs.google.com* >

LIBRI

- Pazzaglia F., Moè A., Friso E. e Rizzato L., *Empowerment cognitivo e prevenzione dell'insuccesso*, Erickson, Trento, 2002.
  Il volume propone ai ragazzi e agli insegnanti materiali operativi mirati a sostenere alcuni aspetti critici, e spesso carenti negli alunni con difficoltà, della comprensione, del metodo di studio e della motivazione ad apprendere.
- Lamedica I., *Conoscere e pensare la città*, Erickson, Trento, 2003.
  Le numerose attività proposte raccolte in questo libro ruotano attorno al concetto di progettazione partecipata, da cui si suggerisce di partire per sviluppare un nuovo modo di pensare la città e il territorio, prestando attenzione al punto di vista dei bambini. L'opera mostra metodi, punti di forza, riferimenti, esperienze operative e concrete per fornire ai docenti tutte le indicazioni necessarie per sviluppare progetti in classe.
- Scataglini, *Geografia facile*, Erickson, Trento, 2002.
  Questo testo si propone di superare tali difficoltà attraverso una presentazione degli argomenti che evidenzi, in modo semplice e diretto, gli aspetti più rilevanti di ciascun argomento. Oltre a temi di carattere generale - come il clima, le diverse regioni naturali, le attività dell'uomo e il suo intervento sugli spazi nei quali vive - il

testo presenta, nell'ordine: l'Italia e le regioni italiane, l'Europa e i Paesi europei, i continenti extraeuropei. Al volume è allegato un CD-ROM da cui è possibile stampare le 71 cartine più importanti in una versione ingrandita pe rattività didattiche e verifiche.

- Rocca L., Geo-scoprire il mondo, PensaMultimedia, Lecce, 2007.
  La riflessione in questo volume si pone come punto di partenza che porta l'attenzione sulla costante necessità per il docente di intraprendere un instancabile lavoro di teorizzazione del quadro epistemologico e scientifico che caratterizza la disciplina geografica e delle metodologie didattiche in grado di dare maggiore espressione al quadro teorico stesso.
- Giorda C., Geografia nella scuola primaria, Carocci, Roma, 2007.
  Il testo, pensato principalmente per gli insegnanti di scuola primaria e per gli studenti del corso di laurea in Scienze della formazione primaria, si propone di fornire le basi disciplinari, pedagogiche, didattiche, psicologiche, epistemologiche e legislative per l'insegnamento della geografia nella scuola primaria, introducendo nuovi metodi e sviluppando un'aggiornata riflessione sugli strumenti per l'insegnamento.
- Calvani A., Rotta M., Comunicazione e apprendimento in Internet, Erickson, Trento, 1999. *Questo libro nasce per individuare e definire gli atteggiamenti e le competenze indispensabili ai docenti per avvalersi di Internet a scopo educativo. L'obiettivo degli autori è quello di mettere il lettore in condizione di distinguere gli aspetti effimeri del mondo di Internet, destinati a rapida obsolescenza, dalle infrastrutture metodologiche e concettuali veramente rivoluzionarie.*
- Calvani A., "L'introduzione delle ICT nella scuola". In: *TD Tecnologie e Didattica*, *48*, 2009.
  Un articolo che presenta diversi punti di vista sull'utilizzo delle tecnologie in classe. Un po' difficile ma molto chiaro nel presentare il quadro completo delle diverse teorie a supporto delle ICT. Disponibile nei materiali on-line < www.donadelli.it/geoascuola >
- Giaccardi C., "Chi possiede le mappe e chi sa navigare". In: *Rocca*, *Febbraio*, 2012.
  Un articolo di ampio respiro che presenta la scuola nell'era della tecnologia digitale a partire da diversi punti di vista. Teorico ma molto stimolante.
  Disponibile nei materiali on-line < www.donadelli.it/geoascuola >

Tutti i materiali che saranno presentati durante i corsi (compresi questi fogli riassuntivi) saranno organizzati e resi disponibili durante e dopo il corso sul sito:
< www.donadelli.it/geoascuola >

Geografi@Scuola

Secondo incontro (giovedì 15 marzo)

Risorse web

- **Il nostro spazio! Il Blog di Geografi@Scuola**
  QUI saranno inseriti tutti i materiali e gli avvisi del corso che si sta svolgendo.
  < www.geoascuola.donadelli.it >

- **Microsoft Bing**
  Visualizzatore digitale online (Geobrower) che permette di cercare indirizzi, attività commerciali e vedere molte città con foto aeree angolate a 45°
  < http://it.bing.com/maps/ >

- **Google Maps**
  Visualizzatore digitale online (Geobrower) che permette di cercare indirizzi, attività commerciali, vedere in fotografia quasi tutte le strade d'Italia e di personalizzare, se si è iscritti, le mappe con segnaposti, linee e poligoni.
  < http://maps.google.com/ >

- **Teaching with Google Earth**
  Pagine web molto ben fatte sulle possibili implicazioni dell'uso di Google Earth in classe. Spiegazioni esaurienti e spunti interessanti. In inglese, ma in tanti casi è intuitivo.
  <http://serc.carleton.edu/sp/library/google_earth/index.html >

- **Guida passo passo il tuo percorso con Google Street View**
  Questo sito offre un servizio molto interessante per visualizzare un percorso da un punto all'altro guardando le foto scattate dal servizio Google Street View. È sufficiente scrivere il punto di partenza e di arrivo e decidere le impostazioni

desiderate (il livello di zoom, se si vuole andare a piedi o in macchina, ecc.). Molto intuitivo.
< http://tripgeo.com/DirectionsMap.aspx >

💻 **GeoGreeting – Saluti Geografici**
Questo sito molto semplice ed intuitivo ti permette di far apparire dei messaggi geografici creati con delle immagini tratte da Google Earth.
< http://www.geogreeting.com/main.html >

💻 **Blog italiano su Google Earth**
Un blog in italiano in cui vengono inseriti costantemente aggiornamenti e novità su Google Earth e sulle sue potenzialità. Non propriamente didattico ma utile per tenersi aggiornati.
< http://googleearthitalia.blogspot.com/ >

💻 **Elenco di luoghi interessanti da visitare**
Spesso può mancarci anche la fantasia sui luoghi da proporre ai nostri bambini. Questo sito raccoglie una lunga lista di luoghi, organizzati per categorie. Non solo possono esservi di spunto, ma presentano anche le coordinate con le quali si possono trovare tutti facilmente su Google Earth.
<http://www.sandrodiremigio.com/google_earth_3d/volare_google_earth_3d_tutorials_manuale_kmz.htm >

LIBRI

📖 De Vecchis, G., Pesaresi, C., Dal Banco al Satellite, Carocci Faber, Roma, 2011.
Pensato come guida di riferimento soprattutto per docenti di scuola primaria e secondaria di primo grado, il volume indica le potenzialità didattiche delle nuove tecnologie e dei visualizzatori di immagini dall'alto che offrono importanti risvolti in chiave geografica. Utile sia per la linearità con cui vengono illustrati gli aspetti teorici e tecnici sia per le particolareggiate esemplificazioni, supportate da numerose immagini.

📖 De Vecchis, G., Morri, R., Disegnare il mondo, Carocci Faber, Roma, 2010.
Il volume si rivolge principalmente a docenti della scuola primaria e della scuola secondaria di primo grado con l'obiettivo di avvicinarli il più possibile al codice cartografico. A partire dall'orientamento e dalla conoscenza della Terra, vengono proposti percorsi didattici per accrescere le capacità di rappresentazione, lettura e interpretazione dello spazio.

📖 Pasquinelli d'Allegra, D., Una geografia da Favola, Carocci Faber, Roma, 2010.
Fare geografia con i più piccoli può essere facile se si ricorre al filtro della fantasia con il quale i bambini osservano il mondo. Le fiabe e i miti vengono utilizzati per costruire percorsi e per cominciare a rispondere alle prime domande su ciò che li circonda. Il libro è ricco di spunti (per gli insegnanti, ma anche per genitori e nonni) in cui i racconti fantastici assumono una funzione organizzatrice nell'esplorazione dello spazio vissuto e nella prima scoperta del mondo accendendo la curiosità e l'attenzione.

📖 Pasquinelli d'Allegra, D., La geografia dell'Italia, Carocci Faber, Roma, 2009.
Interessanti piste di ricerca e di applicazione didattica, per i docenti da sviluppare soprattutto con allievi degli ultimi anni di scuola primaria. Il volume ci aiuta ad "attrezzare" i nostri ragazzi con conoscenze e competenze adeguate, perché siano consapevoli di vivere in un Paese con uno straordinario patrimonio naturale e culturale, da salvaguardare e valorizzare, e con una lunghissima storia, sedimentata e leggibile nel territorio.

📖 Pesaresi, C., Punti di contatto tra informatica e geografia
Estratto di un suo articolo disponibile online dove si sofferma sull'intuizione di proporre la tecnologia all'interno dell'ambito geografico anche nelle scuole.

📖 Turco, A., Verso una teoria geografia della complessità, Unicopoli, Milano, 1988
In questo volume l'autore presenta la sua teoria geografica sulla complessità ovvero propone un punto di vista secondo il quale la geografia sia risultato dell'azione antropica sullo spazio, ottenuta attraverso processi di denominazione, strutturazione e reificazione. Un punto di riferimento teorico importante.

📖 The Geography Collective, Mission Explore, 2011
Serie di libretti che contengono moltissime sfide diverse da proporre ai bambini come vere e proprie missioni da

compiere all'inizio, alla fine o al posto della lezione di geografia. In inglese ma con le figure abbastanza esplicite. < http://www.missionexplore.net/ >

Tutti i materiali che saranno presentati durante i corsi (compresi questi fogli riassuntivi) saranno organizzati e resi disponibili durante e dopo il corso sul sito:
< *www.donadelli.it/geoascuola* >

Geografi@Scuola

Terzo incontro (giovedì 22 marzo)

Traduttori on-line

- Word Reference
  Sito internet che permette di tradurre dall'italiano all'inglese e viceversa. Probabilmente il migliore per la qualità della traduzione.
  < *http://www.wordreference.com/it/* >
- Google traduttore
  Un altro strumento di Google del quale è difficile stare senza. Permette di tradurre simultaneamente parole, testi (anche lunghi) e addirittura pagine internet. Non offre traduzioni impeccabili ma è portentoso.
  < *http://translate.google.it/#* >

Risorse che possono sempre tornare utili

- Easy Timer
  Programmino molto semplice e leggero, in italiano, che fa comparire un orologio personalizzabile (grandezza, colore, posizione) sul quale mettere sveglie e conti alla rovescia.
  < *http://www.inspire-soft.net/data/easy-timer.zip* >
- Wikipedia
  L'enciclopedia più grande al mondo e completamente libera (anche da pubblicità). Contiene voci su quasi tutto e dove mancano si possono aggiungere. Anche in italiano. Bisogna però adattare i contenuti prima di poterli proporre ai bambini.
  < *http://it.wikipedia.org/* >
- Grooveshark
  Sito che raccoglie e permette di cercare e ascoltare le canzoni della maggior parte dei musicisti o cantanti internazionale. Molto utile se cercate una colonna sonora per la vostra attività.
  < *http://grooveshark.com* >
- Geografia su Dienneti
  Raccolta di risorse e materiali in italiano selezionati per lo studio e la didattica della Geografia.
  < *http://www.dienneti.it/geografia/index.htm* >
- Geografia su Scuola Elettrica
  Sito internet che offre diversi materiali per l'insegnamento (anche della geografia, ma non solo) < *http://www.scuolaelettrica.it/indice.htm* >
- GlobalGeografia
  Sito internet in italiano che raccoglie molte schede (aggiornate al 2010) di molti paesi del mondo e delle regioni italiane. Merita una visita
  < *http://www.globalgeografia.com/index.htm* >

Programmi per gestione, ritocco e modifica delle immagini

- Gimp
  Programma di fotoritocco, modifica immagini professionale, in italiano, gratuito e abbastanza intuitivo. Il programma

perfetto per chi ama la fotografia o ha bisogno di uno strumento completo che gli permetta di modificare le immagini a suo piacimento
< http://gimpitalia.it/download/ >

- **Picasa**
  Programma di gestione, modifica e condivisione delle immagini. Questo programma, semplice da usare e che permette di apportare le modifiche più comuni alle immagini, trae la sua fortuna dall'essere parte della suite di Google e in particolare dal potersi collegare al proprio account per condividere e immagazzinare fotografie che poi restano disponibili (se si vuole) sul web.
  < http://picasa.google.com/intl/it/ >

Risorse web per modificare le immagini

- **Pixir**
  Sito web che permette la modifica delle immagini con l'aggiunta di molti effetti. Molto pulito nella grafica ed intuitivo nell'uso anche se in inglese.
  < http://pixlr.com/editor/ >
- **Befunky**
  Sito web che permette la modifica delle immagini con l'aggiunta di molti effetti. Molto pulito nella grafica ed intuitivo nell'uso. In inglese.
  < http://www.befunky.com/create/?openurl=upload#/basic >
- **Photo505 e PhotoFunia**
  Siti internet che permettono di creare dei fotomontaggi molto rapidi e di buona qualità
  < http://www.photo505.com/it/ > e < http://photofunia.com/ >

Siti web per la ricerca di immagini geografiche

- **National Geographic**
  La più famosa associazione geografica del mondo, mette a disposizione nel suo sito molti scatti stupendi provenienti da tutto il mondo. Ogni foto è corredata da una didascalia ma non è possibile fare una ricerca tra le foto. Ottimo sito per avere sempre nuovi spunti.
  < http://www.nationalgeographic.it/fotografia/ >
- **Flickr**
  Social network di appassionati della fotografia. Raccoglie milioni di foto organizzate grazie ai *tag* (parole chiave). Vastissima scelta di foto ma talvolta impreciso nei risultati. Poco adatto per i bambini ma grande risorsa per l'insegnante.
  < http://www.flickr.com/search/advanced/? >
- **Google Immagini**
  Il motore di ricerca Google per le immagini. Comodissimo per la ricerca di un'immagine a partire dal nome. Grandi risultati in poco tempo. Estremamente interessanti i suoi filtri di ricerca "Clip Art" e "Disegno". Poco affidabile per i bambini, essenziale per gli insegnanti.
  < https://www.google.it/imghp? >
- **Microsoft Immagini**
  Raccolta multimediale della Microsoft. Affidabile anche per i bambini contiene foto, disegni, animazioni e suoni. Qualità non sempre eccelsa ma strumento molto valido.
  < http://office.microsoft.com/en-us/images/ >
- **The Big Picture**
  Un blog del quotidiano Boston Globe che racconta storie e notizie attraverso le immagini. Foto e racconti di qualità. Non permette la ricerca ma offre spunti validissimi. In inglese.
  < http://www.boston.com/bigpicture/ >
- **News in pictures**
  Indice dei siti di informazione che hanno una sezione dedicata alle fotografie. In inglese ma estremamente interessante per ricevere degli spunti.
  < http://www.newsinpictures.com/ >
- **Reuters**
  Le foto di una delle maggiori agenzie di informazione mondiale. Merita una visita.
  < http://www.reuters.com/news/pictures >
- **Cepolina**
  Interessantissima risorsa per la ricerca delle immagini (anche per bambini) per colore, per paese o per categoria. Assolutamente da vedere e da tenere in considerazione
  < http://www.cepolina.com/ >
- **FreePixels**
  Sito comodissimo per la ricerca di immagini per nome o per categoria. In inglese ma estremamente semplice da usare per scaricare le foto in grande qualità. Merita.
  < http://www.freepixels.com/ >

- **Image After**
  Estesa raccolta di foto organizzate per categorie. In inglese. Valido soprattutto per la sua facilità d'uso
  < *http://www.imageafter.com/index.php* >
- **Classroom Clipart**
  Sito di immagini e disegni dedicato ai bambini. Risorse limitate ma di buona qualità. Valido
  < *http://classroomclipart.com/* >
- **Panoramio**
  Panoramio, sito di fotografie geo-localizzate e selezionate. Permette la ricerca per luogo e per categoria. È il database dal quale sono prese le foto presenti su Google Earth.
  < *http://www.panoramio.com* >
- **Gigapan**
  Raccolta di foto gigantesche da esplorare con il proprio mouse. Ottimo per un'attività diversa!
  < *http://www.gigapan.org/* >
- **Windows On Our World** (Finestre sul nostro mondo)
  Sito che raccoglie, suddivide per categorie, molte immagini di taglio geografico. In inglese.
  http://woow.phil-sllvn.co.uk/windows/index.php

Giochi geografici

- **Agenzia viaggi Italia**
  Il gioco consiste nel posizionare nella mappa della regione una lista di città, fiumi, mari, monti e pianure escludendo gli estranei. Un po' difficile ma ben fatto
  < *http://try.iprase.tn.it/prodotti/software_didattico/giochi/geografia/gioco.asp?id=904* >
- **Italia Politica**
  Il gioco permette di mettere alla prova la propria conoscenza delle regioni, delle provincie e dei rispettivi capoluoghi. Grafica non eccelsa ma chiara.
  < *http://try.iprase.tn.it/prodotti/software_didattico/giochi/geografia/gioco.asp?id=734* >
- **Salva il bosco**
  Gioco centrato sulle definizioni della geografia. Ci si può mettere alla prova su diversi temi (idrografia, ambienti, regioni, clima, popolazione, cartografia). Tagliato per le scuole superiori di primo grado può essere fatto insieme all'insegnante
  < *http://try.iprase.tn.it/prodotti/software_didattico/giochi/geografia/gioco.asp?id=734* >
- **Seterra**
  Gioco-quiz geografico. Permette di confrontarsi su ampia scala ma è limitato. Nozionistico ma ben fatto.
  < *http://www.seterra.net/it/* >
- **Mr. Green and Friends**
  Un gioco per allenare alla raccolta differenziata. Semplice, intuitivo e in italiano
  < *http://www.vbscuola.it/area/a-appli2005.htm#MrGreen* >
- **GranPremio**
  Giochino che unisce la corsa di un'auto da corsa con un quiz geografico
  < *http://www.vbscuola.it/area/a-appli2005.htm#Granpremio* >
- **Memory con gli animali**
  Il gioco delle coppie. Trova le due figure uguali
  http://www.baby-flash.com/coppie_animali.swf

Giochi geografici on-line

- **Esercizi sulla geografia**
  Indovina e posiziona provincie, regioni, città e monumenti. Giochi ben fatti
  < *http://www.baby-flash.com/esercizi_geo.swf* >
- **Giochi geografici**
  Il migliore dei siti geografici che ho trovato in rete. Il modello è quello classico di indovinare la posizione di città, provincie e regioni. Mappe e disegni ben fatti. È possibile anche giocare su livello europeo e mondiale. Intuitivo e in italiano. Ottima risorsa
  < *http://www.giochi-geografici.com/* >
- **Didattica.org**
  In questo portale della didattica sono stati raccolti moltissimi giochi anche sulla geografia. Si possono trovare giochi che aiutano a disegnare in scala, labirinti per l'orientamento, puzzle con pezzi e forme delle regioni, giochi su segnali stradali, sugli oggetti della classe e molto altro. Da tenere in considerazione
  < *http://www.didattica.org/area_antropologica.htm* >
- **Quia**
  Raccolta davvero gigantesca di giochini e quiz di geografia (ce ne sono qualcosa come 1573). Sono tutti in inglese e spesso dalla grafica minimale, ma possono tornare molto utili in diverse occasioni, anche se solo come stimolo iniziale o verifica finale. Si può cercare quello che serve. *Da evidenziare alcuni giochi tipo: chi vuol essere milionario su longitudine*

e latitudine (http://www.quia.com/rr/31012.html), su lettura carte (http://www.quia.com/rr/32308.html), impiccato su termini geografici (http://www.quia.com/hm/121854.html), battaglia navale con domande su cultura e geografia dell'Italia (http://www.quia.com/ba/29080.html), riordinare le lettere della risposta (http://www.quia.com/jw/46428.html), quiz a risposta multipla su risorse naturali (http://www.quia.com/jq/19657.html) e sull'Italia (http://www.quia.com/quiz/379083.html), giochi intuitivi sulle mappe (http://www.quia.com/jg/324701.html), e molto altro. Merita una visita.
< *http://www.quia.com/shared/geography/* >

- **The geography QUIZ**
  Sito molto semplice, pulito ed intuitivo, che ti chiede di riconoscere gli stati a partire dalla loro carta geografica. Presenti tutti gli stati del mondo, si può giocare su un solo continente o su tutti insieme. Bello ma non molto adatto alla quarta.
  < http://bhoogolvidya.appspot.com/ >

Tutti i materiali che saranno presentati durante i corsi (compresi questi fogli riassuntivi) saranno organizzati e resi disponibili durante e dopo il corso sul sito: < *www.donadelli.it/geoascuola* >

Geografi@Scuola

Quarto incontro (giovedì 29 marzo)

Raccolte di video

- **YouTube**
  La più grande raccolta video del web. Il video online per antonomasia e il secondo motore di ricerca per traffico al mondo. Permette di cercare i video attraverso i nomi, le categorie o anche gli utenti che li inseriscono. Molto valido lo strumento dei canali (*WWF Italia, AnimalPlanetTV, UNESCOVeniceOffice, SuperCartoni, NationalGeographic, KidsTV123, PBS, Geography Skills, BBC Earth, Nature Video Channel, Hooked on Phonics, ecc..*). Passerete senza dubbio di qui.
  < *http://youtube.com* >
- **Vimeo**
  Un altro grande raccoglitore di video
  < *http://www.vimeo.com* >
- **TED**
  Raccolta di discorsi tenuti dai personaggi di spicco mondiali sui temi più diversi. Il motto è quello di condividere le idee che valgono la pena di essere fatte ascoltare. Tutti i video sono sottotitolati in italiano.
  <*http://www.ted.com/* >
- **Kahn Academy**
  Gigantesca raccolta di lezioni registrate in video su temi soprattutto legati alla matematica. Valido spunto di riflessione. Tutti in inglese.
  < *http://www.khanacademy.org/* >
- **Natura**
  Portale della rivista natura che contiene nella sezione video diversi filmati geografici interessanti
  < *http://www.edinat.it/* >
- **TuttoGreen**
  Portale che raccoglie molti video interessanti anche per l'ambito geografico. Merita una visita.
  < *http://www.tuttogreen.it/category/video-tuttogreen/* >
- **National Geographic**
  La più famosa associazione geografica del mondo, mette a disposizione nel suo sito molti video stupendi provenienti da tutto il mondo. Ogni video ha una. Ottimo sito per avere sempre nuovi spunti.
  < *http://www.nationalgeographic.it/multimedia/video/* >
- **Educambiente**
  Sito di notizie e informazioni su ambiente, ecologia, risparmio energetico, energie rinnovabili, rifiuti, cambiamenti climatici. C'è anche una buona sezione video.
  < *http://www.educambiente.tv/index.html* >

Programmi legati all'uso dei video

- **Format Factory**
  Un programma che permette di convertire la maggior parte dei file audio e video da un formato ad un altro
  < *http://formatfactory.org/* >
- **Windows Movie Maker**
  Programma che solitamente è installato con Windows, è molto semplice e permette di creare dei video a partire dalle proprie foto e I propri video. Permette di aggiungere titoli e sottotitoli.
  < *http://windows.microsoft.com/it-IT/windows/downloads/get-movie-maker* >

Risorse per la comunicazione e i video

- **Skype**
  Programmino molto semplice e leggero che permette di chiamare, videochiamare e chattare gratuitamente con tutti gli altri utenti che lo hanno istallato. Permette anche di telefonare e ricevere telefonate dai telefoni fissi. Semplice ed indispensabile.
  < www.skype.com/intl/it/ >
- **SaveVideo.Me**
  SalvaVideo.me è il nome di questo servizio online che permette di salvare tutti i video da un buon numero di siti (tra i quali YouTube, Vimeo, Facebook). Semplicissimo e snello. Cercare sempre di salvare nel formato MP4 più grande possibile.
  < *http://savevideo.me/it/* >
- **Vacaroo**
  Servizio online che permette di registrare e salvare o rendere disponibili su internet le proprie registrazioni
  < *http://vocaroo.com/* >

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< *www.donadelli.it/geoascuola* >

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