# I-CURRICULUM project

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UNIVERSITAT DE BARCELONA

# CASE STUDY

## Mistery at IES Miquel Tarradell

IES Miquel Tarradell

(Barcelona)

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## *The mystery of the lost boy:* Case Study

### 1. Introduction

This case study is based on a project that is running at a secondary school in Barcelona in the Raval[1] neighbourhood. The University of Barcelona has selected a project of the school that has been running for two years for the case study because it is a telematic innovation which combines Internet searches and communication to complete a concrete requirement (solve a mystery). In the Catalan curriculum there are free-election credits (elective courses). One of these courses is a project which combines telematic activities and traditional ones and connects to all the compulsory curricular subjects. The computer helps to investigate the mystery in concrete phases. The material is a booklet done by the teachers and on-line activities uploaded to the school's website. Each student and teacher participating has a password for accessing to the virtual workspace. The teacher is required to lead the course, and there is internal teachers' communication since many teachers work on this project.

This case study has analysed materials produced by students, project material for teachers and students, literature of the project, one teachers-group interview, one informal interview with a teacher after an observation, one in-depth interview with the teacher-manager of telematic projects and two classroom observations. This case study is part of I-curriculum Project and aims to provide information on what competencies are developed.

### 2. The lost boy mystery at IES MIQUEL TARRADELL

This project consists of solving a problem and involves working on content of all subjects (social sciences, natural sciences, maths, literature, foreign languages, etc). The students are required to solve a mystery. Students have to follow some clues and try to make hypotheses analysing the process. Classroom activities, on-line activities, e-mail communication and publications on the Web are what complete this "mystery case".

### 2.1. School and course information

The project is running at the secondary School *IES MIQUEL TARRADELL* of Barcelona (http://www.xtec.es/ies-miquel-tarradell/). This centre is a state school located in the Raval. The school has a high percentage of immigrants (according to teachers, over 95% percent). Thus, the multicultural framework is a challenge with students who are not able to understand Catalan or Spanish. Other problems are that the school has only three computer laptops and that most of the students are not home computer users for different reasons (mostly socio-economical reasons).

The school is really concerned about providing the students with the digital skills they need. For that reason, some teachers were involved in European projects and other initiatives to earn money to buy computers for the school. After participating in projects, such as projects of *Lacenet*[2] network, the teachers decided to start with RAVALNET, their own network for all people in Raval. Then, they started with their own school projects to work on ICT literacy and cross-curricular content in order to insure the participation of all students. The project is planned for an entire course. The part of the project that we have focused on in this case study is the initial part. As the project has its own rhythm, teachers coordinate their work depending on the students' progresses. In the laptops sessions, students work in pairs using one computer. The age of the students of this case study is 15-16 years (3rd grade of ESO[3]).

Third grade teachers are a real team leading this course together. All meet to talk about the progress in order to coordinate for improving. Everyone leads his/her subject content in the course but the tutor is the main leader and the referent for students. Internal communication is basic for the success in this context.

### 2.2. *Mystery of the lost boy* project material

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[1] Raval is the most multicultural neighbourhood in Barcelona.
[2] **Lacenet** is a telematic network that provides to schools all around the world with projects and materials to work on cross-curricular aspects using ICT. For more information visit http://www.lacenet.org/.
[3] **ESO**: Compulsory Secondary level Education.

The materials are a booklet of activities and some on-line activities available at: http://www.ravalnet.org/iestarradell/tercer/. All these materials (for instance http://www.ravalnet.org/iestarradell/tercer/introduccio.doc) are part of a cross-curricular subject that mixes traditional and ICT-based activities. These activities promote different learning aspects:

- *Operational aspects* - know how to use ICT to communicate and to search for information. Manipulate and synthesis the information in order to use it.
- *Cultural and critical aspects* - be aware of the importance of modelling before starting a search, know how to ask for information using the appropriate language and media, be aware of Internet potential to solve problems and the importance to check the reliability of the sources used.

The activities planned in this project are: classroom activities (activities related to subject contents depending on the stage of the mystery), on-line activities (activities in the telematic network of Catalonia, information seeking tasks, etc.), forums (among students) and clue deductions (hypothesising about what has happened and go on to solve the case)..

On the one hand, within this variety of activities, students are required to perform operational tasks. On the other hand, they are asked to do critical work on different current issues (awareness of the use of Internet, proper language use to communicate, etc).

All the materials for students are attractive and well structured. ICT learning is not explicit for students but it is an implicit learning in which they learn how to surf the Web, use common programmes, create products and solve problems. Every year the materials are improved, clues are changed, etc.

### 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 course
- 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 the following: qualitative data gathered in an initial teachers group interview, in-depth interviews with the teacher responsible for telematics in 3$^{rd}$ grade, one informal interview with a teacher after an observation in his class, two classroom observations, informal exchange with students and material review (tasks of other years, current tasks, e-mail correspondence, booklet materials and on-line materials review).

The scientific software  for qualitative analysis ATLASti has been used. Data validation has been done comparing 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: Material
Tthere are infrastructure problems for laptop access. The ratio is two students for one computer. The teachers coordinate the use of the three laptops. A high percentage of teachers (60%) use ICT to support their tasks. Materials are adapted to make the best use of the laptops.  For that reason the materials propose traditional and ICT-based activities.

The materials for the course development are presented in a booklet and supported by activities uploaded to the Ravalnet network. We have to take into account that the ICT competencies are developed in the technology subject (which is mostly planned in an operational level); moreover, this project is part of the elective curriculum and contributes to the ICT competencies at the operational, cultural and critical level BUT is not completely ICT-based and works on other curriculum competencies in traditional activities as well.

These materials are directly influencing the focus of the subject. The teachers lead the course depending on students' progress. Thus, the course runs within a cooperative focus among all teachers involved in order to cover students' needs and guide them effectively.

Because of the mixed character of the course, most of the content is developed without using ICT, although, teachers ask for tasks to be received in their e-mail account. Most of the traditional contents are related to ICT issues (for example: in Spanish lesson part they work on the meanings of Kb, link, browser, password, software, etc.; or in Catalan lesson they analyse the elements of communication and identify types of communication) and other activities use the Internet to search for information such as in the geography section where the students have to search for maps and ask questions, such as "where are Palo Alto and Silicon Valley?" Thus the materials propose two general types of tasks:
- Tasks related to subject contents only
- Different tasks that promote the use of media (operational competencies-use of ICT) and some others that promote critical thinking about media and its possibilities (traditional lessons related to Information Society).

To strengthen ICT competencies, during the investigation process to solve the mystery of the lost boy, students access e-mail accounts they have found following the clues, ask for information from a virtual assistant, exchange hypotheses and work on content. ICT helps in guiding the experience, the information exchange, information searches, and facilitates the work on traditional content as part of a single project.  The "*virtual mystery*" to solve (which the project is based on), encourages the students to get involved in the activities proposed and enjoy while learning. The variety of the activities proposed facilitate some operational learning of the use of ICT; moreover, traditional lessons contribute to competency development at critical and cultural levels. Thus, the material promotes participation and meaningful learning.

In conclusion, traditional lessons are necessary to develop the critical thinking and are included as part of the project because of the infrastructure problems for accessing laptops.

### 3.3. Results: Planning and Focus

After data analysis, we have realised that the focus[4] is the main indicator for knowing the competencies and attitudes (*see diagram provided by data analysis with Atlasti*). How the teachers plan, programme and assess the course is closely related with the materials (because they have been created regarding to the focus and the infrastructure limitations).

Modelling is the main approach used before starting a search. Teachers start the sessions saying what they are going to do in regular classroom settings, not in front of the computers (*see picture and map of the classroom*). Some students need further explanation because of language problems and Special Educational Needs. After this modelling approach, students start the task. All teachers interviewed highlighted the importance of designing the search before starting. That is the basis of the focus, modelling understood as designing before starting.

Regarding the specific focus of ICT-use lessons, the course tries to develop abilities to plan tasks, identify the key words in a search, negotiate ways to do tasks, solve problems before starting, obtain help and decide the objective before starting. Mapping out the work schema makes it easier to achieve the goals and not get lost in all the information available. Teachers try to cooperate with students, but they are the guides and counsellors of the process.

The focus is well-planned for developing competencies for digital literacy although not all the lessons are under this focus, only the ICT-based ones.

### 3.4. Results: Course assessment

The course assessment uses a qualitative approach. The difficulty in converting a qualitative assessment into a quantitative grade (as required in the formal curriculum) has been addressed by teachers. They follow up the whole process, assess the students' products and negotiate with the students the final grade. The grade is based on teachers' observations, quality of the products, self-assessment and group work assessment.

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[4] Focus understood as the approach teacher use to lead an experience in a concrete context.

Teachers have to provide students with aspects to take into account for assessing in order they can evaluate their tasks. Students negotiate with their work-group the general grade; they decide on their own personal grade; and after that, there is a negotiation with the teacher.

The course and the negotiation system they use have effectively solved the assessment problem.  When asked if they felt that this course was not  "real", students replied in the negative. "*For students this is a normal subject, they know they are going to be assessed but because of the mystery to solve, they feel free and evolve more naturally. When negotiating the grade we ask for what they have learnt. Students always realise how much they have learnt when you directly ask for that self-assessment task*".

The importance of the assessment criteria for developing competencies is a point to take into account for the I-curriculum Project purposes. .

### 3.5. Results: Students

In the table below we identify the most important competencies found out in this course classified using I-Curriculum framework:

|  | Information seeking | Telematic communication |
|---|---|---|
| **Operational** | To create products<br>To choose a suitable strategy depending on the concrete need<br>To know different search engines<br>To use the appropriate terminology<br>To respond to the tasks properly<br>To know how to use and save information<br>To present the information in different formats and combinations.<br>To use different programmes<br>To work in team<br>To work independently<br>To know how to search for information effectively<br>To produce reports with text and image | To use e-mail<br>To use virtual workspaces<br>To be proper when communicating |
| **Cultural** | To participate<br>To select relevant information<br>To know how to identify key words to do a search.<br>To learn self-assessment for improvement criteria<br>To manipulate information<br>To organize the information<br>To be Independent to use ICT | To ask for information.<br>To ask for counselling from teachers<br>To communicate with mates and friends<br>To share information with others<br>To work with mates<br>To send tasks via e-mail to the teachers |
| **Critical** | To learn critical thinking<br>To be critic about own tasks and others' tasks<br>To develop the capability to select website while browsing using quality criteria<br>To map out a search before starting<br>To develop curiosity and the research spirit<br>To do meaningful learning<br>To use strategies in other contexts<br>Be aware of the potential of the Internet<br>To learn from the others | To know how to communicate knowledge<br>To be aware of the potential of the Internet<br>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 operational level is not complete because of the nature of the materials and the project itself. The students aren't autonomous and need teacher's approval. Some students are less autonomous than others because of "side problems" and have difficulties keeping the pace of the class.

There is a correlation between competencies of communication and side problems, and although they can ask for counselling via e-mail, they usually prefer to talk face-to-face. Teachers stated about this factor: "*They aren't used to ask for counselling via e-mail because they prefer to do it personally. Most of them have affective problems at home and the attention you pay to them covers the lack of affection in other places*". Side problems influence directly the development of competencies. As side problems we consider problems that are collateral to the ability of learning. For instance, a side problem could be affective lack, socio-economic difficulties, etc. All these problems affect the learning process and create rejection against

education. In that context, these "side problems" are the cause for creating this project materials.

Teachers agree that cutting and pasting is a common trend: "*students are always cutting and pasting information and it is easy to see if they have simply pasted something from google*". The job of organising the search, rejecting non-reliable websites, validating the information and generating a well structured product is the clear aim of the teacher. Teachers insist on solving language problems before starting the search. The information seeking is usually done with google. Teachers said, "*We focus on google. Google offers many possibilities. To work on the visual language and overcome language problems we search on the image search engine of google. Thus, where the text is not explicit the images talk for themselves. To talk about current news as international conflicts students are asked to search for images and after that, they access to the links to know more about what is happening. Fantastic, google is really fantastic.*"

The Internet and ICT attract students, and they learn in searching for information (most of the times to search for music, singers, on-line games, etc.) and in communicating (chats as messenger, e-mail, etc). For instance, one student searched (while the teacher was talking with others) for Arabic music and downloaded some songs. Edutainment is the most attractive use for students.

There were different levels of autonomy in this course regarding the side problems specified above. Transferability, autonomy, awareness, critical thinking and capability to improve with the experience are the aims of this project, furthermore, of the four years of ICT activities in the curriculum. Anyway, not all the students will cover these critical and cultural levels because of these "side problems" that will affect to the operational learning competencies too. If the operational competencies are not well learnt is difficult to develop the other two levels.

### 3.6. Results: Teachers

Teachers that use ICT in the school have participated in different training courses to update their skills and develop new competencies for teaching. Teachers expressed they concern about digital literacy and its increasing importance. The aim to make literate all students providing them with equal opportunities in the Information Society is the engine to develop materials adapted to the audience. Teachers are completely connected with the neighbourhood and the students. Out of class, there is a public place where students and people in general can access the Internet freely. Teachers are involved too in this project and orient students to take advantage of this service.

A large percentage of teachers use ICT in this school. The general attitude towards ICT in this case is positive. Teachers know the disadvantages of being non-ICT literate and try to work against this type of exclusion. This attitude empowers the every-day work, improving year after year.

In general terms, the attitude of the teachers participating in the experience at IES MIQUEL TARRADELL is completely positive. They are interested in making digitally literate all students and overcoming "side problems". The efforts to create experiences adapted to their context and audience are a good example of teachers' concern. This motivation and enthusiasm of the teachers is what encourages students to work on ICT, not only as a mere subject, but also as part of life as a window for communicating and searching for information.

### 4. The impact on the ICT framework

As the decided framework of I-Curriculum focus operates at three levels of skills (operational, cultural and critical), in Appendix A there is a table with all the competencies students have to have when finishing the ESO. This table takes into account these three levels of skills and provides information about this course (*Mystery of the lost boy*).

The nature of the experience goes further on the operational level skills that are the basis for the curricular competences planned in the Catalan curriculum. Although there are barriers that handicap the learning in the cultural and critical levels, traditional activities support this kind of work.

Problems encountered have been the infrastructure limitations (there are only three lap-tops for all the school) and the "Side problems" of the student population. Regarding "Side problems", two issues arise for I-Curriculum: How to manage with diversity in the classroom; and how to mediate different levels in the same group. These research questions are what I-curriculum has to work on for proposing a valid European Curriculum.

Awareness of the importance to make students literate for the digital age is latent in this case study. This experience is not a compulsory experience for all schools. This means that not all Schools are aware of the importance of ICT literacy. A common European Curriculum has to work on this point. It is important to adapt ICT literacy to the concrete audience for encouraging students to participate and understand the importance of not being excluded from the digital age. Furthermore, the curriculum has to be attractive for teachers in order they will implement it. The main positive conclusions that this project gives to I-Curriculum are:

- Importance of adapting ICT projects to concrete contexts
- Importance of work on "Side problems"
- Importance of mediating the diversity in class to avoid a general rejection
- Importance of solving infrastructure problems
- Importance of ICT literacy for inclusion in the Information Society

**References**

*National curriculum on ICT report –* updated at First Class (internal document)
*Ravalnet network:* http://www.ravalnet.org/iestarradell/tercer/.
*IES Miquel Tarradell  Website:* http://www.xtec.es/ies-miquel-tarradell/
*A proposal for a European I-Curriculum -* DRAFT OCT 2003 - Mary Ulicsak and Martin Owen (internal document)
*Skills need for the digital age –* Lars (internal document)
*E-Citizenship case study -*  (UK) - Mary Ulicsak and Martin Owen

**Appendix A: Application of proposed criteria to *Lost boy mystery* project**

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

**But**, we have to take into account that all these competences listed below are divided to be achieved in 4 courses, so, as the case study is based on students of third grade of ESO, what they have to learn in this stage by curriculum is:

| | |
|---|---|
| **Third course** | - Data base concept. Basic functions.<br>- Selection and use of data.<br>- Structure of the networks.<br>- Impact of ICT in the human context of information. |

These competences are achieved in this stage through the subject technology. In this experience they focus on networks, impact of ICT in the human context of information, e-communication and information seeking using Internet and software.

In the table below are listed all the competences observed in this case in relation with I-curriculum framework:

| | Transformational | Integrating | Operational |
|---|---|---|---|
| **Exchanging and sharing information; Communication and collaboration** | | | |
| 1) Learners should develop the ability: | | | |
| a) to work with others to explore a variety of information sources and ICT tools in a variety of contexts | | • To communicate effectively with others using appropriate terminology and be aware of information available<br><br>- *Use the forums, publications, chats and e-mails to communicate with others and share or obtain information of the mystery.* | • To exchange and find information through a variety of packages<br><br>• To know the terms used within ICT, e.g., operating system, computer hardware<br><br>*- Use the workspace of the school to complete activities, publishing, give opinions…* |
| b) to interpret information and to reorganise and present it in a variety of forms that are fit for purpose and to use a range of ICT tools efficiently to draft, bring together and refine information and create good quality presentations in a form that is sensitive to the needs of particular audiences and suits the information content | | • To recognise and infer information from different formats (science studies, literature reviews etc.)<br><br>• To recognise how information presentation varies according to the audience and medium<br><br>*- Adapt the task depending on the peers and their origin (from other countries) to present them and be understood and rich.* | • To use spreadsheets, word processing tools, databases – add elements, format etc.<br><br>• To understand the basics of computers, processes to turn on and off systems, attach peripherals and the operating system, virus checking etc.<br><br>*- Use text editors and power point to present assignments.* |

| | Transformational | Integrating | Operational |
|---|---|---|---|
| c) to use ICT to share and exchange information | • To act with others in a digital space on a collaborative task<br><br>• To identify appropriate information for the task and the medium which it is most suited to<br><br>*- Answer and ask doubts of others, share information, collaborate all together to solve the enigmas…* | • To know the style for communicating effectively through emails, attachments etc.<br><br>• To understand email etiquette, display restraint in e-group transactions etc.<br><br>• **To be aware of the use of the net-etiquette in all online environments.**<br><br>*- Be proper while using the environment and adapt our language to the receivers taking into account cultural differences, roles, etc.* | • To know how to send, add attachments, how networks work, be aware that no email is secret how to log on etc.<br><br>• To be able to act securely (eg use of passwords)<br><br>• **To know how to save and retrieve information to use and share.**<br><br>*- Be able to send information attached in an e-mail to others (teachers, peers or students from other schools).*<br>*- Be able to save the information in the correct route and retrieve it to go on working.*<br>*-Be able to send information by e-mail to ourselves, save it a CD or disk and retrieve it when necessary.*<br>*- Know how to access to the virtual workspace of the school.* |
| d) to reflect critically on their own and others' uses of ICT to help them develop and improve their ideas and the quality of their work | • To incorporate the feedback into future work<br><br>*- Learn from others' tasks and incorporate strengths to complete further tasks.*<br><br>*- Accept the critics and be able to overcome weaknesses.* | • To be aware of the context and purpose of the information, e.g., reflecting on edutainment software<br><br>• To be aware of what information is normally used in that context and how it is analysed<br><br>• To know what format the information could be presented in<br><br>*- Create rich products that respond to the concrete goals.*<br><br>*- Understand the criteria information could appear and identify the most reliable.* | • To know the usages for packages |
| **e) to integrate values and discuss new ones** | • **To negotiate and/or adapt net-etiquette** | • **To know and understand both the** | |

|  | Transformational | Integrating | Operational |
|---|---|---|---|
| **into ICT-based learning experiences (e-values, emergent-values?)** | **rules that match the context.** <br>• **To value the importance of use of proper language in order to maintain and take advantage of relationships at personal, work or leisure levels.** <br><br>*- Promote values and attitudes in the students as the respect, open attitude, negotiation spirit, collaboration, responsibility, etc.* <br><br>*- Create habits as ask doubts, share sources, collaborate, read comprehensively, etc. that could be promoted effectively within the virtual environment.* | **explicit and implicit rules of a community or network.** <br>• **To be respectful with others' opinions** <br>• **To know the importance of use the net-etiquette** <br>• **To take into account cultural differences and its approaches to communicate and establish relationships** <br><br>**-** *Be proper when participate into communication and exchange processes.* <br>*- Take into account the cultural and personal differences to communicate.* |  |
| **Researching: Finding things out** | | | |
| 2) Learners should develop the ability: | | | |
| a) to be systematic in considering the information they need and to discuss how it will be used <br><br>how to obtain information well matched to purpose by selecting appropriate sources, using and refining search methods and questioning the plausibility and value of the information found | • To develop a research plan to find and share relevant information from a variety of electronic and non-electronic sources <br><br>• To agree an evaluation framework for sifting and sorting for the specific purpose <br><br>• Evaluate the process as well as the information <br><br>• **To be able to use their own criteria for selecting reliable sources of information.** <br><br>*- Negotiate with teachers and peers about the assessment and qualifications.* <br><br>*- Learn from the* | • Understand there is a variety of possible data that gives information on the same area <br><br>• Analyse the research question to identify multiple sources of information <br><br>• To be aware of where information can be found <br><br>• To recognise the need to analyse these data sources, e.g., is it reliable? Requires background knowledge of organisations, people etc. <br><br>• **To understand the importance of validating the information** <br><br>• **To be able to select** | • Need to understand what information is required <br><br>• Need to be able to access the information effectively and efficiently <br><br>• To be able to use help functions and manuals <br><br>• For the Internet, databases, resource CDs be aware of search methods like keywords, Boolean operators, formula within spreadsheets <br><br>• **To know the selection criteria of the search engines when providing with the results.** <br><br>*- Design the task before* |

|  | Transformational | Integrating | Operational |
|---|---|---|---|
|  | *experience and improve during the course to adapt better the searches to the goals.*<br><br>*- Respect the dates to present the tasks and follow the search design agreed before starting.* | **reliable websites**<br><br>*- Be able to decide all together what is the task and ask for clarification if required*<br><br>*- Validate and contrast the information to check its reliability.*<br><br>*- Be aware of that the information is not always right, contrast with peers, teachers and ask for counselling if necessary.* | *to start to agree on the goals of the task.*<br><br>*- Ask to Chomsky (the virtual help) of the experience.*<br><br>*- Use different strategies to search depending on the goal.*<br><br>*- Be able to check different sources depending on the criteria we use.* |
| b) how to collect, enter, analyse and evaluate quantitative and qualitative information, checking its accuracy |  | • To be aware of where information can be found and that it will vary according to medium<br><br>*- Use different sources provided by the course, the Internet or traditional sources (teachers explanations, peers presentations, etc)* | • To use spreadsheets, word processing tools, databases – add elements, format, checking procedures etc.<br><br>*- Create products and hypothesis adapted to the requirements and to the format proposed by the course activities.* |

**Developing ideas and making things happen**

3) Learners should develop the ability:

| | | | |
|---|---|---|---|
| a) to develop and explore information systems, solve problems and derive new information for particular purposes |  | • Be aware of the context of the task and hence what information is appropriate<br><br>• To be able to identify omissions or gratuitous information<br><br>*- Give response to the requirements* | • Be able to access the information<br><br>• Need to understand how to analyse information (e.g. using formulae, checking procedures)<br><br>*- Access to the information in different formats, use links…* |
| b) to use ICT to measure, record, respond to and control events by planning, testing and modifying sequences of instructions<br><br>to use ICT to test predictions and discover patterns and relationships, by exploring, evaluating and developing models and changing their rules and values | • **To be able to transfer strategies to solve new problems and needs**<br><br>*- Be able to use previous knowledge and strategies used to solve the mystery.* | • Be aware of the context of the task and hence what information is appropriate<br><br>• Be able to relate the results to the instructions and outcomes<br><br>• To be able to extrapolate within the environment<br><br>*- Be able to understand the relations among the* | • Be able to enter or edit commands with the correct format for that medium<br><br>• To log information and present it in a variety of methods, e.g., in spreadsheets use graphs, tables, charts<br><br>*- Create a rich product combining information compiled.* |

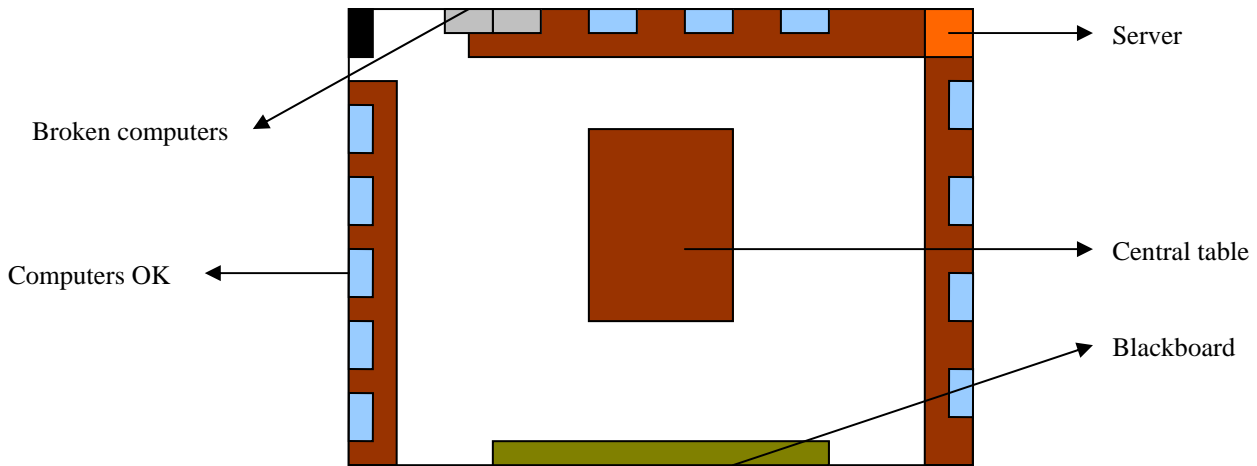| | Transformational | Integrating | Operational |
|---|---|---|---|
| to design information systems and evaluating and suggesting improvements to existing systems | | *clues to solve the mystery.* | |
| **c) Create goal-oriented products** | | • **To take advantage of the different modes to produce richer products (multi-modal products)** <br> • **To know how to use "Cut and Paste" to organize the information before creating a product.** <br><br> **-** *Create a rich product combining information compiled, modes and rejecting redundant and incomplete sources.* | • **To know how to use a variety of programmes adapted to the goals.** <br><br> *- Create a rich product combining information compiled.* |
| **Working practices and attitudes** | | | |
| 4) Learners should develop the ability: <br> a) share their views and experiences of ICT, considering the range of its uses and talking about its significance to individuals, communities and society and also be independent and discriminating when using ICT <br><br> To know how technology may develop and what future uses they may make of technology <br> b) comparing their use of ICT with its use in the wider world <br> **c) Know how to use the ICT tools that match their interests (participate in groups, communities, edutainment, etc.)** | • **To manage the leisure and study time when using ICT** <br><br> **-** *Timing criteria to manage leisure use of ICT and work use.* | • **To learn while playing with ICT** <br><br> *- not applicable* | • **To know how to play and contact with people with the same interests.** <br><br> **-** *Use the internet to find people with same hobbies, interests…* <br><br> **-** *Use computer to play and find leisure and personal interests information.* |

## Appendix B: Mapping of indicators and its relations



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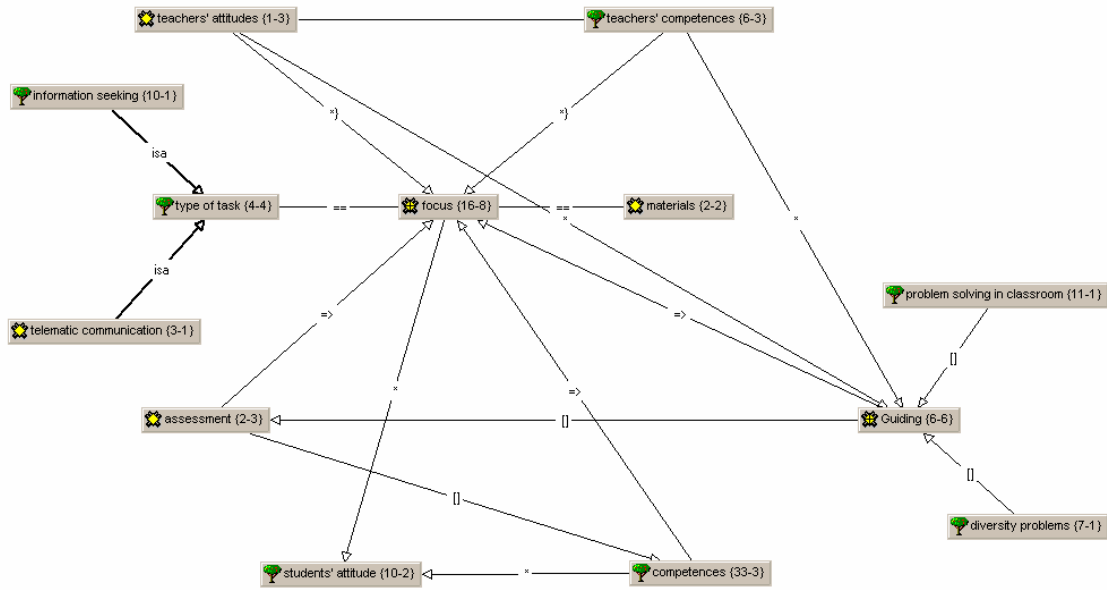
= = - *is associated with* - Relates concepts without subsumption.

[ ] - *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: Classrooms mapping and images
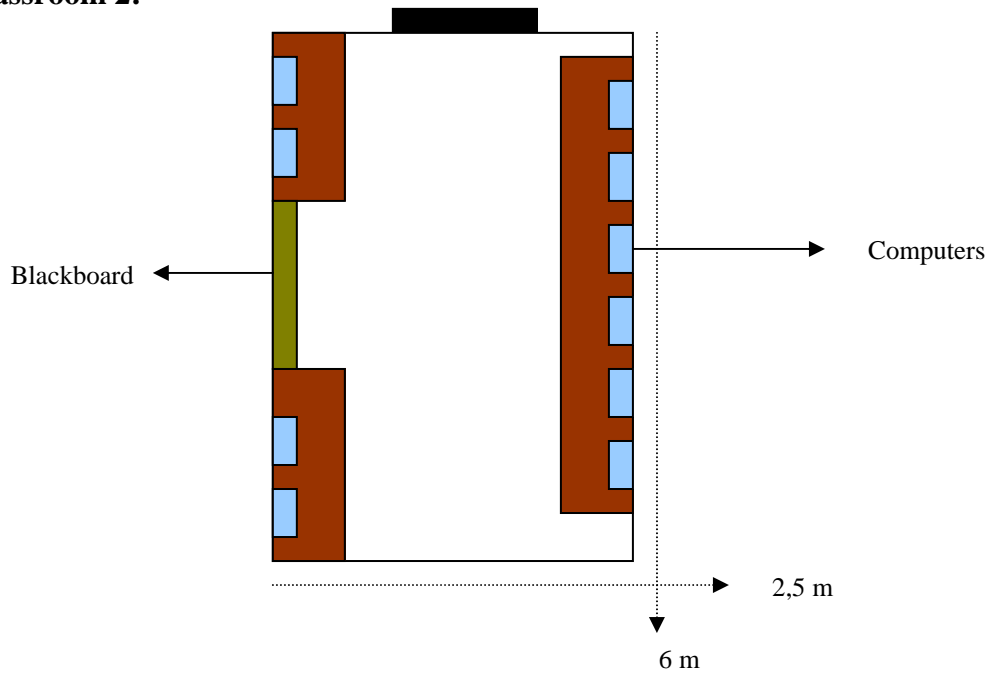
**Classroom 1:**



Server

Broken computers

Central table

Computers OK

Blackboard

**Classroom 2:**



Computers

Blackboard

2,5 m

6 m

**Image of classroom 1:**