

DEVELOPING LITERACY, NUMERACY AND DIGITAL COMPETENCE ACROSS THE CURRICULUM

What is cross-curricular learning?

According to Barnes (2015) cross-curricular learning is identified as a process in which the skills, knowledge and attitudes of numerous disciplines are applied to an idea, problem, theme, question or single experience that focuses around the curriculum. This requires the incorporation of a flexible timetable, a variety of sources and relevant concepts (Hayes, 2010).



Image sourced from: Donaldson (2015) *Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales*. Cardiff: Welsh Government. Front Cover.

How does it fit into the new curriculum for Wales?

Donaldson's (2015: 40) report recommends that 'literacy, numeracy and digital competence should be Cross-curriculum Responsibilities for all teachers and people who work with children and young people.' as the new curriculum for Wales aims to develop learners into critical thinkers who have a strong knowledge and understanding of literacy, numeracy and digital competency (Welsh Government, 2017).



Image sourced from: Donaldson (2015) *Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales*. Cardiff: Welsh Government. Front Cover.

What types of cross-curricular teaching are there?

According to Barnes (2015) there are eight distinct types of cross-curricular teaching, which can be applied in the curriculum through topic-based, project or thematic approaches. The eight types of cross-curricular teaching include:

- Theme-based
- Inter-disciplinary
- Multi-disciplinary
- Tokenistic
- Single transferable subject
- Opportunistic
- Hierarchical
- Double-focus (Barnes, 2015)

This poster exemplifies two of Barnes' models and how they can be used to incorporate literacy, numeracy and digital competence as cross-curricular responsibilities within a Key Stage 2: Year 6 class.



Image sourced from: Barnes, J. (2015) *Cross-curricular learning 3-14 (3rd edition)* London: SAGE. Page 73.

Inter-disciplinary

The inter-disciplinary approach produces the integration of disciplinary insights by incorporating two or more subjects (Haynes, 2002). Learners progress in these subjects through a shared meaningful experience which is 'then creatively connected in a presentation using the skills and knowledge of both subjects more-or-less equally' Barnes (2015: 73). This approach requires teachers confidence in the disciplines used and an inclusive, flexible and bold teaching style (Barnes, 2015).



Image sourced from: Donaldson (2015) *Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales*. Cardiff: Welsh Government. Page 50.

- **Question:** Should Pluto be a planet?

Development of Literacy: The learners may develop their oracy skills by expressing their opinions clearly using specialist vocabulary with supporting reasons (DES, 2015a) on whether Pluto should be a planet. They may also develop their reading skills by comparing the viewpoints of different writers (DES, 2015a) on the topic of Pluto's planetary status. During their investigation they may also develop their writing by creating a comprehensive account (DES, 2015a) on the planets in our solar system and Pluto.

Development of Numeracy: During the investigation, the learners may use simple proportions and ratios (DES, 2015b) when comparing planet sizes. They may also read and interpret scales (DES, 2015b).

Development of Digital Competence: Towards the end of their investigation, the learners may 'use a range of software to produce and refine multimedia components' by selecting and combining a range of video, text, sound, image and animation to produce an outcome for a specific audience (DES, 2016: 1) in this case it may be for the International Astronomical Union.

Benefits of using an inter-disciplinary approach:

Barnes (2015) suggests that in this approach:

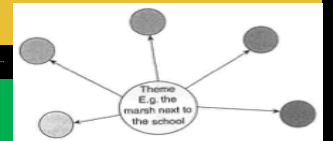
- Creative responses are generated amongst the learners.
- New understandings are created and real life problems can be solved through the combination of disciplines.
- The knowledge and understanding in the separate subjects is increased.
- Enriches the learners personal growth, lifelong learning habits and academic skills (Jones, 2009).

Limitations of using an inter-disciplinary approach:

- New misconceptions and half understood ideas can be produced when two, three or four subjects are applied to the same experience (Barnes and Shirley, 2007; Roth, 2000 and Willingham, 2013).
- There maybe less clarity about what a subject entails (Barnes, 2015).
- Co-teaching and sharing responsibilities within an interdisciplinary approach may create problems (Jones, 2009).

Image sourced from: Barnes, J. (2015) *Cross-curricular learning 3-14 (3rd edition)* London: SAGE. Page 70.

Theme-based



The theme-based approach involves the use of authentic and relevant themes to generate exploration and learning whilst also consolidating the learners knowledge in a wide variety of subjects (Retnawati et al., 2017). Barnes (2015) suggests that this approach requires teachers who are confident, knowledgeable and consider their themes carefully - a subject should only be included if it is essential to deepening the understanding of the theme.



Image sourced from: Donaldson (2015) *Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales*. Cardiff: Welsh Government. Page 46.

- **Theme:** World War II

Development of Literacy: In this theme the learners may explore the challenging issues of being an evacuee through sustained role play (DES, 2015a). During this theme, the learners may use their role play to inform their writing by adapting the style and purpose (DES, 2015a) for example, when writing a letter home compared to writing a newspaper article on events. Within reading they may develop further understanding of World War II by identifying information and ideas that interest them (DES, 2015a).

Development of Numeracy: Within the theme the learners may 'make comparisons between prices and understand which is best value for money' (DES, 2015b: 5) when exploring rationing. As a celebration at the end of the theme the learners may plan a victory day party, a part of this process for the learners would include making calculations (DES, 2015b).

Development of Digital Competence: Within the theme of World War II the Enigma Code may be used as inspiration for the learning. Using this the learners may investigate and demonstrate how programs and algorithms work, whilst also showing an understanding in how 'changing instructions can affect or even terminate a process, e.g. moving instructions around in a program could produce unexpected outcomes or cause the program to fail altogether.' (DES, 2016: 1)

Benefits of using a theme-based approach:

- Learners are informed and motivated through a wide variety of subjects (Barnes, 2015).
- The learning is viewed more holistically (Hayes, 2010).
- Can have a positive impact on concept learning (Liu and Wang, 2010).

Limitations of using a theme-based approach:

- Some teachers may lack an understanding of the theme-based approach and how to implement it properly (Finch *et al.*, 1997). This may result in unclear aims and tenuous links (Barnes, 2015).
- If the theme-based approach is not properly implemented then teachers may struggle with assessment for learning (Retnawati *et al.*, 2016)
- Hayes (2010) suggests that too much learner choice within a theme-based approach may allow learners to avoid areas they find difficult.