I-CURRICULUM project

**SOCRATES – MINERVA project funded by
THE EUROPEAN COMMISSION DIRECTORATE
GENERAL EDUCATION AND CULTURE**

CASE STUDY

Bitantart project

IES JONQUERES

(Sabadell)

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BITANTART (*Lacenet*): Case Study

'Truth is not born nor is it to be found inside the head of an individual person, it is born between people collectively searching for truth, in the process of their dialogic interaction' (Bakhtin, 1984, p.110).

1. Introduction

This case study is based on a project that is running at a secondary school in Sabadell (Barcelona). The University of Barcelona has selected *Bitantart* to do this case study because it is a telematic innovation which combines Internet searches and telematic communication. Within the secondary level Catalan curriculum there are free-election credits, that is, elective courses. One of the elective courses in this school is a telematic project about the Antarctica. This course connects to all the compulsory curricular subjects using a common interest point (Antarctica). All the material is on-line. Each student and teacher participating has a password to access the virtual workspace. The mediation of the teacher is required to cover the work on time (in order to share it with other schools) and to guide students.

The project started in this school three years ago. This case study analyses several tasks designed by students, project material for teachers and students, literature of the project, three in-depth interviews with teachers (compared by mini-DELPHI method) and classroom observation. This case study is part of the I-curriculum Project and aims to provide information on curricular competences. *Bitantart* was selected because it is based on information seeking and telematic communication exchange using the Internet within an innovative context.

2. The Lacenet network projects: Antarctica project

The Antarctica project is a telematic project that emulates a virtual trip across the Antarctica. The students are involved in role-playing and become members of an expedition across Antarctica. They have to solve "enigmas" that emerge while they are travelling at the end of each stage. Classroom activities, on-line activities, forums, videochats and publications on the Web complete this exciting travel.

2.1. School and course information

The project is running at the secondary School *IES JONQUERES* of Sabadell (http://www.xtec.es/iesjonqueres/index1.htm).This centre is a state school located in a city 30 km from Barcelona which has a high percentage of immigrant students (reportedly around 30%, the remaining is in a high amount of gypsy ethnicity). One problem is that the school has only three computer laptops and most of the students are not home computer users for different reasons.

The engagement with Lacenet[1] started seven years ago. The projects consists of a trimester course of three hours a week divided in three one-hour lessons during which students work in pairs on one computer. The ages of the students are 12 to 16 and the course is adapted to the requirements of each grade level. This case study is based on a group of 12 – 13 year-old students (1st grade of ESO[2]).

Three teachers are the main leaders in the use of telematic projects at IES JONQUERES. Only one of them is specialist in the use of ICT. Each one chooses the project (among the offered projects in Lacenet) that best fulfils his/her objectives and expertise. Each of them adapts the materials freely, always responding to the common aims of all schools involved. They guide the students through dialogue in order that they can correct and improve their work. Teachers review the students' materials before sending them to the virtual space.

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[1] **Lacenet** is a telematic network which provides to schools all around the world with projects and materials to work on cross-curricular aspects using ICT. Bitantart is one of the projects offered by Lacenet in which this case study is based on. For more information visit http://www.lacenet.org/.

[2] **ESO**: Compulsory Secondary level Education.

2.2.   Antarctica project material

The learning materials are available on-line at: http://www.lacenet.org/edu365/antartida/ . All these resources are part of a cross-curricular subject that uses knowledge from other fields in various languages (sciences, maths, Spanish, Catalan, English, etc.) According to our analysis, the course aims to work on two aspects of the ESO curriculum (Compulsory School curriculum):
-    Operational aspects
-    Cultural and critical aspects

To present these aspects and to show how they are programmed within the subject, the following table introduces the main objectives:

	ICT	*General knowledge*
Operational	To know how to use ICT to participate, complete tasks, solve "enigmas," seek information and communicate within a telematic context.	To know more about the Antarctica and its ecological problems. (Geography, culture, environment, etc.) To know how to work in teams.
Cultural and Critical	To promote the use of ICT. To develop skills and attitudes for critical and intelligent use of the resources available on the Internet.	To promote the work in teams. To promote scientific investigation and research. To be aware of the impact of our every-day life on the natural environment.

The activities planned in this project are: classroom activities (to do readings and resumes, calculate distances, check maps, do a follow up of the virtual travel, etc.), on-line activities (mostly in the telematic network of Catalonia, information seeking tasks, etc), forums (participants in all schools) and videochats in which students can consult experts (the dates are published on the website and reminders are sent via e-mail), and "enigmas" (to solve as a combined activity--the correct answer is published on the website).

Within this variety of activities, students are required to perform operational tasks and to do a critical analysis on different current issues (awareness of the use of Internet, environmental problems, etc).

Teachers have a section which provides them with practical information to have a best practice with *Bitantart*. In this section there is an outline of the subject, maps, a guide of the project, bibliography and webgraphy, teachers' forum, recommendations for teachers, "Decalogue" to students, telematic guide on-line (www.guiaeducativa.net), proposals for assessment and a virtual assessment of teachers for Lacenet Network directors.

All the materials for students and teachers are attractive and well-structured. Activities combine content learning and ICT learning. ICT learning is not explicit for students, but it is an implicit learning of how to surf the Web, use common programmes, create products, solve problems, etc. They mostly work on content using ICT as a vehicle, not as the knowledge to acquire.

3. Study

Responding to the I-curriculum purposes to define the digital competencies and performances required for the digital age. The data gathered in this case study aims:
-    To assess the materials used in this innovative project
-    To assess the focus in the practical work using ICT
-    To determine the attitudes, perception and beliefs about learning by the students
-    To determine the attitudes, perception and beliefs about learning by the teachers

3.1. Method

This case study used qualitative data gathered in an initial e-mail questionnaire, three in-depth interviews to teachers involved in different projects using Lacenet, one group interview to clarify some contradictions (mini-DELPHI method) with these teachers, classroom observation and material review (tasks of other years, current tasks, e-mail correspondence of the last year

among experts, forums transcriptions, support materials for teachers, on-line materials and every-day students assessment charts).

To analyze the data the software for qualitative analysis **ATLASti** has been used. The interview data has been validated using the mini-DELPHI method. To validate the data, a comparison has been made between the interview data and the observational data. The materials have been checked several times comparing products to tasks, following the processes, etc.

3.2. Results

3.2.1.   Materials

The materials for the project (available on-line) are suitable for developing the curricular competencies planned by the Catalan curriculum. We have to take into account that most of the competencies are worked on in a compulsory subject context (the so called "technology" subject) which is mostly planned at the operational level; moreover, this course is part of the elective curriculum and contributes to the ICT competencies' development at the operational, cultural and critical levels.

The materials are used, with ICT as the vehicle, to acquire knowledge, search for information, and present students' products on a Website where they can exchange experiences and assess each others' products. These materials are directly influencing the focus of the project as the teachers plan the programme, on-line tasks required and concrete goals to achieve in an specific class-group. Thus, there are different uses of the ICT technologies; for instance, searches using the Internet, solving of "enigmas," video-chats with an expert to clarify some questions of the virtual travel, forums with other schools to solve problems and exchange information, chats, personal introductions.

During the virtual trip, the students have different files for being involved in a real trip, such as a virtual visit to a ship, audio and text files of the captain's diary on board, maps, links to sites such as National Geographic (for finding games, instructions for learning how to sail, etc.), weather reports from stations in Antarctica in real time, and links to the NASA website to check on-line documents and images about, for example, the ozone. These are the activities that make the students "*live*" the trip, learn contents through an adventure context, know on-line people, learn ways to investigate, and use ICT to achieve goals. Students are able to use different types of files (video, image, text, audio, flash, etc.) and produce their own products reflecting what they are able to do with ICT. For instance, an activity is: "*Make an schema or a diagram of how an iceberg is created. After that, publish it in the Web".* Having done this task, they have solved an "enigma" with the help of an expert, have checked a flash file of a national newspaper explaining the process, checked some photos, talked about the Titanic, etc. This task can combine a text file with a spreadsheet diagram or images files and audio if they want.

The virtual adventure, on which the course is based, encourages the students to be involved in the activities proposed and enjoy while learning. The materials catch the interest for leading to meaningful learning. Students become main actors of their knowledge, working as the "crew" and collaborating with others (in classroom and in others schools).

In conclusion, the materials are chosen to develop suitable competences using ICT, not merely operational but cultural and critical as well.

3.2.2   Planning and focus of the activity

After data analysis, it is clear that the **focus of the activity**[3] is the main indicator for knowing the competencies and attitudes generated in students and teachers using ICT (*see diagram provided by data analysis with ATLASti*). How the teachers plan, programme and assess the subject is closely related with the materials available and the type of tasks proposed within the telematic course.

To develop the *ability to design a search using the Internet and develop the learning of effective search strategies, a modelling process is necessary*. Teachers always start the sessions telling

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[3] **The focus** stands for the approaches teachers use to lead an experience in a concrete context.

the students what they are going to do in the regular classroom setting, not in front of the computers (*see picture of the classroom in the Appendix*). After that, teachers ask them how they want to do it; students brainstorm and agree how to do the task, asking questions to the teacher if required. Then, they start the task. Once finished, the teacher and the students go back to the regular classroom setting and talk about what they have done, problems, etc. Finally, there is an introduction to what they are going to do in the next session. Then students complete the self-assessment table of the day and finish the session. All teachers interviewed agreed that the main point is to do a suitable design of the search before starting.

This focus contributes to the students' development of abilities to plan the task, identify the key points to do the search, negotiate styles for doing the task, solve problems before starting, get help if needed, and decide the objective before starting. Mapping out the schema for working is important for achieving the goals without getting lost among all the information available.
Modelling is the basis of this focus, and the key point to developing critical and cultural level competencies by using ICT. Thus, the focus used in this case contributes to meaningful learning and provides transferable learning skills.

3.2.3   Course assessment
The course assessment test if students have achieved attitudes and skills, such as curiosity, ability to overcome stage-fright, respecting others. The assessment is planned in a three-dimensional perspective: a part by external evaluators (other students of other schools); another part by the teacher based on every-day sessions, observation and products; and, a part by the students' based on their own experience and how they value their work done.

The main concern of the teachers is how to assess the course. The on-line project materials provide a list of possible ways to assess in a qualitative approach. On one hand, the problem is that the evaluation system is quantitative (grades) at schools (especially at secondary level). The issue for the teachers is how to translate this qualitative assessment into a quantitative grade. On the other hand, the assessment done is well-structured to gather qualitative data. After each session, the students complete a self-assessment table[4] responding to questions related to the work done. The teacher completes a diary of classes, taking into account the participation, interests, progress, and the work done (products) of the students. Finally, the teacher asks students to grade themselves, and in a counselling session with the students both agree on the grade for the work done.

An important and innovative assessment point is that schools assess each other. This external evaluation helps students realise their strengths and weaknesses, and at the same time, they get the evaluator's role assessing other students' products. This type of assessment gives to the students the opportunity to develop their critical skills and how to accept external comments on their work.

3.2.4   Students
The work done in class by students fits quite well into the levels of the framework of I-Curriculum (operational, cultural and critical skills). The focus gives information on this issue, as the tasks are first of all designed and after performed. In the table below we identify the most important competencies:

	Information seeking	Telematic communication
Operational	To create products To choose the proper strategy depending on the concrete need To know different search engines To use the appropriate terminology To respond to the tasks properly To use and save information properly To present the information in different formats and combinations	To use e-mail To use forums To use chats and video-chats To use virtual workspaces To be polite when communicating

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[4] See appendix to check the items.

	To use different programmes To work in team To work independently To know how to search for information effectively To produce reports with text and image	
Cultural	To avoid the mere Cut&Paste without manipulating the information To participate in the classroom To synthesise data To select relevant information To know how to identify key words to do a search To perform self-assessment and have criteria for improvement To validate the information found To organize the information To be Independent to use ICT	To ask for information to organizations To ask for counselling to teachers To communicate with piers and friends To share information with others To work with people they do not know directly To work with mates To know new people
Critical	To be critical about their own tasks and others' tasks To update knowledge To expand on knowledge To develop the capability to select a website while browsing using quality criteria To map out the search before starting To develop the curiosity and the research spirit To be autonomous To be consequent with their own actions To take advantage of the resources of the Web To apply strategies found in other contexts To use ICT in a responsible way Be aware of the potential of the Internet To learn from the others	To know how to communicate knowledge To be aware of the potential and limitations of the Internet To learn from the others

The operational competencies are the basis for acquiring cultural and critical competences. First of all, students focus their efforts into knowing how to use ICT. In this case, the autonomy was not complete because they are in the first year of ESO. Some of the students have experience in the use of ICT that allowed them to work on content easily and, thus, the teacher can focus on developing critical thinking with activities such as resume writing and search for new information. The experience and the maturity in the ICT use increase during the Compulsory Education. In this affirmation, we find statements such as, "*students of the last grade of Compulsory Secondary Education sometimes validate the information, and they use their subject knowledge and their experience to reject 'litter-websites'. This doesn't happen in the first grades where the common attitude is to assume that all what is on the Web is reliable. We work to improve this problem since the very beginning and in the last grade you can see the work done*".

There is a common trend in student attitude to "Cut and Paste". During the observation, students asked several times if they could cut and paste for a report they had to do in a classroom activity. This trend in the first grade is generally the main way to present the information. Teachers said that "*there is the law of the minimum effort among the students*" and cut and paste saves time. The abilities of synthesis, rejecting non useful information, being organised and producing an original product evolve during the process. Teachers want to prevent bad-habits by encouraging this evolution.

On the other hand, students are attracted by the Internet and ICT, and they evolve on their own in ICT-use mainly in searching information (most of the times to search for music, singers, on-line games, etc.) and in communicating (messenger-type tools are very popular, e-mail, etc.).

Teachers stated that "*students feel attracted in the leisure side, searching for games and music, website of information about leisure and entertainment, buying, and finally to search for information for the academic requirements. ICT is a high motivator for students.*"

Although students are free to choose any search engine, most of the time they use only one-- *Google*. At school they work on adapting the selection of the search engine to the task required, but most of them start with Google.

As with respect to attitudes, in the observations done, students were organised and sufficiently autonomous. They learnt from others and felt encouraged about the activities of the project. The attitude of the students was highly participative, respectful and positive.

3.2.5   Teachers
The teachers have participated in different training courses to update their skills and develop new competencies for teaching. The reasons teachers expressed for using ICT and participating in telematic projects were:

- ICT improves the work on a specific subject,
- They have competencies to do it.

Among the reasons why teachers in their school do not use ICT to work on subject content, they said that "*they do not know how to introduce ICT in their subject, and sometimes they haven't received any training in ICT. That's why they do not feel secure to lead a class using ICT and reject it*".

We have observed that if the teachers feel comfortable with their subject and try to use ICT as in this telematic project, their attitude in the class has two main roles: one as a leader (observing, proposing tasks, solving needs, etc); the other one as a participant (collaborating with students to do tasks, learning, participating, etc). These two roles are necessary to create a horizontal communication with the students and for guiding the process. When working at the horizontal level sometimes there is a fear of losing authority. This fear is one of the reasons more teachers aren't using ICT frequently. Teachers working at the horizontal level are counsellors and participants learning from the students, but this role is not comfortable for all teachers.

The attitude of the teachers participating in the experience at IES JONQUERES is very positive. They are interested in providing ICT competencies to their students, recognising that being an economically deprived area, they are more exposed to get excluded from the Information Society. This purpose of digital literacy is what move them towards improving their practice every year. They are highly motivated and after starting to collaborate with I-Curriculum, more teachers in the centre are getting encouraged to use ICT.

4   The impact on the ICT framework
Problems encountered have been the limited infrastructure (there are only three lap-tops for all the school) and the attitudes that a large percentage of teachers have against the use of ICT. Moreover, this type of course is not compulsory and only some schools with motivated teachers are leading telematic projects to cover the area of elective credits. Though there is a general reluctance to get involved in this kind of courses, all teachers can access ICT training if they want. Schools should be aware of the importance of digital literacy, not merely at the operational level, which is the minimum level that the curriculum requires, but at the cultural and critical levels. The main positive point of the project *Bitantart* is that it contributes to the digital literacy at all levels, complementing the learning of the operational level that is usually done within the compulsory subject of technology.

As the decided framework to I-Curriculum focus operates at three levels of skills (operational, cultural and critical), in appendix A there is a table of all the competences students have to have when finishing the ESO. This table takes into account these three levels of skills and provides information about the levels related to this concrete course (*Bitantart*). It is important to know

that this course is being applied in the first grade of ESO, so not all the competences have to be achieved during this course. In appendix A, there is a summary to map out what the students have to learn during the first grade.

Some of the problems encountered have been: a) the infrastructure limitations (there are only three computer labs for all the school); b) the passive attitude of some of the school teachers not supporting the development of this type of ICT projects. Moreover, this course is not compulsory for all the schools in Catalonia, and few schools with motivated teachers are leading telematic projects to cover elective credits. Though there is a general reluctance to get involved in this kind of courses, all teachers can access ICT training if they demand it. Schools have to be aware of the importance of digital literacy, not merely at the operational level, which is the minimum level that the curriculum requires, but at the cultural and critical levels. The main positive point of this project *Bitantart* is that it contributes to the digital literacy at all levels, complementing the learning of the operational level that is usually done within the compulsory subject of technology.

The strengths encountered in this case study that are important for the development of learning competencies for the digital age are:

. Communication competencies: students demonstrate operational competencies, but the most interesting is what refers to cultural and critical skills. For instance students are able to understand the cultural dimension of communication when exchanging with students far away in terms of culture and place. They are able to see how the local actions effect globally, demonstrating the critical dimensions of the global communication and the sharing of information on Internet. We could even talk about "***critical e-communication***"; critical referring to a qualitative stage of understanding of the other, and e-communication, since the communication is mediated and brought about by telematics. The fact that these case has been conducted within a traditional school environment, also in a deprived area, allow us to say that the competencies that emerge could be adapted and generalise within the curriculum framework.

. Information seeking competencies. Without the previous planning of the search, a process that could be called as ***student's seeking design competence****,* the student would find a lot of information, but eventually would be unable to transform this data into meaningful knowledge. This competence would allow students to have criteria to recognise what information is usable and useful; and to develop information literacy critical competencies by building up his/her own criteria for manipulating and producing information. The information seeking exercises allows for the students to try a new paradigm in which they think on the Web as a (first) source of information that fills their expectations. They select pieces of information with criteria that fits their interest, and with this information satisfy their information needs.

. The combination of both competencies and their eventual integration into the curriculum would allow for the student to develop ***information modelling competencies*** at higher qualitative level, as shown in this case study. The critical e-communication skills make the student to think on the appropriate way to present the information to the specific audience, in order to be understood by the others and to understand him or herself (paraphrasing Wittgestein we could say that *my limits of communication are my limits of learning*); the students seeking design competences would allow him or her for looking richer sources of information and to present it into a more attractive and suitable way.

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Appendix A: Application of proposed criteria to *Bitantart* project

This table contents the curriculum in ICT competences stated in the Catalan curriculum. The comments on each aspect will provide with information related to the competences worked on this telematic project and ICT competences in curriculum.

BUT, We have to take into account that all the competences listed below are divided to be achieved in 4 courses, so, as the case study is based on students of first grade of ESO, what they should learn in this stage of the curriculum is:

First course	- Physic and structural components of ICT and its terminology. - Concept of programme and application. - The Internet network. - Applications to create, edit and produce texts.

In this stage these initial competences are achieved through the subject technology. As there is no any other compulsory subject to work only in ICT during the ESO, this project works on more competences that will be worked in future courses, integrating ICT learning with other knowledge learning.

In the table below are listed all the competences for the 4 courses and in each competence is listed if has been observed or not (then is in blank) and at what level.

	Critical	Cultural	Operational
• **Basic knowledge of informatics systems**			
1) Pupils should be taught:			
a) To know the basics of the computer and its functions	- To chose and do combinations of programs to enrich and present a task. In the products is visible how they do that to produce richer tasks.	- To use different programmes depending to the task required.	- To know how to use different programs.
b) To know the correct process to turn on and turn-off the computer		- To know why is better to turn on or to turn off the computer. They do not ask why, they only do it.	- Turn on and off the computer properly.
c) To be able to connect the basic peripherals to the computer (printer, mouse, etc.) and perform necessary maintenance. To be able to install software (following the instructions on the screen, or on the Manual)	- Teachers do not work it. Not observed within the project development.		
• **Basic use of the Operative System**			
2) Pupils should be taught:			
a) To know the basic terminology of the operative system: archive, folder, programme, etc		- To use different programs, archives, etc. without problems.	- To know the terminology to differentiate among all archives, folders, etc.
b) To be able to save and retrieve the information in the computer and in different supports (diskette, disk drive,	- Understand the advantages and disadvantages of saving a task in a place or other to work on it, etc - Discussed in class to	- Be able to save information in different supports adapted to their possibilities and to able them to use it easily.	- Save and retrieve information in their own route, diskette, workspace.

|	Critical	Cultural	Operational
etc.)	follow the routes and why they have to do it.	- They discussed why it was better to save it in the C:/ than in a diskette to work easily as it is a classroom work.	
c) To be able to correctly organise the information in files and folders		- To know the benefits of maintain in order in archiving files in folders and subfolders to their life and studies. - Explained by the teacher with general agreement.	- Organise their tasks in their own folders.
d) To realise basic activities of maintenance of the system (anti-virus, copies of security, deleting unnecessary information, etc.)		- Understand the importance of check the computer status, make copies of security…to maintain the computer in an optimal status to work easily and prevent problems. - This was not done.	- Save files to do not lose information in case of computer problems, delete documents that are not useful, etc. - This is the work done in class. The anti-virus and the copies of security were not done.
e) To know different utility programmes: compressing files, programmes to visualise documents, etc.)		- Understand why to use different programmes and how to combine information, incompatibilities, etc.	- Chose the correct programme to visualise documents.
f) To be able to use distributed resources in a network (printer, disk, etc.)			- Select and use information from different resources.
• **Search and selection of information on the Internet**			
3) Pupils should be taught:			
a) To have criteria to evaluate the reliability of the information found	- Follow experience and own knowledge criteria to reject websites that are not reliable, personal pages, or doubtful sites. - Be aware that all the information found in the web if it is not an official website has not any reliability, and compare information in order to validate it. - Assess the information archived checking if it is what it was required, if it has been compared and if it comes from a reliable sources in order to reject it or use it. - All these steps has been tried by teachers but during the process they observe that students use to avoid the comparison of information, thus, sometimes they get incongruence in the information got and ask for help to teachers. In	- Understand the importance of select reliable sources (official websites, etc) to get information. - Compare information to validate it and reject personal websites and websites in which the information found is not related to the one found in official websites.	- Seek for information in the Internet and find out what they were looking for. - Reject websites that are not reliable or personal pages.

	Critical	Cultural	Operational
	this case students were too young to use their own knowledge and the Internet surfing experience but in older students it improves and helps to assess the information.		
b) To know basic use of navigators: surfing the Internet, storing information, retrieving, classifying, and printing information	- Be able to surf Internet applying reliability criteria when browsing sites and focusing on what they are looking for to ease the search, - Selecting the appropriate navigator in which they feel comfortable to surf, using the tools available to improve the search, etc. - They use the Explorer to navigate without use others. This level is not wholly acquired.	- Understand the advantages of use the favourites list, archive the information, classify, etc… to ease the retrieval and to use it when needed. - Students use the basics of navigators but they do not take advantage of all the possibilities the navigator offers.	- To know how to use a navigator, add a site to the favourites list, get information, use he help, etc…
c) To be able to use the search engines in order to locate specific information on the Internet	- Know what is the criteria of each search engine in providing solutions, take into account when selecting the options among the ones provided. - Be able to contrast the information and check not only in a website produced. - Be able to check for specific websites in order to get to better information. - To know why the functioning of a website is and the possibilities of seeking information using it, being aware of possible problems as reliability, commercial criteria of providing sites, etc. Although the teachers explain why a website provide some options and why other website different ones, students go on selecting the first options, and almost nobody contrast the information found. Teachers are working on this issue hardly, so this level is not completely achieved although teachers work on a critical level too.	- Use different search engines and know how to use them optimally, using Boolean factors, combining queries, etc. - Be able to select the better search engine depending on the type of need and browse reading diagonally within the pages options.	- To identify the key words to achieve the task with the information matched. - To know how to introduce the query and the key words in the searching box. - To know how to browse and select the options provided by the search engine. Sometimes students have problems to identify the key words. Teacher let them try and if not asking to the group they agree on possible key words. The experience helps to improve into identifying key words.
d) To know how to identify the search goal, and to navigate through hyperlinks in relevant paths for the desired aim (not	- Planning the search before starting, identifying the basic key question and possible key words that can drive to direct or indirect information.	- To be aware of the criteria where information can be found depending on the search engine used. - To know how to	- Be aware of search methods like keywords, Boolean operators. - Know how to access to the websites

	Critical	**Cultural**	**Operational**
dummy navigation)	- Select appropriate source or sources and use research strategies suitable to the way in which information is stored or structured and the level and complexity of the solution required - Evaluate the process as well as the information, contrasting and validating the product done with the information found. Teachers are very concerned on the importance to do suitable queries for a successful search. They focus on how to resume and detect the key words, and teach how to surf within the options directly or searching for specialist pages and try to access indirectly. The main point all teachers agree is on do a good planning before starting the search.	synthesis the information in key words or link key words in a same query. - To know how to browse the options not merely using the first ones and trying to refine the search if the options provided are not what we expected.	provided by the search engine. - Know how to use the query box to enter the query words.
• *Personal communication and collaborative work in networks*			
4) Pupils should be taught to:			
a) To be able to responsibly use the ICT as a mean for interpersonal group communication (chats, forums, etc.)	- Adequate the type of message to the receiver. - Respect the others' opinions and express your without insulting or being rude. This is basic to participate in the forums, if not they can't.	- Know the basical rules and respect them in order to share information and communicate with others. - Use proper language to be understood, and net-etiquette rules.	- know how to use a forum and a chat (rules to participate, etc.) - know how to e-mail with others.
b) To send and receive e-mail messages, to organise mailing addresses, and to know how to attach files		- Know how to create mailing groups to communicate with peoples in a common interest. Mostly it has been worked at operational level, not all know how to do a mailing list and why.	- Know how to send e-mail text. - Know how to attach files - know how to introduce addresses to your list. - know how to forward e-mails. - know how to download files.
• *Word and image processing*			
5) Pupils should be taught to:			
a) To know the basic terminology about text editing: formatting words, paragraphs, margins, etc		- Know the possibilities of text processors and how to introduce other files in a text file.	- Know how to work with text processor.
b) To know how to use the basic functions of a word processor: to edit, save and print documents	- Analyse why is important to save in a concrete route in the school (if not the file will be deleted, to be responsible of your tasks and save it, organization	- Know the importance of saving in a place or other depending on the use we want to give to a document.	- Know how to edit, save and print.

	Critical	Cultural	Operational
	criteria, etc) This level is highly worked by teacher.		
c)To know the use of the keyboard			
d) To be able to internally structure documents: to copy, cut and paste	- Understand that cut and paste is only a tool to compile and organise information, that is necessary to work with the information and manipulate it to concrete requirements and to understand of what are we talking about. This is one of the challenges teachers have to focus on because most of the times the students only use the operational level and compile info without checking the reliability, bad-organised, etc.	- Know the utility of Cut and paste to compile information and organise it.	- Know how to copy, cut and paste.
e) To be able to format a text: types of letter, margins, etc		- know why is important to chose a type of letter or other if the document has to be sent to other person. This was worked at class because when sharing documents on-line if the computer has not the type of letter used, the text will be unformatted as desired.	- know how to format a text.
f) To be able to add images and other graphic elements		- know how to enrich products combining images with text.	- know how to add images and graphics.
g) To be able to use the correctors in order to assure the orthography		- know the importance of presenting a well-scripted document which enriches the quality.	- know how to use the corrector.
h) To be able to use the basic functions of a graphic editor: to draw, graph, store and print the work done	Not observed within the project development.		
• **Use of databases and spreadsheets**			
6) During the key stage, pupils should be taught the knowledge, skills and understanding through:			
a) To know the basic terminology about the spreadsheet: rows, columns, cells, data and formula			- know how to introduce data to do a graphic or diagram. - know the basic functioning.
b) To know what it is and what it is for	This is worked in further courses. Within the project is planned they only learn how to do basic actions with spreadsheets if the students are skilled enough.		
c) To be able to filter data in a database			
d) To be able to introduce new data in a form			
• **Edutainment with ICT**			
7) During the key stage, pupils should be taught the knowledge, skills and understanding through:			

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	Critical	Cultural	Operational
a) To be able to monitor the time devoted to edutainment with ICT and its addiction possibilities			- know how to play with applications included in the telematic project.
b) To know the multiple sources of educational materials and information available on the Internet (libraries, training courses, training resources, press, etc.)	- know what sources are reliable and contrast information if the source is not completely reliable. This is another challenger for teachers.	- know how to update and know more in a subject accessing to current news, libraries, websites, etc.	- know the multiple sources of educational materials.
c) To be able to use the Help files in manuals and in software programmes			- know how to ask for information to the captain Xiles (help pet during the virtual trip)

- **Tele-operations and awareness**

8) During the key stage, pupils should be taught the knowledge, skills and understanding through:

	Critical	Cultural	Operational
a) To know the necessary precautions for making monetary operations and giving or receiving information	Not worked on in this experience.		
b) To know the existence of protection systems for the operations made in the net: electronic signature, privacy, encrypting, safe places, etc		- know why there is a password and electronic licenses. It is only worked at that level because is better worked in further courses.	- know how to introduce their password to access to the virtual workspace.

- **General attitudes in front of ICT**

9) During the key stage, pupils should be taught the knowledge, skills and understanding through:

	Critical	Cultural	Operational
a) To have an open and critical attitude toward the new technologies: contents, edutainment, etc	- Be critical using ICT, learning from the experience, mapping out the searches before starting, etc.	- know how to use ICT for concrete purposes and to facilitate information access, edutainment, etc.	- know how to use all the technologies.
b) To be able and willing to pursue both lifelong learning and continuous professional development	Not in this experience, this job is done in the last course of secondary post-compulsory education. Only few indications are done.		
c) To act prudently with the ICT: origin of messages, critical files, etc	- Observe and be prudent in order to know what lines of acting are more appropriate to communicate with unknown people.	- Know basic cultural differences to work in harmony with foreign students participating in telematic projects.	- know some acting guidelines to communicate politely.
d) To know the risks of accessing of conflictive or illegal information	Not worked in this experience.		

Appendix B: Mapping of indicators and its relations
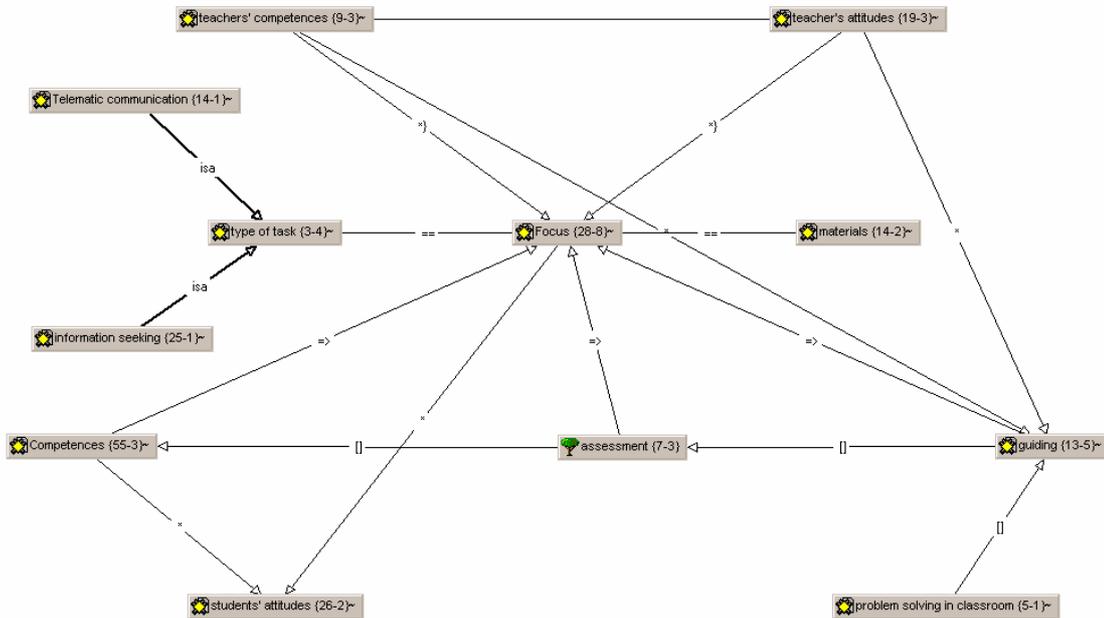
= = - *is associated with* - Relates concepts without subsumption.

[ ] - *is part of* - The part-of relation links objects, not concepts of different abstractional level (as does ISA)

=> - *is cause of* - Used for representing causal links, processes, etc.

* - *influences* - Influences to the development of the category related to.

Isa – *is a..* - The ISA relation links specific concepts to general concepts. It is widely used to represent structural relationships in knowledge based systems (expert systems). It is also used for structuring the term base of descriptors in information-retrieval systems. Such structured descriptor sets are labeled "thesauri".

(no name) - If no other relation applies for a link, this one does.....

*} – *is property of* – is a property of the category to which is related.

Appendix C: Pictures[5] and classroom mapping

Classroom:
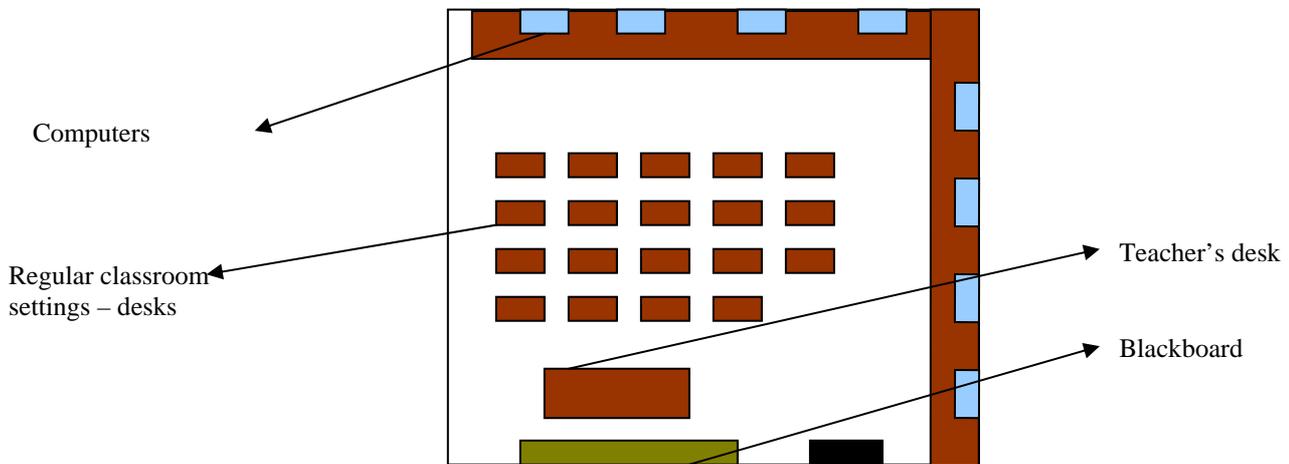
Pictures:

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[5] School allowed UB to use the pictures in this case study.

APPENDIX D: Auto – assessment student's table (translated version)

PROGRESS REPORT Bitantart   Name... of 1st....................

	9	12	15	16	19	9	12	13	16	19	20	23	26	27	30	2	3	6	9	10	13	16	17	20	24	27	1	2	5	8	9	12	15	16	19
Punctuality when arriving to class.																																			
Punctuality when starting to work.																																			
I have done a suitable use of the session																																			
Attitude towards the mates																																			
I have collaborated with my couple of job																																			
I have finished the tasks																																			
Have I done a good job?																																			
Have I followed the guides?																																			
Have I asked for help to my mates?																																			
Have I tried to solve the problems searching for info in the Internet?																																			
Have I asked for help to the teacher?																																			
Have I checked the forum for helpful information?																																			
Do I respect the classroom materials?																																			