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de Educación Secundaria

“ Revisión y evaluación de materiales existentes para
Natural Science / Biology and Geology”

**“ Review and analysis of materials for Natural
Science / Biology and Geology”**

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1. INTRODUCTION.

CLIL is an acronym for Content and Language Integrating Learning. It is an approach to teaching the content of curricular subjects through the medium of a non – native language. In a CLIL course, learners gain knowledge and understanding of the curricular subject while simultaneously learning and using the target language (Bentley, K. 2007).

When planning a CLIL science lesson, it is very important to plan the input: the information that is being presented in the CLIL class. In general, a teacher should follow these steps:

1. Choose the topic, and establish the main subject and language contents related to it.
2. Look for the materials that are going to be used (texts, audio, video...).
3. Organize and adapt these materials.
4. Decide what kind of activities are appropriate.
5. Elaborate the activities.

However, one of the most common concerns of CLIL teachers is that they can't find appropriate materials for their lessons. We are going to focus on this issue in the next section of this work.

2. CLIL MATERIALS.

2.1. General ideas.

There is a dearth of commercially produced CLIL course books and the content knowledge is usually inferior to that of the L1 - Science curriculum. For these reasons, teachers often have to prepare their own materials. In doing so, teachers have a basic choice between three options (Pat Moore and Francisco Lorenzo, 2007: 28).

- a) Produce their own original materials from scratch;
- b) Employ “undiluted” authentic materials.
- c) Adapt authentic materials in line with the teaching goals.

Each of these options offers advantages and disadvantages.

a) Produce their own original materials from scratch.

If teachers produce their own materials, they can be reasonably sure that the focus will be exactly where they want it to be, yet the process can be extremely time-consuming and many teachers simply do not have the time to produce everything themselves (the amount of time dedicated to lesson preparations could be disproportionate).

b) Employ “undiluted” authentic materials.

The term “authentic material” can be used in a variety of meanings (a definition is far from consensual). Here it is used in these two senses:

- *Non – pedagogic materials from the general media.*
- *Specifically didactic content materials produced for native speakers of the target language.*

One important point is that authentic materials provide genuine models of the target language in use. But, taking this into account, why is the use of authentic material so scarce?

- Such material is either too difficult or too easy. When the content of the material is at the right level, the language tends to be at a much too sophisticated level, and vice versa, when the language is at the right level, then the content is too simplified.
- Furthermore, authentic material is not adjusted to Spanish curriculum.

c) Adapt authentic materials in line with the teaching goals.

It is a well established fact that being a CLIL teacher is usually more time consuming than being any other type of teacher, much due to the fact that a great deal of time has to be spent on adjusting and creating appropriate teaching material.

It can be difficult to find authentic materials which do not require some form of treatment prior to use (because of the complexity of language used in the instructions, in texts or in the activities themselves...).

Different attitudes to adaptation are clearly recognizable in teachers (Pat Moore and Francisco Lorenzo, 2007: 32-33):

a) **Simplification.** The simplified texts tend to sacrifice linguistic complexity to factual content. The resulting text is much shorter overall as sentences are much shorter. This can create problems: sometimes there is a lack of coherence, and in some cases supporting evidence has also been removed. As a result, simplified texts appear unnatural, they don't provide a good linguistic example for learners and they do not necessarily guarantee understanding.

b) **Elaboration.** Elaborated texts tend to be redundant (important points are highlighted and often rephrased for emphasis); they are longer than the original and provide rich L2 input. Metaphorically speaking, the reader is taken by the hand and led through the text. However, the fact that elaborated texts are longer, can mean that they pose more difficulties for the reader; elaborated texts rely heavily on paraphrase and synonyms yet lower level learners do not always recognize paraphrase as such and may have problems processing synonyms. The additions may be interpreted as additional information. When this happens the text will become even more cognitively demanding.

c) **Discursification.** It implies adapting the text to the students. What was a scientific text becomes a pedagogic text. The discursified texts tend to be highly reader-friendly, designed both to draw the reader into the text through engagement strategies and to ensure maximum comprehension with the addition of visual and glossaries and the redesigning of the text layout.

It is not argued that any one approach is inherently better than any of the others. Rather, it is likely that what teachers need is a range of techniques. Teachers should be able to carry out the appropriate technique depending on the students second language level, the kind of content, the time available, etc.

2.2. Types of CLIL resources.

Even if teachers are able to develop the different techniques described before, they need, first of all, to have the initial texts, articles, activities...Where can teachers find the authentic materials, materials which could be used as a reference, or materials specially adapted for CLIL lessons? There are different sources of information that CLIL teachers can use.

Initially, we can distinguish between published and online resources.

2.2.1. Published resources.

- “Authentic materials”. Textbooks from the English speaking Educational System, encyclopedias, the Periodic Table...

Textbooks from the English speaking Educational System usually try to develop and apply the investigative and practical skills of the students. They usually focus on environmental issues and real – life contents.

- CLIL textbooks.

They are usually printed by Spanish publishers, and based on the (L1) Official Curriculum; however, sometimes the content is inferior to L1 books. CLIL textbooks usually have a simple structure and a visually attractive design. They usually add also a CD audio to help pronunciation and comprehension and a “Teacher’s Book”, where teachers can find resources necessary to present, extend and consolidate the contents. Sometimes, they include digital resources (with visual examples, videos, activities...).

- Another kind of materials (in L2): films, documentaries, science news, magazines, articles...

2.2.2. Online resources.

We have two options:

- We can use the Internet for obtaining materials and **using them in paper or presentations** (ppt, pps, video...).
- We can **use web materials** (animations, videos, podcasts, Internet pages...) **and do** (or create) **activities on the web** (Virtual Labs*, Webquests*, Quizzes, online exercises...). We can also share information with the students in blogs, forums, by email...

* Virtual Labs: The Virtual Laboratory is an interactive environment for creating and conducting simulated experiments. It simulates the real lab and provides the students with tools, materials and lab sets on computer in order to “perform experiments”.

* Webquests: A WebQuest is an inquiry-oriented lesson format in which most or all the information that learners work with comes from the web. These can be created using various programs, including a simple word processing document that includes links to websites. A WebQuest is distinguished from other Internet-based research by three characteristics. First, it is classroom-based. Second, it emphasizes higher-order thinking (such as analysis, creativity, or criticism) rather than just acquiring information. And third, the teacher preselects the sources, emphasizing information use rather than information gathering.

Regarding these online resources, it is important to master the use of **Internet Searchers** in order to save as much time as possible. Teachers should know the criteria which allow them to make an easier search, like doing an Advanced Search or looking for specific links: from an specific country, related to teaching (.uk , .us, .edu, .org) or in a specific format (. pdf, .doc, .ppt).

If we want to find **video** resources, it is also important to know that we can use Google Videos, Vidipedia, TeacherTube Channel, Ignite Learning Videos, HowStuff Works- Videos; in the same way, for **audio** resources, there are podcast searchers such as Pdzinger.

Another important tool when we are looking for online resources are the “**Educational Portals**”, where teachers can share different materials. Educational Portals are Websites which offer a big amount of services for the members of the educative community (teachers, students, families...), such as: information, tools for searching for data, didactic resources, training courses information, etc.

2.3. Characteristics of CLIL materials.

Once we know the sources of information (textbooks, websites...), and the way in which we can use this information (adapting it in different ways), we have to think about the characteristics of the materials we are going to present in our CLIL lessons.

First of all, it is important to remember the **core principles of CLIL at Compulsory Secondary Education** (Barrio Gómez de Agüero J. et al. 2012: 3).

- The subject comes first.
- Long, dense texts and complex sentence structures should be avoided.
- Presentation of content should be supported by visual aids: photos, flow charts, diagrams, tables, and labeled drawings, for example.
- Learning must be guided and structure.
- Comprehension tasks will be used more frequently than in a native language context to reinforce assimilation and processing of content and provide additional language practice.
- Learning is active whenever possible.
- Greater emphasis is placed on the process of learning.
- The four skills (listening, speaking, reading and writing) are crucial for presenting and learning new information.

Trying to fulfill these principles, there are **different points we have to take into account when designing the materials for our CLIL lesson**:

- **How to approach the contents.**

Whatever topic we were talking about, it is important to link the content of the curriculum to real world problems and to the backgrounds and experiences of the students, in order to increase their motivation. In that way, we can use, for example, real news or parts of films to introduce the topics.

- **Collaboration with the English teacher.**

We have to take into account that in CLIL programs, the subject of English should be closely related to all other subjects taught in English. An exchange of ideas, materials, problems, etc should be constantly taking place back and forth between subjects, teachers and students. In that sense, collaboration with the English teachers in order to adapt and prepare materials is very important.

CLIL also promotes links with other subjects in the curriculum, so teachers should plan to include references to learning similar content in other subjects. In that sense, it is very important the coordination between the different teachers; they can also try to develop cross disciplinary projects which will increase students' motivation.

The content subjects are linguistically supported by the target language class, and the backbone of the teaching of the target language is made up of authentic material used in other subjects. Students are going to learn the content through the second language, and the second language through specific contents. Again, coordination between teachers is very important.

By working in this way, students are challenged and at the same time they get acquainted with real language and acquire technique in how to deal with any difficulties.

- The use of TICs:

Students' motivation is also increased by the use of TIC in the CLIL lessons (videos, animations, podcasts, Internet pages, Virtual Labs, Webquest...).

In these materials, we have also to check that language is comprehensible for learners.

Most of these activities are listening activities, and we have a clear problem: they cannot be simplified (we cannot adapt them), so they have to be appropriate for the students' level.

Anyway, using TICs in the classroom has lots of advantages: increases students' motivation, promotes interaction among students, and develops basic competences (handling new technologies, learning to learn, independent/autonomous learning...).

2.3.1. Characteristic of printed CLIL materials.

In printed materials for a CLIL lesson, we have to try to highlight key content vocabulary and add more pictures and diagrams, given that the quantity and complexity of new science vocabulary can cause problems.

Regarding the printed activities and tasks, they should be different and they have to stimulate output of content and language. Here we have some examples (Bentley, K. 2007).

- Circle, underline or tick the word, sentence or diagram which is true.
- Information transfer from text to graph or table.
- Sequence stages in a scientific process.
- Classify types of materials, plants, etc.
- Domino games. (In each card there are a word and a definition. They have to link each word with the correct definition).
- Word searches and web searches.
- Collect and organize information (from different sources: texts, articles, worksheets, websites...)
- Find the mistake or find the link (e.g. between different organisms).
- Gap – fill. (In sentences or in diagrams).
- Label or match diagrams or images.
- True/False; yes/no e.g. an elimination game.
- Compare and contrast results of experiments.

- Multiple choice /odd one out. They have to choose the word which does not fit with the rest.

3. REVIEW AND ANALYSIS OF MATERIALS.

I have performed the review and analysis of different materials and sources of information which could be used in a CLIL lesson. Even if I have not had the opportunity of using all of them in a real class, I will give my personal opinion about them, taking into account my background knowledge and what I have seen in my training period.

First of all, I have divided these materials between textbooks and online resources.

3.1. Textbooks.

I have chosen books from six different publishers. Some of them are books from the English Educational System; the rest, have been designed specifically for CLIL lessons.

I am going to analyze, in each case, the structure, the way in which the contents are approached, the activities proposed, the methodology used, the way in which language skills are developed, and, finally, I will give my personal opinion.

**English, Nigel 2011 AQA GCSE Biology Student Book (AQA GCSE Science 2011).
London: Longman.**

GCSE: General Certificate of Secondary Education. Academic qualification awarded in a specified subject by students aged 14-16 in secondary education in England, Wales and Northern Ireland.

AQA: Assessment and Qualifications Alliance. It is one of the five Awarding Bodies which are recognized by the regulators of the public exams systems for England, Wales and Northern Ireland. AQA compiles specifications and holds examinations in various subjects at GCSE, AS and A Level and offers vocational qualifications.

- General ideas:

The book follows the AQA 2011 GCSE Biology specification. It tries to give the students the level of knowledge and exam practice they would need to get the highest grade possible in that exam.

- Structure:

It is divided in three units, B1, B2 and B3. Within each unit there are two sections; each section is divided into chapters. These are the units and sections:

B1

How organisms work.
Environment and evolution.

B2

Growing and using our food.
Understanding how organisms function.

B3

Biological systems
Humans and the environment

There are different types of pages in each section:

- Opener page, with learning objectives and a check of prior knowledge.
- “Content” pages.
- “Grade studio” pages, with examiner commentaries to help the students understand how to move up the grade scale to achieve an A.
- “ISA practice” to give the students practice with the types of questions they will be asked in their controlled investigative skills assessment.
- “Assess yourself questions” pages to help you check what you have learnt.
- “Examination style questions” to provide thorough exam preparation.

- Contents:

In general, contents are explained relating them with the students’ daily life, and trying to show them the practical application of those contents. Maybe they are not explained as carefully as in the Spanish books, but they try to show the students the importance and use of this knowledge.

- Activities:

We have different activities and questions along the chapter. The questions are similar to the ones they will be asked in their exams. Some of them try to help them to memorize or review the theoretical concepts, but the majority of them tries to develop the students investigative skills, making the students think and learn by themselves, with questions like:

- *Suggest how you could...*
- *Write a brief plan of how to investigate...*
- *Critically, evaluate...*

- Methodology:

Every chapter includes:

- “Keywords” in bold. They are listed with their meanings in the glossary at the back of the book to help with revision.

- “Science in action” boxes, which highlight new applications of science.
 - “Examiner feedback” boxes, which helps the students to do better the exams (advises).
 - “Science skills” boxes, which include activities which focus on investigative skills.
 - “Taking it further” boxes cover content that extends from GCSE to A level.
 - “Route to A”. These boxes highlight specific content or ways to answer questions that will help the students to get an A grade.
- Developing language skills:

Despite being an English book, it does not include very complicated vocabulary. I think that concepts are explained in a simple way, and could be understood by our students.

It does not include so many group or pair activities (speaking activities) as CLIL books (logically), and there are more written activities, which would be difficult for our students (explain, compare...).

- Personal opinion:

From my point of view, this book is too much oriented to the students’ examination; anyway, I like a lot the way in which some contents are explained, and the kind of activities proposed. I think that we could take some of them as a complement for our CLIL lessons.

Byrne, Kevin and Clive Jones 2009, AQA GCSE Environmental Science Student Book. London: Nelson Thornes.

- General ideas:

This book is also written to help students for the AQA Environmental Science GCSE, helping them to apply their knowledge to new situations when answering exam questions.

- Structure:

It is divided in two parts:

Part A. The contemporary issues.

1. Population and sustainability.
2. Energy resources.
3. Global climate change.

Part B. The environmental management issues.

1. The management of wildlife resources.
2. The management of water resources.

- Contents:

Contents are explained with lots of examples and real data, making students think about some of the big environmental issues that affect our lives today and in the future. This book focuses just on these topics.

The examples are often related to the UK.

In this case, vocabulary is sometimes a little bit complicated for the CLIL students' level (in general).

- Activities:

Activities make students think and develop their investigative skills; sometimes several answers are possible, and there are some group and pair activities to make them argue about the topics. Real data are also included in the activities.

- Methodology:

Along the book, we can find:

- "Learning objectives" at the beginning of each section or topic.
- "Environmental scientists Work" boxes. They explain how environmental scientists apply their knowledge to tackle environmental issues. They show how environmental science impacts on every aspect of everyday lives.
- "How science works" boxes. They encourage students to think like a scientist and develop the skills and knowledge needed to carry out their ISA.
- "Key terms". Specialist terms or really important terms have been identified as key terms. They are highlighted in blue type where they first appear in the text, and an explanation for each term is given in the Key Terms box as well as in the Glossary at the end of the book.
- "Examiner's Tips". They help the students with their study and to prepare the exam.
- "Examination – style Questions". They are questions in the style that they can expect in their exam.

- Developing language skills.

There are some group and pair activities which could be used in our CLIL lessons, to make them speak in the second language.

- Personal opinion.

We could use these books as a complement in our CLIL lessons. Real examples and group activities could be useful when studying these topics.

Kelly, K. 2008: Vocabulary Practice Series Science. Student's Book with Key. Oxford: Macmillan Education.

- General ideas.

This book is designed for students who are taught science in English. It could be used as a reference tool for them.

- Structure.

It includes glossaries divided in topics and activities that practice the vocabulary in context. There are not explanations, just definitions and activities.

- Contents.

This book provides a range of 28 key science topics. Concepts are defined in a clear simple way.

- Activities.

There are different types of activities. Most of them could be used in our CLIL lessons (match words with definitions, label diagrams, complete sentences...).

- “Working with words” activities.
- “Working with sentences” activities, which help the students use the words in the correct context.
- “Working with texts” activities. They allow you to practice your knowledge of the words in larger contexts.

- Methodology.

Each word has a definition in English, but there is also space for students to write down a translation in their language. There are also phonetic transcriptions. Some words also have an example sentence to make their meaning even clearer. Furthermore, there are clear diagrams to visually represent scientific concepts.

- Developing language skills.

Most of the activities could be used in our CLIL lessons: match concepts with definitions, label diagrams, complete sentences, extract information from a text...

- Personal opinion.

This book could be used as a useful tool to complete the information given with each topic of the course.

Echeverría, C et al. 2010. Natural Science. Secondary Education (1º). Anaya English.
Benito, M.J. et al. 2012. Natural Science. Secondary Education (2º). Anaya English.
Dehesa, E. et al. 2011. Biology and Geology. Secondary Education (3º). Anaya English.

I am going to analyze the books from the first to the fourth year of Compulsory Secondary Education (ESO) in a general way, given that they are structured and organized similarly.

- General ideas:

These books are based on the Official Curriculum, but content is inferior to that of the Spanish books.

- Structure:

The contents are divided in Learning Units (9 or 12).

In every unit, we can find:

- Unit Objectives.
- “Stop and think”. Series of questions designed to make the students think about some of the topics they will cover in the unit.

From this point, every two pages we have:

- “Pre-reading activity” (as an introduction).
- “Read and learn” section.
- “Science Project” section. Practical activities of different types are proposed.
- “Organize what you know” section. This section helps the students organize their ideas and summarize the contents of the unit. It also offers them the opportunity to put into practice concepts and skills that they have learnt throughout the unit.
- “Let’s revise” section, dedicated to consolidating the students written and oral expression and the use of scientific vocabulary, and encouraging reasoning, the interpretation of graphs and the comprehension of texts.

- Contents:

Concepts are explained in a very simple way. The book does not deal with the concepts in depth. From my point of view, the information in the book is not enough for the students. (Specially in the 3rd and 4th years).

- Activities:

They are also very simple. We have different types of them:

- “Pre – reading activities” (as an introduction).
- “Pair work activities” (make a list and compare with your partner, discuss with your partner...).
- “Consolidate vocabulary activities” (define, complete the definition...).
- “Express what you know”. (Explain..., Why...?).
- “Work with images”.
- “Organize information” (summarize, write the differences...).
- “Take the initiative” (write a report about these discoveries...).
- “Summarise with a drawing”.

We have also interactive activities “on the net” (www.anayadigital.com), which are also very simple.

- Methodology.

These books are based on the Official Curriculum. They have a simple structure and a visual design.

- Important concepts have been highlighted in yellow boxes or marked in bold.
- There are “key vocabulary” boxes, but without the translation (we have just the type of word it is: n., adj.,...).
- Photographs, illustrations and revision diagrams help to motivating the students and consolidate the topics presented.

There is also a CD to help pronunciation and comprehension (but it is just a reading of the text).

We can also use the resources on the website www.anayadigital.com., where we can find more visual examples, videos, presentations...

- Developing language skills.

There are some pair activities to make the students speak in the second language.

We can develop our students listening skills with the animations and videos on the website, and listening to the CD.

Reading and writing skills are developed by reading the contexts and doing the activities.

- Personal opinion.

In my opinion, content is far inferior to that of the Spanish textbooks. There is not enough information, and activities are scarce and easier than they should be.

Diagrams and pictures are ok, but, from my point of view, if we chose this book, we would need additional materials (our own notes, worksheets taken from the Internet, activities...).

Regarding the online resources, PowerPoint presentations are too simple (pictures are ok, but there is not enough information, just the main points are written), and the activities are too easy again (the majority is multiple choice, but very simple). However, some of the videos are great (adapted to the students English level, and explained in a good way).

Barrio Gómez de Agüero, J. et al. 2011: Natural Sciences (1º). Oxford: Oxford University Press.

Faure López, A. et al. 2012: Natural Sciences. (2º). Oxford: Oxford University Press.

Cabrera Calero A.M., et al. 2011: Natural Sciences. (3º). Oxford: Oxford University Press.

I am going to analyze the books of the different years (from the first to the fourth year of Compulsory Secondary Education) in a general way, given that they are structured and organized similarly.

- General ideas:

The book is based on the Official Curriculum, but content is inferior to that of the Spanish books.

- Structure:

Contents are divided into 4 sections. Within each section we have several Learning Units.

Every Learning Unit contains:

- An opening page which introduces the topic covered.
- Explanatory pages and activity pages.
- Revision activities.
- Unit summary (summary diagram).
- Appendices (Natural Science in Practice).

- Contents:

The unit topics are presented in numbered sections. In general, contents are explained in a simple way. Sometimes, the book does not deal with the concepts in depth. From my point of view, the information in the book is not enough for the students. (Especially in the 3rd and 4th year).

- Activities:

Even though they are, in general, more difficult than the ones in Anaya textbooks, they are also easier than they should be (from my point of view).

There are different types:

- *Listening and answer the questions.*
- *True/False.*
- *Put the words in order.*
- *Match the words in each column.*

Some of the activities (Talking points sections) allow the students to take part in guided discussions, making them speak in L2.

The activity pages present a series of exercises designed to check your knowledge and help you to develop your speaking, listening and reading skills.

- Methodology.

Contents are presented through concise, straightforward language with plenty of visual support.

There are “Key words” boxes, where we can find the most important words with their definitions. In the CD, these words are read, and we have some additional activities.

- Developing language skills.

There are specific activities involving reading and listening comprehension and oral (work in pairs and groups) and written expression.

- Personal opinion.

From my point of view, it is better than the previous one, but, again, the information contained in the book is too scarce for our students (especially in the 3rd and 4th years).

Bruse, D. et al. 2003. Science. Biology and Geology. Santillana. (4º). Richmond Publishing.

In this case, I have just been able to examine the fourth course book, edited in 2003.

- General ideas:

It follows the Official Curriculum. In fact, it seems to be a translation from the Spanish book.

- Structure:

Fourth year book is divided in 9 Learning Units.

In each unit, we have:

- The first page (introduction, detecting prior knowledge).
- The tasks (explanation of the different contents). A specific task is developed in each double page. After the last task, a summary and a Unit Map bring together all the relevant information that has been studied in the unit.
- Activity pages.
- The pages on cross curricular themes (Nature, Health, Science, Technology and Society...). All these pages suggest debates and free and active research projects to allow the students to develop strategies for finding out information and for communication.

- Contents:

They are explained at the same level as the ones in the Spanish book, because it seems to be a direct translation. Some sentences are too long, and sometimes the information is not transmitted in a clear way.

Contents are not presented through concise, straightforward language. There are pictures and diagrams, but maybe the visual support is not enough.

- Activities:

In the Activity pages we have different sections.

- Test of knowledge. Activities related to the comprehension of concepts studied in the unit.
- Test of skills, which concentrate on procedural activities.
- Test of maturity, which gives students the opportunity to present their own ideas and attitudes.
- Discover section. This section gives some basic guidelines for one or more laboratory experiments.

They are not “CLIL activities” (such as the ones explained in 2.3.1. Characteristics of printed CLIL materials); in most of them students have to explain concepts and give long answers, which could be difficult for them (in the second language). There are not listening activities or pair / group activities in which they could develop listening and speaking skills.

- Methodology.

Language skills are not developed in a particular way (there are not key words, or particular “language develop” sections...). The book is a direct translation of the Spanish one.

- Personal opinion.

I don't like the way in which the contents are explained; sentences are too long, and they are not presented through concise, straightforward language. There are pictures and diagrams, but maybe the visual support is not enough. There are not key words or specific section related to language skills develop.

Activities are also translated from the Spanish book, so they are not “CLIL activities” (true / false, sequence stages in a process, collect and organize information, label or match diagrams or images, classify things or living beings...). As I have said before, in most of these activities students have to explain concepts and give long answers, which could be difficult for them (in the second language). There are not listening activities or pair / group activities in which they could develop listening and speaking skills.

In my opinion, the Spanish book is ok, but, as I have explained, this one is just a translation of the Spanish book. I would not use this book in my CLIL lesson, neither as a complement.

3.2. Online resources:

I am going to analyze briefly the content of different websites, which I have found most interesting in the search for CLIL resources.

First of all, I would like to point out the fact that there are lots of websites where we can find information about bilingual education and CLIL methodology, but I am going to focus on the ones which have information about resources and materials.

Some of them have information about several subjects; others are specific sites for science topics. Some of them help us to know new interesting links. Some of them contain specific resources for Secondary Education, while others have general information for everyone. But, from all of them we could obtain useful resources for our CLIL Science lessons.

It is not easy to choose the criteria to classify all these websites. First of all, I have selected the ones in which we can find other useful links. Then, I have divided them taking into account the frequency which I would use them.

3.2.1. Websites with useful links:

<http://inglesamigo.blogspot.com.es/2012/01/clil-useful-websites-for-secondary.html>

Here we can find useful websites for Compulsory Secondary Education teaching. Some of the sites are designed with the CLIL teacher in mind, others have material that has been designed by and for British and American teachers. Some of them are general, with information of many subjects, and others are specific of one of them. There are a lot of useful websites, but there is not information about them (even if they are divided into topics), so you should try one by one to find what you want. Some of them are going to be explained later.

One of the links included here is this: <http://www.isabelperez.com>

In this website, we can find information about “What is CLIL”, “CLIL Methodology”, “Creating CLIL Activities”, “Search of resources”, and lots of useful online resources: educational portals, blogs, projects... It is an excellent portal with a lot of resources for bilingual schools in English, French and German. It is maybe the one which includes more information, and it is organized in a clear way.

<http://blog.educastur.es/primaria/files/2010/02/webs-con-recursos-para-trabajar-clil.pdf>

In this link, we can find different websites which could be used in CLIL lessons in Primary and Secondary Education.

<http://naturalsciences.sdsu.edu/links.html>

This is a very good source of resources. In “Biology Education Resources” we find different links which could be very useful for us.

Besides the “Biology Education Resources” section, we have also useful information in the next points:

- “Biology and other Science lesson plans”.
- “Miscellaneous Sites Devoted to Biology and Science Education.”

3.2.2. My proposal.

From these websites (and others) we have access to lots of educational portals, science websites, blogs about CLIL... There is a lot of information. But, from my point of view, we have to choose some of them as usual tools for preparing our lessons. These would be the ones in which information is organized in a clearer way, so we would not need too much time to find the resources we are interested in.

The rest of websites could be very useful for developing specific topics, or just for taking some games, animations, activities... In this case, it will be more difficult for us to find what we want, but there are great materials as well.

I have established three categories, taking into account the frequency with I would use them.

3.2.2.1. My usual tools.

The websites I have chosen as usual tools in my lessons, are these:

www.sciencehelpdesk.com

Science Helpdesk is a website meant to help develop the scientific contents of the Bilingual Project Integrated Curriculum designed by the Spanish “Ministerio de Educación y Ciencia” and the British Council. It is designed, developed and published by Arturo J. Murias, a Science teacher in Secondary Education.

The contents are divided by years (from the first to the fourth year of Compulsory Secondary Education). For each year, we can find different topics, all of them related to the Official Spanish Curriculum. For each topic, we have:

- “What to learn”.
- “Basic Information”.
- “External links”.
- “Movies, Animations and Audios”.
- “Images”.
- “Activities”.
- “Now in the news”.

In my opinion, it is a very useful website, where the information is very clearly organized.

<http://www.skool.co.uk/>

This is an excellent educational portal which develops contents of the different levels of Secondary Education in Mathematics, Physics, Chemistry and Biology. The information is organized by key stages. Explanations are very clear, and they are supported by images, animations and subtitles (in English). There are interactive activities as well.

I would use these explanations for reviewing concepts at the end of the lesson. They are very clear and well explained.

www.biologycorner.com

This is also a very useful website, with very good materials. Contents are organized by topics. We can find lesson plannings, quizzes, practical sessions in the lab, power point presentations, webquests, information about the different science topics...

From my point of view, there are very good resources in this website.

www.bbc.co.uk/schools (<http://www.bbc.co.uk/schools/gcsebitesize/science/>)

The information is organized in levels and subjects (of the English Curriculum). You can find explanations, tests, activities, interactive games, videos...

In my opinion, the information here is not organized as clearly as in the previous websites. However, the explanations are great as well.

www.enchantedlearning.com

Here we can find cross-curricular resources to download. There are useful drawings, schemes, definitions... The information is organized by topics.

I think that drawings and diagrams are very good in this website.

www.pppst.com

In this website we can find Power Point presentations of different topics, which could be used in our CLIL lessons. They are divided in topics. We can also find games and activities for kids.

Presentations are great, but they are divided by topics, not by levels. (We would need time to select or adapt them for our students).

<http://www.sheppardsoftware.com/>

Web with excellent interactive material for different subjects. It includes games, activities, and information with good pictures and clear explanations.

Here we have an example:

http://www.sheppardsoftware.com/health/anatomy/cell/cell_tutorial.htm

3.2.2.2. Useful websites for specific science topics.

As I said before, there are lots of websites which could be very useful for developing specific topics, or just for selecting some ideas, worksheets, projects, games, animations, interactive activities... In this case, it will be more difficult for us to find what we want, but there are great materials as well. These are some examples:

www.schoolscience.co.uk

Here we can find the resources organized by ages. For each group of ages (11-14, 14-16, 16-19), there are explanations, activities, quizzes... about specific topics (but there are not resources for all the topics in the Curriculum).

<http://www.biologyinmotion.com>

In this website we can find very good animations, games and interactive activities about specific science topics.

They are very good resources, but just some topics are approached.

<http://www.learningscience.org/>

In this website we can find explanations, quizzes, activities... From my point of view, the information is not organized in a clear way. However, there are good materials in this site.

<http://www.nobelprize.org/educational/>

Here there are interactive games, videos... They are not organized by levels, but some of them are great.

Here we have an example:

<http://www.nobelprize.org/educational/medicine/bloodtypinggame/> (The Blood Typing Game).

<http://www.nationalgeographic.com/>

Web with excellent videos about different topics, pictures and interactive games.

Finally, I have found these two websites which are very useful to study the human anatomy:

<http://www.innerbody.com/htm/body.html>

<http://www.healthline.com/human-body-maps#1/1>

This is an interactive tool to explore the human body in 3 D.

3.2.2.3. Additional resources.

From my point of view, just a few things of these websites would be useful for us, so it would take us too much time to look for the worksheets, projects or activities that are appropriate for our students level (of content and language). However, if we have enough time, we can find here very useful resources as well.

<http://www.nasa.gov/audience/forkids/home/index.html>

<http://www.ars.usda.gov/is/kids/>

<http://kids.earth.nasa.gov/>

<http://www.hhmi.org/coolscience/>

<http://www.sciencemadesimple.com/>

http://www.atozteacherstuff.com/Themes/Science_Themes/index.shtml

<http://www.teach-nology.com/themes/science/>

www.planet-science.com

<http://whyfiles.org>

<http://www.accessexcellence.org/>

<http://www.biochemlinks.com/>

<http://www.fi.edu/tfi/units/life/>

<http://www.educationworld.com/>

<http://www.nybta.org/web.htm>

3.2.3. My personal view.

As I have said before, I would use the websites quoted in section 3.2.2.1. (My usual tools) in my daily lessons. First of all, I would look for a good presentation and / or explanation of the contents. Then, I would try to find an animation or a video related to it (starting from these websites but using also the ones include in sections 3.2.2.2. (Useful websites for specific science topics) and 3.2.2.3. (Additional resources).

Finally, I would look for worksheets and suitable activities or practical lessons. Of course, all these materials can be completed with the textbook resources.

Some of the resources found in these websites would be very useful for working in the Computer's Room. Students could get information from them in order to answer some questions or doing interactive activities or games.

Finally, I would like to say that there are many more Internet sites where we can find useful resources for our lessons. Internet allows people to share every kind of information from everywhere in the world, but it is not easy to find exactly what we want. Even if these websites can help us to select and organize this information, it is very hard to find the suitable materials for each lesson. In my opinion, this is one of the most difficult challenges of CLIL teachers.

4. CONCLUSION.

One of the most common concerns of CLIL teachers is that they can't find appropriate materials for their lessons.

There is a dearth of commercially produced CLIL course books and the content level and depth is usually inferior to that of the L1 - Science textbooks. For these reasons, teachers often have to prepare their own materials. In doing so, they have a basic choice between three

options: create their own materials, employ authentic materials, or adapt these in line with the teaching goals.

Each of these options offers advantages and disadvantages, but what teachers need is a range of techniques. However, even if teachers are able to develop the correct technique in each moment, they need, first of all, to have the authentic materials, materials which could be used as a reference, or materials specially adapted for CLIL lessons. There are different sources of information that CLIL teachers can use. First of all, we can distinguish between published (textbooks from English speaking Educational System, encyclopedias, CLIL textbooks, films, documentaries, articles...) and online resources (educational portals, blogs, Science Websites...).

In any case, we have to take into account that it does not exist a perfect source of resources where we can find the suitable materials for each lesson. Finding appropriate materials for our students content and language level is not easy at all; in fact, it is a hard task which could take us a lot of time. However, in my opinion, if we are able to find or create good materials, we are going to improve considerably the students' output.

I think that the most important difficulty for CLIL teachers is not the use of a second language, but the way in which the contents are presented. We have to try to transmit the information in the clearer possible way, and, in that sense, materials used play a very important role. Besides increasing students motivations, using attractive materials help them to understand the concepts in a better way.

Another important point is the fact that, even if we have good materials, we have to use them in the suitable moment, and adapt them depending on the characteristics of our students. A very good material could be a useful tool, but we have to know when and how to use it. If not, we could not obtain the expected results. In that sense, I think that there are different ways to achieve the best results: going to teacher training courses if possible, try to learn from other teachers, evaluate the materials we use...

As a conclusion, I can say that even if obtaining good materials for our CLIL lessons is a hard task, it is clearly worth it.

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