Thinking skills for CLIL

By Jean Brewster

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Thinking skills for CLIL

In the first of a new series of study skills for CLIL, Jean Brewster takes the very topical subject of thinking skills and looks at how CLIL teaching embraces many of the thinking skills principles and how this benefits the learner.

Introduction

In CLIL lessons the cognitive challenges of language learning are great; much of the content lies outside children's direct experience and is often more abstract. For example, in science lessons learners may struggle to describe and compare the properties of materials, may find it impossible to hypothesize about why particular materials are used for particular purposes. They may be able to write up the procedural part of a report after testing materials but not how to write conclusions. By being taught specific thinking skills and the associated language, learners are better equipped to deal with the complex academic and cognitive demands of learning school subjects in a foreign language.

Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP)

In 1979 the Canadian educator, Jim Cummins, made a useful distinction between BICS, the skills of listening, speaking, reading and writing for so-called social or conversational purposes and CALP, linked to more academic, cognitively challenging tasks in subject lessons. The work of Biber (1986) and Corson (1995) provided evidence of the linguistic reality in the distinction between BICS and CALP. This original distinction, refined over time in response to some criticisms, has continued to provide useful insights for many CLIL teachers.

Typical language and thinking in tasks

If learners are experimenting with different colour combinations in an art class, trying out magnets in the science class or investigating the lines of symmetry of 2D shapes in maths lessons, what kinds of skill, aside from basic language skills, will they need to draw on or develop? Learners may be encouraged

- to predict what will happen,
- to carry out simple investigations or experiments,
- to describe and record what they observe,
- to find patterns, notice similarities and differences,
- to compare results, to draw conclusions and so on.

If we take the example of predicting, learners may know the use of will/ going to for an easy, everyday situation. However, with little knowledge of the concept of magnetism, for example, learners may not be able to think very clearly about their intended meaning and may not know the subject-specific words of attract or repel. Some children find it difficult enough to draw on these more academic kinds of interaction in their first language, never mind a foreign language. As John Clegg wrote in an earlier article: The truth is that schools don't often teach these skills explicitly. Instead, teachers hope that their learners will pick them up.
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The first section of this article will refer briefly to the renewed interest in teaching thinking skills, often based on modern re-conceptions of the traditional taxonomy of thinking skills published by Benjamin Bloom in 1956. This categorization and ordering of thinking skills involves a discussion of how the so-called lower-order thinking skills should ideally lead onto the teaching of higher order thinking skills. The next section on process skills outlines those skills typically required in different stages of concept development in subject lessons. Finally, there will be a brief example of how the use of graphic organizers to record and interpret information links thinking skills to process skills and language skills.

Teaching thinking skills

Today there is international recognition that education is more than just learning knowledge and thinking, it also involves learners' feelings, beliefs and the cultural environment of the classroom. Nevertheless, the importance of teaching thinking and creativity is an important element in modern education. Benjamin Bloom was the first to develop a highly popularized hierarchy of six thinking skills placed on a continuum from lower to higher order skills: knowledge, comprehension, application, analysis, synthesis and evaluation. According to this system, lower order skills included recalling knowledge to identify, label, name or describe things. Higher order skills called on the application, analysis or synthesis of knowledge, needed when learners use new information or a concept in a new situation, break information or concepts into parts to understand it more fully, or put ideas together to form something new. Bloom's structure was a useful starting point and triggered many applications to school activities and curricula.

Bloom's revised taxonomy of thinking skills

In 2001 a former student of Bloom, Lorin Anderson, published a revised classification of thinking skills which is actually rather similar to the original but focuses more on verbs than nouns and renames some of the levels.

Fig. 1 Bloom's Revised Taxonomy

<table>
<thead>
<tr>
<th>Higher order thinking skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating</td>
</tr>
<tr>
<td>Evaluating</td>
</tr>
<tr>
<td>Analyzing</td>
</tr>
<tr>
<td>Applying</td>
</tr>
<tr>
<td>Understanding</td>
</tr>
<tr>
<td>Remembering</td>
</tr>
<tr>
<td>Lower order thinking skills</td>
</tr>
</tbody>
</table>

We can see that these levels have an intuitive appeal to many teachers; however it can also be difficult to implement some of these ideas. For example, comparing falls both under analyzing and understanding, which is confusing. Here analyzing the level of comparison depends on context, for example: how complex is the concept or knowledge being compared?

Linking thinking and language

The figure below is an example of how publications on thinking skills began to start linking some common thinking and process skills with the typical language required. For reasons of space, only three levels are exemplified.

Fig. 3 Typical thinking and language skills

<table>
<thead>
<tr>
<th>Thinking skill</th>
<th>Possible language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remembering/ Recall</td>
<td>Questions using who, what, where, when, which how, how much?</td>
</tr>
<tr>
<td></td>
<td>Tasks using describe, choose, define, find, label, colour, match, underline key vocabulary in different colours (e.g. parts of a system and functions)</td>
</tr>
<tr>
<td></td>
<td>Language:</td>
</tr>
</tbody>
</table>

www.onestopenglish.com/clil/methodology/study-skills-for-clil/thinking-skills-for-clil/501197.article
That’s a ...(because it has ...and ...)  
This is a ... and this is what it does.  
This has...  
This is a kind of .... which/that ...  
A ... is a kind of... which/that ...  
This goes with this.

### Understanding/Interpreting
Comparing, explaining, exemplifying, classifying, understanding cause and effect, generalizing, summarizing,

#### Questions
- using *is this the same as...? What’s the difference between...? Which part doesn’t fit or match the others? Why?*

#### Tasks
- using *classify, explain, show what would happen if ... give an example, show in a graph or table, use a Venn diagram or chart to show...*

#### Language:
- *This is ..( a kind of...) but that one isn't (because...)*
- *This has ( a type of...)but that one doesn't/hasn't (because...).*
- *These are all types of ...because*
- *This belongs/ goes here because...*
- *If we do this then...*
- *This leads to...*
- *This causes ...*

### Applying to new situations
Planning, implementing, carrying out, drawing conclusions, reporting back

#### Questions
- using *what would happen if..? What would result in ...? How much change is there if you ...?*

#### Tasks
- using *Explain what would happen if..., Show the results of..., Using investigations and experimental inquiry e.g. surveys, web quests etc. choosing how to record and represent information*

#### Language:
- A variety of language functions for planning, hypothesizing, asking questions, reporting, drawing conclusions e.g.
  - *What shall we try/ do first?*
  - *if we try this then ...that could be...*
  - *First we thought about... then we...This must be .. because...*
  - *It can't be ...because...*

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**Marzano's taxonomy of skills in education**

In 2000 Marzano published a different way of looking at skills. His classification is based on the *Knowledge Domain* and three systems - the *Cognitive, the Self* and the *Metacognitive*. The self system involves a learner's attitudes, beliefs and feelings that determine his/her motivation. The metacognitive system relates to *learning to learn*: it helps the learner to set goals, make decisions about and monitor which information is necessary and which cognitive processes are the best fit for the task in hand.

*Fig. 2 Marzano’s New Educational Taxonomy*

<table>
<thead>
<tr>
<th>KNOWLEDGE DOMAIN</th>
<th>Information</th>
<th>Mental procedures</th>
<th>Physical procedures</th>
</tr>
</thead>
</table>

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COGNITIVE SYSTEM

<table>
<thead>
<tr>
<th>Knowledge retrieval</th>
<th>Comprehension</th>
<th>Analysis</th>
<th>Knowledge use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall: Recalling information, facts, sequences and processes.</td>
<td>Synthesis: identifying what is important to remember.</td>
<td>Matching, classifying, error analysis, generalizing and specifying: by engaging in these cognitive processes learners use what they learn to create insights and invent ways of using learned information in new situations.</td>
<td>Decision-making, problem-solving, experimental inquiry, investigations. These are also especially useful in project-type work.</td>
</tr>
</tbody>
</table>

The knowledge domain, consists of three categories of knowledge: information, mental procedures and physical procedures. A child at primary level may learn about quadrilaterals and the key vocabulary and characteristics to describe them. This is the what of knowledge. She will also learn how to draw different kinds of quadrilateral (physical procedures) and how to compare or classify them (mental procedures).

The cognitive system is made up of four components:

- knowledge retrieval,
- comprehension,
- analysis, and
- knowledge use.

Marzano’s cognitive system is similar to the six levels of Bloom and Anderson. In knowledge retrieval (cf. Remembering and Understanding) the child needs to be able to identify and put a name to new information; for example, the topic might be mammals and the names of different types of big cat, such as tiger, lion, cheetah and so on. Facts about mammals will involve statements and generalizations using the simple present tense, such as:

- mammals have a covering of fur, hair, or skin,
- mammals give birth to live young,
- mammals are warm-blooded,
- mammals feed their young with milk from the mother,
- tigers have stripes but cheetahs and leopards have spots, etc.
- tigers can swim

These language functions can be linked to all four basic language skills using activities based on oracy (speaking and listening) and literacy tasks (reading and writing). For example, learners can listen to descriptions of animals and choose the correct picture, use a tick chart to listen to comparisons of big cats and then use this as a speaking frame to produce simple sentences. Learners might read simple descriptions of big cats and transfer key information onto a chart, then use this chart to write simple sentences. This basic knowledge can be extended to compare and classify types of big cat in different ways according to features such as habitat, characteristics, appearance etc.

Under comprehension the learners sort out which information is important or relevant for a task and ignore other information. Graphic organizers such as charts, grids, Venn diagrams and flow charts are especially important here for learners as they organize information in a way that reduces the language load. Thus they help the learner to focus on the key language and thinking required.

In analysis the learners need to draw on more complex thinking processes - matching, classifying, generalizing and specifying - in order to create and invent new insights or new ways of using learned information. These skills are likely to be highlighted when carrying out investigations. Knowledge use is the highest form of thinking process under Marzano’s system and is used particularly in the creation of investigations, projects and web quests, where application and the creation of new ideas are particularly useful.
Conclusion

These attempts to analyze and classify thinking processes move from a foundation of simpler, lower order skills to more complex higher order skills. However, there is still no consensus about the exact number of skills or levels, the interaction between them nor is it easy to analyse the level of difficulty of a particular task or the precise thinking skills required. All we can do for now is draw on insights that have been made and see which ones seem to fit in with our views. The next article focuses on process skills and data-handling, referring particularly to the use of graphic organizers to record and interpret data. The importance and benefits of graphic organizers for both learners and teachers will be described and how teachers can plan for them. Different types of organizer will be outlined and one type called glyphs will be illustrated in some detail.

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References


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