Making connections between dimensions

Paula Christophersen
ICT Curriculum Manager, Victorian Curriculum and Assessment Authority

This article explores the relationships between the three dimensions in the Information and Communications Technology (ICT) learning domain within the Victorian Essential Learning Standards. The article demonstrates how students can develop their understandings of a concept in Humanities–Economics by using electronic sources of information and visualising thinking tools to help structure their reporting on the concept.

Go to ComNET <www.vcta.asn.au> and download a memory meaning nodes template and a concept frame template from 'ICT approaches' in the *Compak* section.

In the February 2006 issue of *Compak* I wrote an article ('ICT and learning', pages 7–12) on how ICT can stimulate and transform a student's learning; in particular, focusing on how the knowledge, skills and behaviour identified in the Information and Communications Technology (ICT) domain of the Victorian Essential Learning Standards (VELS) supports this. The following article explores the relationships between each of the three dimensions in this domain, namely 'ICT for visualising thinking', 'ICT for creating' and 'ICT for communicating'. As with all domains, the standards are organised into dimensions—this assists in identifying key perspectives or aspects of a domain and helps in the construction of learning programs and units of work.

For most domains there is a strong dependency between each dimension. For example, in Humanities–Economics students apply economic reasoning/thinking as articulated in the dimension 'Economic reasoning and interpretation' to develop an understanding of the key economic concepts, principles, methods and models identified in the 'Economic knowledge and understanding' dimension. These dimensions work hand-in-hand—*what* should a student know and *how* should they make sense of those concepts, principles, methods and models.

Connecting the ICT dimensions

To illustrate the interrelationship between the ICT dimensions and Humanities–Economics I am going to focus on the concept of 'globalisation' and how it impacts on Australia's standard of living (Level 6), with the key question being: 'Does globalisation make the rich get richer?'. Students are expected to substantiate their answer to this question in an oral presentation, accompanied by a presentation file such as a PowerPoint slide show.

ICT for communicating

This dimension focuses on students being able to express themselves in contemporary ways and being able to collaborate with known and unknown people to share ideas and solve problems.

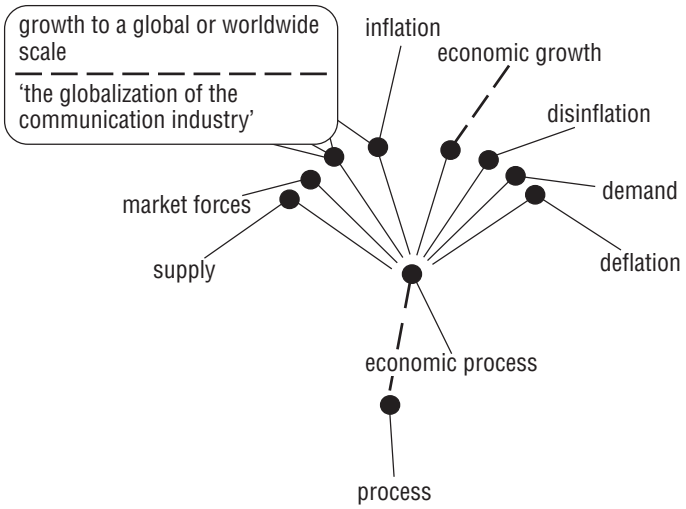
For those of us who Marc Prensky (author of *Digital Game-based Learning* and *Don't Bother Me Mom—I'm Learning!*) calls 'digital immigrants'—those people who speak with a 'digital accent' because they have consciously had to learn ICT—the Internet and other devices are viewed as sources of information. Our students, who Prensky calls 'digital natives' because they have grown up with ICT and their approach is intuitive, expect this technology to help them become creators, providers and collaborators, not just recipients of information.

When exploring this topic, students should not only access information from websites using precise searching techniques, but also interact with people through online forums, SMS messaging and emails, and interact with websites such as Wiki <http://wiki.org> (server software that allows users to freely create and edit Web page content using any Web browser). A very useful software tool for generating definitions and keywords to help searches is the Visual Thesaurus, available for purchase (or a 30-day free trial) from <www.visualthesaurus.com>. See Figure 1 for the first attempt at searching for 'globalization' (note American spelling). Each of the words listed can be activated to expand the options, and can be presented as adverbs and adjectives.

Armed with a plethora of information acquired from a variety of sources and processes, students need to develop a deeper understanding of the content. This involves having the skills and knowledge to identify what information should be discarded, and then determining how to organise their ideas and relevant information to foster effective thinking.

It is critical that students 'value add'—that they don't just repeat other people's opinions. Value adding fosters deeper understanding and strengthens thinking and learning abilities. Making thinking visible is a powerful framework for learning content and nurturing intellectual development.

FIGURE 1: VISUAL THESAURUS WEBSITE USED TO LOCATE KEYWORDS ASSOCIATED WITH 'GLOBALISATION'



ICT for visualising thinking

Visualising thinking tools serve a variety of purposes, such as representing abstract information in concrete forms, depicting relationships between facts and concepts and relating new information to prior knowledge. Visualising thinking tools include graphic organisers, modelling and simulation tools and controlled models.

In addition to the graphic organisers illustrated in the February 2006 issue of Compak (see pages 7–12), there are some other easy-to-use software tools such as Intel's Seeing Reason, Visual Ranking and Showing Evidence at <www.intel.com/education/tools/index.htm>, which are all free, and Reason!Able (a product of the University of Melbourne), which supports critical thinking. This is available for purchase from Edsoft at <www.edsoft.com.au>.

This article features two graphic organisers, namely a memory meaning nodes diagram and a concept frame. Both were developed by David Whitehead, University of Waikato, New Zealand, and discussed *in Literacy Thinking and Reflection*, a paper presented to the Curriculum Corporation and School Library Association of Victoria conference, 'Think About it', on 17 June 2005.

Whitehead views these organisers as prewriting tools to help students organise information and build their higher order thinking skills. Within these tools students work at higher levels of complexity for two main purposes:

- to deepen their understanding of the concept
- to scaffold or structure their reporting on the concept.

Whitehead contends that concepts are represented or stored in our memory in the form of connected 'meaning' nodes; hence a very useful starting point for students is to create a template for a memory meaning nodes organiser like that in the 'ICT approaches' section of *Compak* Supplements 2006 on ComNET <www.vcta.asn.au>. This immediately engages the student in learning and focuses on identifying essential information. A sample memory meaning nodes organiser for the concept 'globalisation' is shown in Figure 2.

From this initial representation of the concept, students progress to a concept frame. Students can work through this at increasingly more complex levels. For example, they could:

1 expand the attributes listed in the memory meaning nodes
2 remove redundant ideas
3 prioritise and group sets of information.

FIGURE 2: SAMPLE MEMORY MEANING NODES ORGANISER FOR THE CONCEPT 'GLOBALISATION'

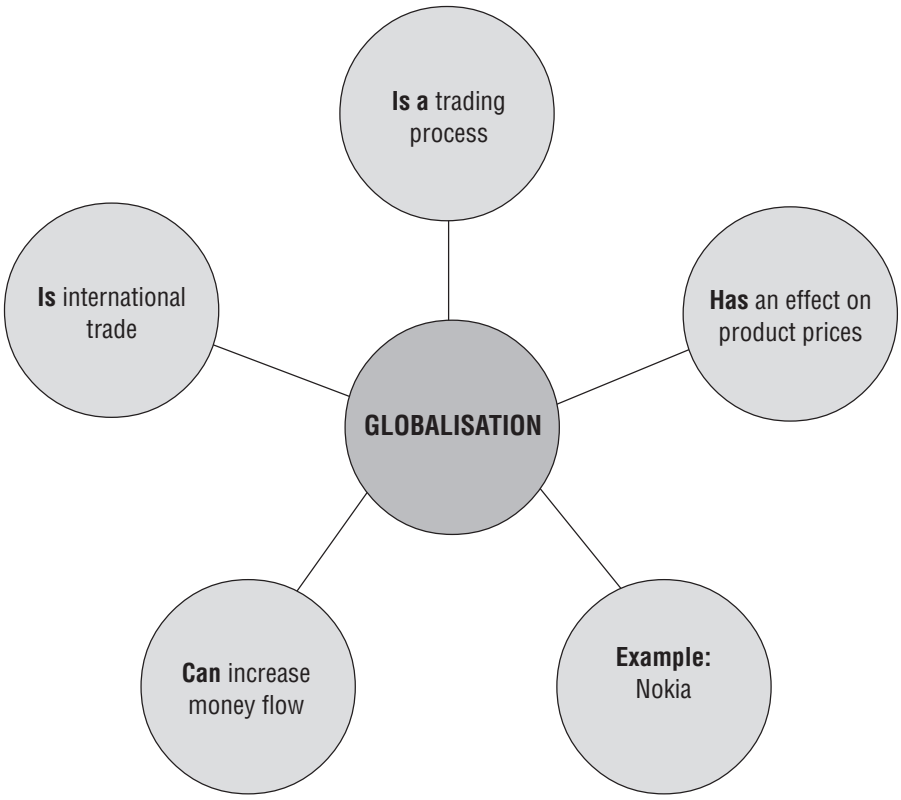
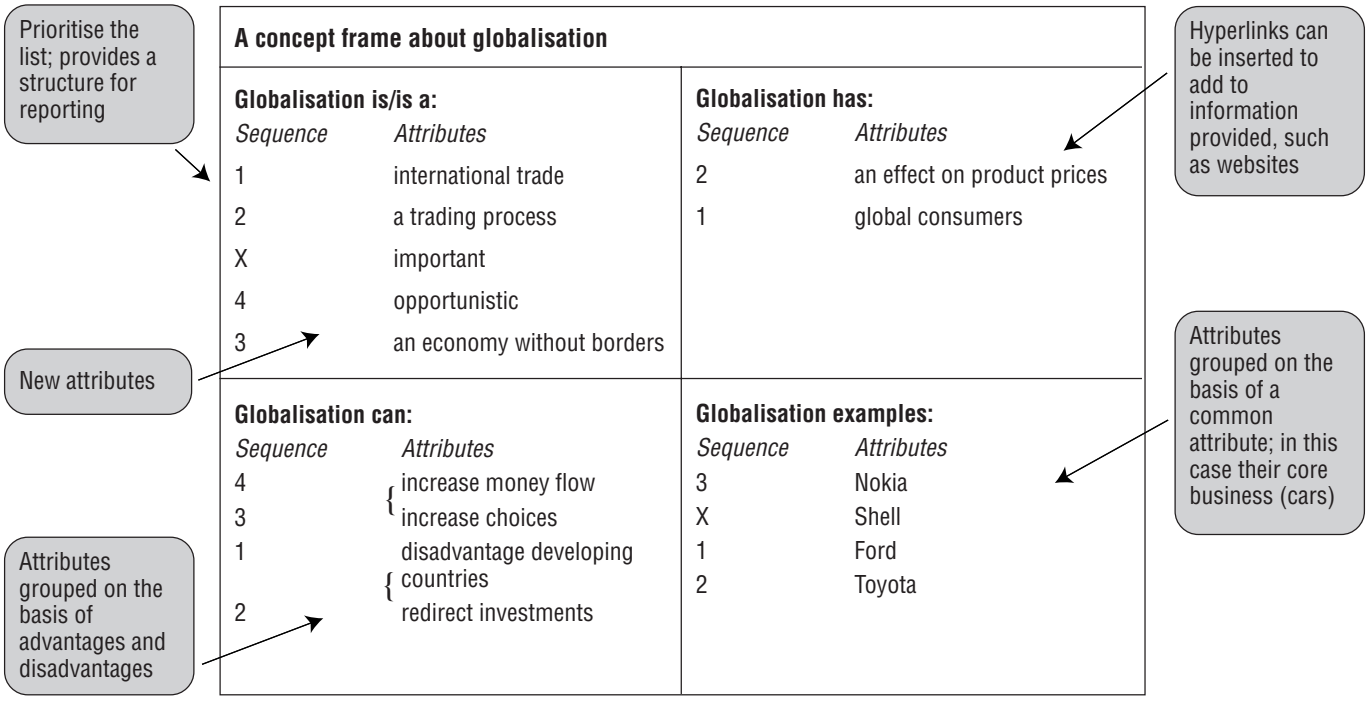


FIGURE 3: A CONCEPT FRAME ABOUT GLOBALISATION



Legend: X = item made redundant

See Figure 3 for a brief concept frame for globalisation that is annotated to show the three levels. (See Figure 4 for further information on memory meaning nodes organisers.) Whitehead suggests that when using the concept frame students can merge together the nodes 'Is a' and 'Is', as this typically reflects a component of report writing where a topic is classified as being associated with a larger idea. Note that students would copy and paste their entries from the memory meaning nodes organiser to this and initially add new ideas/attributes. Student can create the concept frame using the Table function in Microsoft Word or download a concept frame template from the 'ICT approaches' section in *Compak* Supplements 2006.

Students continue to refine their concept frame until they have sufficient structure and content to begin the reporting process. It is important that teachers stimulate student review by asking critical questions about the information they have gathered and processed. For example, these can be linked to values, power and identity matters associated with globalisation. Key questions should stimulate students to reflect on the depth and accuracy of their ideas.

ICT for creating

Students can use the concept frame as the basis for their presentation file. The cells of 'globalisation can', 'globalisation examples' and 'globalisation has' can relate to slides (or paragraphs, if a written report). The sequencing within each cell and the identification of redundant items prior to draft writing helps students achieve links and cohesion in their presentation file. Where appropriate, students copy and paste text and images from their concept frame into their presentation file and use ICT techniques that 'maximise the accuracy, clarity and completeness of the information' (Level 6).

The above example illustrates how ICT knowledge and skills can be applied to assist students:

- develop their understandings of a concept in Humanities–Economics by using visualising thinking tools
- share understandings of a concept by electronically acquiring and discussing information about globalisation
- demonstrate their understandings by creating a presentation file.

Only when students process real data and information for a real purpose will real learning take place.

FIGURE 4: WHAT IS A MEMORY MEANING NODES ORGANISER?

Memory meaning nodes organisers are starting points for processing and selecting information. This graphic organiser starts with a concept in the middle of the diagram and five connected 'meaning' nodes that reflect the way we think concepts are represented in memory. These include:

- the 'is a' meaning node (general classification of the concept)
- the 'has', 'has a' or 'have' meaning node (concept attributes)
- the 'can' meaning node (represents dynamic aspects)
- the 'is/are' meaning node (represents qualities of the concept)
- the 'example' node (represents a specific instance of the concept).