CAMAU

Dilyniant Dysgu i Gymru | Learning Progression for Wales

CAMAU Project: Research Report (April 2018) University of Glasgow and University of Wales Trinity Saint David

Louise Hayward*, Dylan E. Jones‡, Jane Waters‡, Kara Makara*, David Morrison-Love*, Ernest Spencer*, Janine Barnes‡, Heddwen Davies‡, Sioned Hughes‡, Christine Jones‡, Sam Nelson‡, Nanna Ryder‡, David Stacey‡, Rachel Wallis‡, Jayne Baxter†, George MacBride*, Rachel Bendall‡, Siân Brooks‡, Angella Cooze‡, Linda Davies‡, Helen Denny‡, Peter Donaldson*, Sioned Hughes‡, Ishmael Lewis‡, Peter Lloyd‡, Srabani Maitra*, Catherine Morgan‡, Sue Pellew James‡, Shan Samuel-Thomas‡, Elaine Sharpling‡, Alex Southern‡, Sarah Stewart‡, Francisco Valdera-Gil*, Georgina Wardle*

*University of Glasgow ‡University of Wales Trinity Saint David †Welsh Government

University of Glasgow

Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

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Learning about Progression –
Informing thinking about a Curriculum for Wales

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Explanatory Foreword

Learning about Progression – A Research Resource Tailored to Meet your Needs

'Learning about Progression' is a suite of research-based resources designed to provide evidence to support the building of learning progression frameworks in Wales. 'Learning about Progression' seeks to deepen our understanding of current thinking about progression and to explore different purposes that progression frameworks can serve to improve children and young people's learning. These resources include consideration of how this evidence relates to current developments in Wales and derives a series of principles to serve as touchstones to make sure that, as practices begin to develop, they stay true to the original aspirations of *A Curriculum for Wales – A Curriculum for Life.* It also derives, from the review of evidence, a number of fundamental questions for all those involved in the development of progression frameworks to engage.

Within this suite of resources you will find

- **Reviews of research into progression in children and young people's learning**
  - research related to progression in learning generally and research on progression in learning specifically related to each of the six AoLEs
- **Reviews of policies on progression from other countries**
  - who have similar educational aspiration to Wales in each of the six AoLEs
- **A review and analysis of progression as it is emerging in Wales in *Successful Futures* and in *A Curriculum for Wales – A Curriculum for Life*.**

We hope that you will find 'Learning about Progression' a useful resource. We recognise that a range of audiences will want to make use of its contents for a range of purposes and thus present information from 'Learning about Progression' in different ways, leaving you to choose which form is most useful for your purpose.

1. **Learning about Progression: a comprehensive review of research and policy to support the development of Learning Progression Frameworks in Wales**

   The whole report, 'Learning about Progression' offers a **comprehensive overview of research and policy related to progression in learning in general and to progression in learning in all six AoLEs**. You are currently using this mode.

2. **Diving into Research and Policy in an Area of Learning and Experience**

   For individuals or groups who are interested in finding our more about the **evidence as it relates to an individual Area of Learning and Experience (AoLE)**, a detailed report is provided for each AoLE derived from Section 2 of 'Learning about Progression'. These six reports offer an overview of research on progression, an in-depth analysis of evidence exploring how different countries have tackled progression in an individual AoLE and evidence from research on progression within the discipline. These reports are entitled *Learning about Progression: Expressive Arts, Learning about Progression: Science and Technology* etc.

3. Learning about Progression: From Ideas to Action

If you want to identify key messages from 'Learning about Progression' and your major concern is how to **use** the ideas as you develop progression in your AoLE, then read '**Learning about Progression: From Ideas to Action'** as your first point of engagement. This provides

- **key messages** on progression relevant to all of the AoLEs
- **an analysis of how the evidence from international policy and research relates to policy advice on progression in Successful Futures and A Curriculum for Wales**
- principles that might act as a touchstone to promote a close alignment between ideas and action and
- information on the strategy used to **inform decision making** about the framework to be used to develop statements of progression.

'Learning about Progression: From Ideas to Action' is supported by

- **a series of PowerPoint slides to introduce key ideas to others**
- **Decision Tree Workshops**

The evidence emerging from 'Learning about Progression' indicated strongly that there were a number of decisions that AoLE groups had to take before embarking on the development of statements of progression. These related to the major questions derived from the research. Decision tree workshops were designed to support AoLE groups and others in that process.

Decision trees were used as the basis of workshop activities at AoLE meetings to support AoLE discussions. Each decision tree

- identified the decision to be taken
- offered evidence from the 'Learning about Progression' report (from research, policy and practice) to help inform discussions within each AoLE
- was consistent with the principle of subsidiarity and encouraged AoLE members to add to the evidence available
- provided a framework where each individual AoLE, having reflected on the evidence, agreed a decision proposal to be shared with the Coherence Group.

All proposals were reviewed to ensure that they were consistent with the vision *A Curriculum for Wales – A Curriculum for Life* and reflected what AoLE members believed would best serve young people in Wales.

Proposals from the six AoLEs were then submitted to the Coherence Group whose task was to reach agreement about which decisions had to be consistent across AoLEs to promote coherence across the system and where there could be flexibility for individual AoLEs. This would then inform the next stage of work of the AoLE groups.

Terminology within both the Welsh and English versions of this report reflects the range of current thinking about concepts of progression; this may lead to one term being employed with different but related senses and/or to one concept being referred to by different terms.

Introduction

The education system in Wales is in the process of transformation. Since the publication of *Successful Futures* (Donaldson, 2015) and the subsequent adoption of its recommendations in *A curriculum for Wales – a curriculum for life* (Welsh Government, 2015), a national strategy has been underway to build new curriculum, pedagogy and assessment arrangements to offer young people in Wales educational experiences that are fit for the 21st century. The creation of these new arrangements is the responsibility of all involved in education in Wales – communities, policy makers, practitioners and researchers – and is led by a network of Pioneer schools whose task it is to identify what matters in the curriculum and how progress might best be described and discerned. The Curriculum Pioneer schools are working in national groups related to each of the six Areas of Learning and Experience (AoLEs) – Expressive arts; Health and well-being; Humanities; Languages, literacy and communication; Mathematics and numeracy; and Science and technology. The CAMAU project, a collaboration between the University of Glasgow (UofG) and the University of Wales Trinity Saint David (UWTSD), funded by the Welsh Government and the UWTSD, seeks to support the Welsh education system in its task by providing evidence to address three main questions:

- How might curriculum, progression and assessment be described and developed in Wales to focus on learning and to promote better alignment between research, policy and practice?
- In what ways do models of curriculum progression relate to progression in learning emerging from evidence of learning and progression within schools and classrooms?
- To what extent is it possible to think of assessment as the use of evidence to enable future learning, as 'progression steps', rather than as a summary of past achievement? (And how might we avoid this focus leading to a narrowing of the curriculum?)

The focus of the CAMAU project is **progression**. It takes its starting point from *Successful Futures* (Donaldson, 2015) and *A Curriculum for Wales* (Welsh Government, 2015), builds on the work of the Progression and Assessment Group (Welsh Government, 2017) and on what the AoLE groups have identified as what matters. The project works with teachers, schools, researchers and policy makers (local, national and international) to bring different knowledge, skills and understandings together to explore how progression might best be described and developed in relation to the AoLEs and to investigate how progression steps might be most helpfully identified, described and used to support learning.

Progression matters. Since the seminal Black & Wiliam (1998) review highlighted the potential for formative assessment (or Assessment for Learning as it is sometimes called) to enhance learning, particularly amongst learners who found learning most challenging, countries internationally have sought to realise that potential in schools and classrooms. The way in which Assessment for Learning has spread has been compared to a 'research epidemic' that has 'feverishly spread into every discipline and professional field' (Steiner-Khamsi, 2004: 2). However, at best, the enactment of Assessment for Learning has been patchy (Hayward *et al*, 2006, Marshall & Drummond, 2006) and problems around the articulation of progression have been part of the problem. Wiliam & Thompson (2007) offer a framework to articulate the roles that key actors (teacher, peer and learner) play in the assessment process based on three key ideas: where the learning is going, where the learner is right now and how to get there. Implicit in this model is the centrality of progression. For example, for teachers to provide feedback that moves learners forward, they must have a conceptualisation of what matters next both for learning in the domain and for the learner. But self-evident as that might

seem, progression and its relationship to assessment and learning has proven to be a complex business. Indeed, in a recent article Baird *et al* (2017) argue that learning and assessment have been 'fields apart'. Recognising the inexorable relationship between learning and progression, Heritage (2008) argues that

> *'By its very nature, learning involves progression. To assist in its emergence, teachers need to understand the pathways along which students are expected to progress. These pathways or progressions ground both instruction and assessment. Yet, despite a plethora of standards and curricula, many teachers are unclear about how learning progresses in specific domains. This is an undesirable situation for teaching and learning, and one that particularly affects teachers' ability to engage in formative assessment.'* (p.2)

Internationally, there are areas of the curriculum where work has been done to build understandings of progression. Pellegrino (2017) argues that research undertaken on cognition and learning has led to the emergence of highly developed descriptions of progression in particular curricular areas (science, reading and mathematics) and that these can form a sound basis for assessment design (e.g. Bransford, Brown, Cocking, Donovan, & Pellegrino, 2000; Duschl *et al*, 2007; Kilpatrick, Swafford, & Findell 2001; Snow, Burns & Griffin, 1998). There are, however, other areas where work related to progression is far less well developed.

Progression as a concept is built in to *Successful Futures* through the identification of reference points (Progression Steps). The term 'reference point' is important. It establishes learning as an expedition, with stops, detours and spurts, rather than as a linear process. The progression frameworks will be central to the work of teachers and learners as they seek to enhance the learning of every young person in Wales and thus it is crucial that these frameworks are dependable. To address this challenge, the CAMAU project seeks to work with policy makers and practitioners to build progression frameworks that are, as far as is possible, evidence informed and supportive of assessment practices that are consistent with the 'spirit' rather than the 'letter' of assessment for learning (Earl, Volante & Katz, 2011; Marshall & Drummond, 2006).

Theoretically, the design of the CAMAU project builds on the work of Senge & Scharmer (2001) and on the empirically derived Integrity model of change (Hayward & Spencer, 2010). This model argues that for change to be meaningful and sustainable, project design must pay attention to three main areas:

- Educational integrity (a clear focus on improving learning)
- Personal and professional integrity (participants have a significant role in the construction of the programme, rather than being passive recipients of policy directives)
- Systemic integrity (coherence in development at all levels of the education system)

The CAMAU Project is designed in three phases. This first phase is concerned with the co-construction of an evidence-based Progression Framework. The second phase is designed to develop, review and learn from feedback on the draft Progression Framework and the third phase will trial, evaluate and review the Progression Framework in action. In all phases of this project teachers, pupils, policy makers and researchers are co-investigators with the shared aspiration of developing high quality, well-informed curriculum, pedagogy and assessment arrangements for Wales.

This report provides evidence on three specific aspects of the first phase of the CAMAU project:

- the review of how progression is described and structured within frameworks in other countries
- the review of progression in learning (in policy and research) and of evidence related to progression contextualised in each area of learning experience and
- initial work undertaken to explore teacher perceptions of progression in learning. (Evidence on teachers' and pupils' perceptions of progress will be collected throughout the CAMAU project and will be published in the final research report.)

Following this introduction that includes a description of methodology, Section 1 of the report identifies ideas about progression as they emerge in *Successful Futures* and then analyses these ideas using evidence from research on progression.

Section 2 is divided into six sub-sections, each devoted to one of the six Areas of Learning and Experience (AoLEs) identified in *Successful Futures* (Donaldson, 2015): Expressive arts; Health and well-being; Humanities; Languages, literacy and communication; Mathematics and numeracy; Science and technology. The evidence offered to each AoLE is in two parts. The first part is a review of how different countries have conceptualised and interpreted progression in that area of learning. The second part provides insights into evidence available from research on progression relevant to the specific AoLE.

Section 3 provides evidence of teachers' understandings of progression.

Section 4 draws together themes emerging from the different sources of evidence analysed and identifies decisions which require to be taken to allow the development of statements of learning progression within the AoLE.

This research report is intended to provide a dependable evidence base to inform thinking in the AoLE groups as ideas of progression are developed. The CAMAU project team throughout the project will work with AoLEs to use evidence from international curriculum and assessment documentation of how progression has been conceptualised in the research literature and in policy contexts similar to Wales. When AoLEs have identified what matters in the curriculum and have built initial models of progression, the CAMAU team will obtain and analyse empirical evidence from wider teachers' and learners' experiences of progression in schools and classrooms: evidence from teachers' perceptions of what is central to enable effective progression in their pupils' learning; and pupils' reflections of their own progression in learning. This sense checking of existing and expert models of progression is intended to promote curriculum, pedagogy and assessment arrangements in Wales that are grounded in teachers' and young people's actual experiences in learning. This work will be reported in the final CAMAU project report.

Methodology

The central purpose of the reviews of international policy and of research on progression is to provide dependable information to AoLE groups to support their thinking. Thus both the policy review and the review of research are focused and purposeful. Discussion with AoLE groups made it clear that to be useful, the reviews must be clearly focused, succinct and directly related to the task which the groups are being asked to undertake. In addition, the CAMAU project sits within the demands of a development programme operating to tight policy deadlines: all activities must be undertaken within a limited time-frame and with limited resources. This is not a situation peculiar to this project.

Dependable Evidence Summaries

The methodology for the creation of dependable evidence summaries emerges from the recently developed EPPI (Evidence for Policy and Practice Information) protocol for a rapid review of existing evidence (O'Mara-Eves *et al.*, 2016). Rapid reviews have been commonly used in Health policy contexts to inform evidence-based practice. The Welsh Government has itself used the process in an educational context, e.g. in a review of the impact of poverty on attainment (Wilson, 2011). Rapid Reviews are contentious. They are seen by some as conforming to policy timelines at the cost of rigour in the literature or policy review. More recently, rapid evidence assessments have become more common in policy contexts and the method is referred to on a number of Government websites across the UK. The Department for International Development identifies three main uses for rapid evidence assessments:

> *'[They] provide a more structured and rigorous search and quality assessment of the evidence than a literature review but are not as exhaustive as a systematic review. They can be used to:*
>
> - *gain an overview of the density and quality of evidence on a particular issue*
> - *support programming decisions by providing evidence on key topics*
> - *support the commissioning of further research by identifying evidence gaps'*
>
> (https://www.gov.uk/government/collections/rapid-evidence-assessments -- accessed 10/07/17)

These aims are consistent with the aspirations of the CAMAU project. The challenge is to provide evidence that is dependable within the constraints identified.

Grant *et al.* (2009) suggest that if Rapid Research Reviews (RRR) are to be dependable, they need to be rigorous and explicit about their methodology and acknowledge the concessions that have had to be made to breadth and depth. The need to synthesise evidence within a limited time frame with the specific intention of informing decision making processes lies at the heart of the increased use of RRRs. Khangura *et al* (2012) argue that, despite the rise in the popularity of this approach, very little has been published on appropriate methodologies. They rename RRRs as evidence summaries and propose a methodology to increase the means by which the validity, appropriateness and utility of the review might be discerned. The authors identify eight steps developed from their Knowledge to Action programme. These steps have been adapted in the CAMAU project as the framework for the

development of the Dependable Evidence Summaries, designed to inform the thinking of AoLE groups as they tackle the complex challenge of describing progression.

Table 1: Outline of eight steps informing Knowledge to Action evidence summary approach (Khangura et al, 2012)

Knowledge to Action step	Task
Step 1	Needs assessment
Step 2	Question development and refinement
Step 3	Proposal development and approval
Step 4	Systematic literature search
Step 5	Screening and selection of studies
Step 6	Narrative synthesis of included studies (including assignment of evidence level)
Step 7	Report production
Step 8	Ongoing follow-up and dialogue with knowledge users

The Evidence Summaries in the CAMAU project have been developed as part of a process of on-going discussion with the knowledge users – each of the AoLE groups.

Progression in International Policy and Practice

The countries involved in the international policy and practice review were identified in two ways. The first priority was to identify countries of particular interest to the individual AoLE group. Second, CAMAU team members sought to select countries with aspirations similar to those identified in *Successful Futures* where different approaches to descriptions of progression were illustrated. The analysis of policy in each country followed a three-stage process:

- eliciting information on curriculum design, 'what matters' in the curriculum and how progression is described
- making summary statements of the above
- analysing information from across countries

Table 2 on the next page provides the framework for responding to questions on progression. The complete protocol can be found as Appendix 1.

Recognising the difference between policy intention and policy enactment, the final stage of this policy review went beyond the analysis of policy documentation. As part of the work of the CAMAU project's National and International Advisory Group, leading researchers in selected review countries were invited to discuss the enactment of policy in their respective countries in order to provide insights into how ideas have played out in practice. These reflections on the implementation of policy and on lessons learned add depth and texture to the information available in policy

documentation and enhance the knowledge of policy-in-action afforded to CAMAU researchers by research publications.

Table 2

Country Information
Name of Country: Year the curriculum was written/published/updated: Website(s) where materials were found:
How is the curriculum structured? e.g. Is there a curriculum document as well as achievement outcomes or are these combined? Are there supporting materials for teachers? Is there one curriculum across all ages or is it split into primary and secondary? How many stages/levels/benchmarks are included? Are they aligned with specific years?
What components/subjects/themes related to the AoLE are covered in this country's curriculum? What seems to be missing?
How does the documentation define 'what matters' in this AoLE? Does this include content knowledge, competencies, skills, etc? What is the balance between knowledge and understanding, skills, attributes, and capabilities?
How is progression defined? Is it defined explicitly or implicitly? You may need to look beyond the statements themselves at the supporting documentation and introductions to the curriculum. Give some specific quotes or examples.
Are key progression points identified as expected standards for specified ages? Or as descriptions of knowledge, skills, capabilities needed for further progression in learning? Or is it some combination?
What form do statements of progression take? Are they detailed or broad? Are they in pupil-first person language or written for the teacher? Provide some examples.
To what extent does the curriculum for this AoLE seem to align with what is written in Successful Futures? Does it seem to align with Donaldson's vision for progression? Give some examples.
Is there anything else worth noting? E.g., Is there anything particularly unique, innovative, or useful about this curriculum? Are there any aspects of the AoLE that are included in cross-curricular aims? Was there anything within this portion of the curriculum that seems to have connections with any other AoLE?

Progression in Research Literature in the Context of Policy in Wales

The review of research literature in the context of policy in Wales was undertaken in three strands

- a review of *Successful Futures* to identify what had been written about progression
- a review of seminal papers on the concept of learning progression
- six separate reviews, one undertaken for each of individual AoLE.

Whilst much has been written on curriculum progression, far less is available on learning progression. Papers for the review were identified using three approaches:

- expert knowledge (including recommendations from CAMAU Professorial Consultants - internationally recognised experts in individual Areas of Learning Experience)
- search strategies
- reference snowballing.

As reviews for individual AoLEs were undertaken by several members within each AoLE team, detailed guidance was provided. Reviewers conducted independent searches using keywords, employing Ebscohost or a similar academic database. Key terms were contextualised in each AoLE, e.g. 'progression in mathematics'; keywords specific to particular domains were identified, e.g. in Health and well-being keywords included 'child development' and 'developing'. Texts published before 2000 were excluded unless identified by Professorial Advisors as seminal texts. Wales is a bilingual country. Where possible, eg, in LLC, the review included evidence from bilingual countries. However, we recognise that most of the evidence used to inform this report has been drawn from material published only in English, that the research has to a large extent considered practice in English speaking countries and that, with few exceptions, progression frameworks examined have been drawn from countries and states in which English is the sole or a major language of schooling. This limitation has to be recognised.

When lists of possible texts had been generated, titles and abstracts were reviewed to identify potentially relevant sources. Expanded or snowball searches were also carried out where authors cited within the original sources were investigated, either by following up on articles cited or by undertaking author searches within Ebscohost. In addition to recommendations made by Professorial Advisors, CAMAU researchers sought advice from colleagues in the University of Glasgow and in the University of Wales Trinity Saint David with specific expertise in a particular area. From this range of sources, a list of all papers considered was generated by each group and the screening processes that led to the final selection of papers to be reviewed were documented.

The analysis of literature review is intended to address critical questions related to progression within a particular Area of Learning Experience. To illustrate this process *Table 3* on the next page offers an example from the review for the Health and well-being AoLE. The full protocol can be found in Appendix 2.

Table 3

Literature Review- Critical Questions
• What evidence exists that informs our understanding of progression in this domain?
• In what ways have researchers described how children develop their knowledge/ skills/ capacities in this area? In other words, how do they model progression? For example: – According to the literature, are the changes that children make qualitative jumps (with big steps at key moments) or more gradual sophistication (children seen to gradually add more of the same skills over time)? – Is progression linear or could children move backwards and forwards? – Do the researchers see children's progression as something that can be impacted on by the environment and open to change, or is it fixed? – Is there one path that children seem to take in this area, or are there multiple paths? Do the researchers acknowledge that children may have different paths based on the context in which they grow up/learn? – Are there different models of progression for the same topic and to what extent do they overlap, complement, or conflict?
• To what extent does the literature focus on how children develop in terms of their knowledge/understandings vs. behaviours/skills?
• To what extent is the progression that is described at a micro-level (for one lesson/unit) or at a macro-level (across multiple years)?
• What ages are covered when describing how pupils learn in this area? Which ages seem to be missing or receive less adequate attention?
• What is the theoretical background of the relevant literature (e.g., education, public health, psychology, etc.)? We may get some insight by looking at the journal it is published in.
• Importantly, what seems to be missing in this area? What do we still not know? Is there little research on this topic?

Building Dependable Evidence: Synthesising Sources

The evidence emerging from across the six AoLEs was then compared with the review of *Successful Futures* and the more general research evidence on progression. From this synthesis key themes were identified. These themes were then used as the evidence base to inform for the final section of this report, Learning about Progression: from ideas to action.

This central purpose of this research report, *Learning about Progression – Informing thinking about a Curriculum for Wales*, is to provide a dependable evidence base to inform the work of each AoLE. To

maximise the use of the evidence to inform action in AoLEs, the research report is available in a number of forms.

The full research report is available to all interested parties. In addition, a domain specific report has been developed for each individual AoLE. Each individualised report contains key points from:

- the introduction
- the review of *Successful Futures* and research evidence on progression as a concept
- the policy review and research review specific to the area of learning experience
- 'Decision Trees' as an enabling artefact to stimulate use of an extensive evidence base in practice: 'Decision Trees' structure evidence from the research report succinctly around key questions for use within AoLE workshops. Their purpose to promote better informed decision making.

The decision trees identify crucial questions to be addressed by each AoLE as they design a progression framework for the Welsh curriculum. Using evidence from the research report, they offer insights into how issues have been tackled in different countries and suggest some initial possible advantages and disadvantages related to each decision. They also identify relevant insights from research. Examples of decision trees can be found in Appendix 3.

Using the decision tree approach as a stimulus for discussion and negotiation, each AoLE group was invited to respond to each question, to consider evidence available from research and policy and to add insights from their own professional experience. Once the group had considered the evidence, they were invited to develop proposal to be considered by the cross-AoLE Coherence Group. The role of the Coherence Group was to consider proposals from each AoLE and to take decisions to promote consistency and coherence across the six AoLEs.

Evidence from Teachers and Learners

A central feature of the CAMAU methodology is to promote approaches to progression that are empirically informed by evidence from practice.

In line with the principles of partnership, subsidiarity and collaboration which underpin the CAMAU research project, teachers are co-researchers. While teacher participation in the curriculum development process was an expectation arising from their employment in pioneer schools, participation in related research was voluntary. Consequently, all teachers in the AoLE groups were asked and agreed to participate in this research in accordance with the ethics procedures of the two universities.

Between April and July 2017, collaborative research focused on the articulation of teachers' conceptualisation of learning progression. Evidence was generated through approaches which acted as prompts to support this articulation. The aim was to draw on teachers' practical experience to contribute to developing learning progression frameworks.

Four research questions were developed by the CAMAU team. These were designed firstly to explore evidence of teachers' understanding of progression in learning emerging from the data and secondly to consider the efficacy of different approaches to the collection of evidence of teachers' understandings of progression:

- What evidence on progression emerges from teachers' articulations of progression in learning in their classrooms?
- What are the characteristics of learning identified?
- What types of activities led to teachers articulating their understanding of progression most effectively?
- What sorts of group structures and size supported such activities?

Evidence related to the first two questions would directly inform the drafting of progression statements; evidence related to the latter two would inform later research into teacher views to further develop these statements and to offer insights into processes of sustainable change.

The CAMAU team developed three principal approaches to gathering evidence relevant to the first two questions. It was agreed that the approach(es) used in each AoLE would recognise the views of teacher participants and would be reviewed in the light of evidence related to the latter two questions. The CAMAU team adapted tasks to take account of the broad direction of developing thinking within each AoLE about what matters.

Approach One – Time1-Time(n) (see Newby, 2010)

Teachers were supported to articulate typical learner progress across a period of time; the number of stages (i.e. T1-T2, T1-T3) used was determined by the perceived requirements of each AoLE. The fundamental questions posed took the form of:

- T1 - Can you describe what, in general terms, you expect a learner to know, understand and be able to do at a start time (e.g. the beginning of the year)?
- T2 - Can you describe what, in general terms, you expect a learner to know, understand, and be able to do at an end time (e.g. the end of the year)?

A variant of this approach explored progression made by three individual young people in a class as they moved through a phase: one who finds little challenge in relation to expectations; one who generally achieves expectations; one who finds expectations challenging.

Approach Two – Evaluation of progression in other countries' frameworks

Teachers were asked to examine critically aspects of frameworks from other countries. This afforded opportunities for teachers to review, from a relatively disinterested stand-point, policy and practice and to articulate views on models of progression, broad progression steps and appropriate language.

Approach Three – CoRe (Content Representation) (see Eames et al. 2011; Loughran et al. 2004)

This approach involves identifying areas of knowledge or skill that seem central to learning in an AoLE and for each of these areas responding to questions such as:

- What do you intend young people to learn about this idea or skill?
- Why is it important for them to know this?
- What prior or related knowledge do learners have of this idea or skill?

- What difficulties / limitations may be associated with progression in developing this idea or skill?
- How do you ascertain learners' progression or difficulties in developing this idea or skill?

Findings from this early stage of teacher research are reported in Section 3.

Section 1: Progression – Welsh Policy and Research Insights

Progression in learning is crucial to the realisation of the aspirations of *Successful Futures* and it is essential that progression as developed across the AoLEs is well informed. As indicated in the Introduction, the evidence to promote well informed ideas of progression in learning comes from different sources. This section of the report reflects on two sources of evidence: evidence from policy – what *Successful Futures* says about progression – and evidence from research – an analysis of research on progression.

Evidence from the Policy Context in Wales - Donaldson, Progression and Learning

The concept of progression is at the centre of the new curriculum in Wales. It structures, describes, and enables learning. Donaldson's use of the term represents a shift in discourse that aims to restructure the learning experience for pupils, from discrete and generalised stages of attainment, to a **learning continuum** of individual achievement. Within this new structure, each learner moves forward fluidly through statutory education from age 3 to age 16, guided as appropriate by reference points, supported and challenged according to his/her needs, and assessed in relation to the four purposes of the curriculum.

The four purposes describe what all children and young people should become and achieve through statutory education as well as how they are perceived and positioned as they experience the curriculum.

Recommendation 2 (p.23) states:

> *'The school curriculum should be designed to help all children and young people to develop in relation to clear and agreed purposes. The purposes should be constructed so that they can directly influence decisions about curriculum, pedagogy and assessment'.*

This follows the argument that:

> *'statements of curriculum purpose need to be formulated carefully so that they have integrity, are clear and direct and become central to subsequent engagement and development; in that way they can shape the curriculum and suffuse practice. Common understanding of **why** we are doing what we are doing is a powerful starting point from which to determine **what** it is we need to do and **how** we are going to do it.* (p.22, author's emphases)

The purposes tell us about how children should experience their curriculum day to day. Learners progress to become more ambitious, capable, enterprising, creative, ethical, informed, healthy, confident individuals. Progression is characterised in terms of depth, complexity, level of abstraction, accomplishment and skill, for disciplinary knowledge and wider competencies, and each child's learning continuum functions as a journey through the curriculum. This journey will include diversion, repetition, and reflection, as appropriate for each individual to make progress in learning. There is greater responsibility for teachers to ensure child-centred learning to ensure effective learning takes place, since the pace of each journey is set according to the requirements of the learner.

Discerning the progress being made by each child is fundamental to establishing learning. While the concept of progression shifts control of the curriculum into the hands of the schools, it also shifts assessment from generalised phases and stages, to a greater focus on the evaluation of learning from the perspective of the child: a shift from 's/he should' to 'I can'. This means all children and young people can travel on the same continuum, regardless of any Additional Learning Needs. In the new curriculum, assessment is purposeful and designed to support the progression of each child's learning: what does each child need in order to move forward, what difficulties might s/he have, what are the next steps and how might these next steps best be supported?

Assessment is the means by which teachers seek to discern progress and to identify what is most important for future learning. Progression, and therefore achievement, in Donaldson's terms is positive, beginning from the child or young person's point of departure. Progression describes a forward movement for each learner which is not necessarily linear and which does not end at a given age or stage. Throughout the Donaldson Review, learning is conceptualised as growth. Learners build on previous knowledge/skills/competencies/dispositions in a continuous journey across and within the Areas of Learning and Experience.

Learning is defined through the concept of progression, which is represented as a coherent continuum without separation or interruption. The continuity that the new curriculum places at the centre of learning describes a holistic approach to the development of the individual, including experiential learning that is valuable in and of itself. Learning is the end goal of the education system. The learner is at the heart of the process and a fundamental element of the curriculum is choice. Learners are encouraged to take responsibility for their own learning, to become pro-active, and teachers are encouraged to ensure learning is meaningful and 'authentic', so that it has real world relevance.

What Successful Futures says about Progression

The term progression occurs 116 times in Successful Futures. Additional Document 1 provides a list of each occasion when the word progression is used and an analysis of the different contexts for the idea of progression. In *Successful Futures* (2015) the four purposes provide 'coherence, progression and flow' to learning intentions (p.21). Significant emphasis is placed on manageability:

> *'Having common Areas of Learning and Experience from 3 to 16 should promote and underpin continuity and progression and help to make the structure easier to understand'* (p.39).

Successful Futures presents a clear vision for progression

1. Phases and key stages should be removed in order that progression can be continuous, increasing the potential for higher attainment by minimising transitions.
2. Progression in each Area of Learning and Experience should be based on a well-grounded, nationally described continuum of learning that flows from when a child enters education through to the end of statutory schooling at 16 and beyond.

3. Learning should be an expedition, with stops, detours and spurts rather than a straight line. Progression is a 'road map' for each and every child/young person's progress in learning though some children and young people will progress further than others.
4. Progression Steps will be described at five points in the learning continuum, relating broadly to expectations at ages 5, 8, 11, 14 and 16 (staging points for reference rather than universal expectations – but expectations should be high for all learners).
5. Progression Steps are made up of a number of achievement outcomes linked to what matters in the curriculum and linked to the four purposes ('I can' statements). Literacy, numeracy, digital competence and wider skills should be embedded as well as elements of the Cwricwlwm Cymreig.
6. Achievement Outcomes should not be a checklist of knowledge or skills and should incorporate effective pedagogy.
7. Achievement outcomes should inform next steps and be framed as broad expectations achievable over a period of time (approximately 3 years).
8. Achievement Outcomes should use 'I can', 'I have' (and 'I am ready to') statements to describe progression (not over specified or overly vague – this may vary across AoLEs).
9. Assessment (relevant and proportionate) should be focused on learning intentions and progression in relation to the four curriculum purposes and based upon the intentions set out in the Achievement Outcomes at each Progression Step within each Area of Learning and Experience. In each AoLE the Achievement Outcomes at each Progression Step will need to encapsulate the most important aspects of learning, take account of the ways in which children progress in different kinds of learning and recognise what they need to be able to know and do to move securely to the next stage.
10. Professional judgement is central to assessment (formative assessment with relevant summative information collected and used formatively within classrooms and schools).
11. Schools should use teacher assessment of progression systematically, together with other sources of evidence, to inform their self-evaluation for school improvement purposes.

The ideas presented in *Successful Futures* form the principles from which curriculum, progression and assessment in Wales should be developed and offer a touchstone against which emerging proposals can be evaluated.

Evidence from Research – an Analysis of Research on Progression

The inter-relationship of curriculum, assessment and pedagogy is recognised as being at the heart of learning. Yet, Wyse, Hayward & Pandya (2015), analysing the state of the field internationally, suggested that all too often research has focused on these as different fields leading to a lack of alignment in how curriculum, assessment and pedagogy are experienced in learning. This theme was developed by Wiliam (2017:1) who argued that theories of learning and theories of assessment lack connection because assessment and learning are trying to do different things and each field has been inward looking in identifying and addressing challenges. *Successful Futures* (2015) recognises the importance of promoting a strong relationship between curriculum, assessment and pedagogy. The policy states clearly that everything in education in Wales should be driven from the curriculum: the identification of what matters for a person to be considered educated. What matters in the curriculum in Wales is being identified by the Pioneer Schools in each AoLE. This research review

begins from that premise and explores how progression and assessment might emerge in relation to what matters.

Curriculum, Progression, Pedagogy and Assessment – a Coherent Whole

Built into every curriculum internationally is a notion of learning development but there are different ways in which this can be done. Some countries seek to describe outcomes in different areas of the curriculum through the specification of standards commonly related to ages and stages on development in schools. The aspiration is that by specifying standards, these will become teachers' expectations and student performance will improve. Yet concerns have been raised that many of the statements of standards do not provide the information necessary to achieve that aspiration and are not helpful in developing an understanding of where students are in relation to what might be regarded as desired goals (Heritage, 2008). This lack of clarity can lead to problems emerging between curriculum and learning, for example, teachers may find these statements of standards difficult to use for formative assessment purposes – where the learning is going, where the learner is right now and how to get there (Wiliam & Thompson, 2007). Learning progressions offer the potential to support learning more effectively as they offer teachers the opportunity to relate learning in their class to learning undertaken in previous and learning to be undertaken in future classes. They can make connections between prior and future learning and use information from formative assessment to discern where students' learning lies, allowing them to relate teaching more specifically to what matters and, crucially, to what matters next. Heritage (2008) suggests that '*Explicit learning progressions can provide the clarity that teachers need'.*

Heritage (2008:2) also suggests that greater attention should be paid to the different levels of specificity used to articulate the curriculum. Some curricula specify detailed objectives to be mastered at each grade in sequence. When the curriculum is described in this level of detail, its 'grain size', it may be difficult to see how these discrete objectives connect to bigger, organising concepts and learning can become little more than a checklist of things to be learned. Curricula organised around core concepts or 'big ideas' and sub-concepts offer better opportunities for a stronger relationship between assessment and learning goals: assessment for formative purposes. However, Heritage (ibid) argues that care also needs to be taken with this approach for too often 'big ideas' are not brought together as a coherent vision for the progressive acquisition of concepts and skills. Without a coherent vision the potential for teachers to have a broad overview of learning in a specific domain is restricted. Broadly speaking, learning progressions differ in the span of the progressions and the degree of granularity in their description. Some models present a learning progression as almost a unit of work, whilst others, such as spelling, span several years. Often, the shorter the span, the greater the detail and specificity.

The work of Black *et al.* (2011:74) develops the idea that having a coherent model of progression that is closely linked to assessment and pedagogy will effectively support learning. They conclude that progressions are essential to high quality learning and teaching.

> *'One essential ingredient for a teacher is to have in mind an underlying scheme of progression in the topic; such a scheme will guide the ways in which students' contributions are summarized and highlighted in the teacher's interventions and the orientation the teacher may provide by further suggestions, summaries, questions, and other activities.'*

Pellegrino *et al.* (2012) offer further insights into what is important in the assessment process, a process he describes as reasoning from evidence, and how assessment might relate to curriculum and pedagogy. He identifies three interconnected elements that should underpin any assessment and conceptualises these as an assessment triangle whose three sides are:

- a model of student cognition and learning in the assessment domain
- a set of assumptions and principles about the kinds of observations that will provide evidence of competences
- an interpretation for making sense of the evidence

Whilst all three elements are essential, in a later article (2017:361), Pellegrino argues that often the critical cognition component is missing. The focus of learning should be determined as far as possible by models that describe *'how people represent knowledge and develop competence in the domain of interest'*. This, he suggests, is a distinguishing feature of an evidence-based approach to assessment design, where the most important aspects of student achievement are identified, aspects which then become the focus for '*inferences'* and which should '*provides clues about the types of assessment tasks or situations that will elicit evidence to support those inferences'.*

Although most work on learning progressions has been carried out within domains, deeper understanding of what is important to improve learning may require work to be undertaken across domains. Some more recent studies have begun to explore learning progression across domains. An example of this is to be found in Wylie *et al* (2017 in press) where the researchers sought to build companion learning progressions in mathematics and language. They argue that analysing mathematics and language learning progressions together offers a more detailed and nuanced picture of progression to inform teaching and formative assessment. By focusing on both mathematical knowledge and the discursive skills required to share that understanding, the researchers moved thinking from right versus wrong to a deeper understanding of the ways in which pupils were developing competences in mathematics and language. The application of content and language progressions, they suggested, provided teachers with a deeper understanding of the interaction of mathematical knowledge and language proficiency.

What are Key Characteristics of Learning Progressions?

Mosher & Heritage (2017:1) define Learning Progressions as

> *'inferences or hypotheses describing the order of definable steps, stages, or levels that students' understanding and skill in a subject or discipline are likely to go through over time in response to instruction and experience as they reach the levels of understanding and skill that are the goals of instruction.... The inferences should be based on empirical evidence from student work, assessment performance, responses to clinical interviews, or other observations by teachers or researchers. They may describe likely steps or growth paths in the context of typical instruction, or they could describe what becomes possible with more effective instruction.'*

Learning progressions are pathways along which students are expected to progress. These pathways or progressions are the basis of teaching and assessment. Learning progressions can be conceptualised in different ways but as part of a review of a range of different approaches to learning progressions, Heritage (2008) identified certain common features.

- All models conceptualise progression as a continuum of increasing sophistication of understanding and skills as young people move from 'novice to expert'. (p.4)
- No definition contains references to grade or age level expectations, in contrast to many standards and curriculum models. Instead, learning is conceived as a sequence or continuum of increasing expertise.
- Learning progressions adopt a developmental view, inviting teachers to conceptualise learning as a process of increasing sophistication rather than as a body of content to be covered within specific grade levels.
- Progression also implies a sequence along which students move incrementally from novice to more expert performance. Implicit in *progression* is the notion of continuity and coherence. Learning is not seen as a series of discrete events, but rather as a trajectory of development that connects knowledge, concepts and skills within a domain.
- Learning progressions are accommodating. They recognise that students do not move forward at the same rate or with the same degree of depth and progression and see this as an expected part of learning.
- Learning progressions enable teachers to focus on important learning goals paying attention to what a student would learn rather than what a student would do (the learning activity). The learning goal is identified first and teaching, pedagogy and assessment are directed towards that goal. 'Consequently, the all too common practice of learning being activity driven rather than driven by the learning goal is avoided.' (p.5)
- Learning progressions are an important part of assessment to support learning. Clear connections between what comes before and after a point in the progression offers teachers a better opportunity to calibrate their teaching, to address misunderstandings or to develop skills as revealed by assessment, and to determine what important next steps would be to move the student forward from that point.

Further key features of learning progressions are identified in the work of Duschl *et al* (2007) and Pellegrino (2017). Duschl *et al.* (2007) suggest that a distinctive feature of learning progressions is the evidence base from which they are developed. They define learning progressions as evidence based hypotheses about how students' understanding and ability to use core concepts and explanations become more sophisticated over time. These hypotheses represent the pathways that young people are likely to follow as they make progress. These pathways should be empirically tested to ensure that they relate closely to how most students experience progression and should be empirically evaluated to determine their efficacy to discern whether or not lead to better learning.

Pellegrino (2017) suggests that although learning progressions are not developmentally inevitable, they may be developmentally constrained. He suggests that numerous progression paths are possible and that progress rather than being linear may be more like 'ecological succession' (p.362). A learning progression offers one or more possible paths but 'does not represent a complete list of all possible paths'. In addition, at any point in the process, an individual may demonstrate thinking and/or practices that could be considered to be at different points on the path. Mosher & Heritage (2017) support this view, adding an optimistic view of learning progressions which suggests that there is a small number of likely paths, that the steps along the way are clearly distinguishable and that they represent understanding and related skills which are stable for reasonable periods of time. They also re-emphasise the complex nature of the progression concept, its non-linear pathways, its confusions and regressions as learner thinking develops over time to new levels of sophistication.

The inter-relationship between the learner and progression is further complicated by regressions that can occur in particular circumstances, e.g. stress or challenges that feel to them to be too great. This approach may align more closely with Bruner's spiral curriculum than any model of linear learning, building on the hypothesis that '*any subject can be taught effectively in some intellectually honest form to any child at any stage of development*' (Bruner, 1960*:* 33). Pellegrino (2017) argues that there is a clear connection between progress in learning and the quality of teaching to which the young person is exposed. High quality curriculum and pedagogy are essential for optimal progression as is the teacher's confidence in dealing with the complexities of differentiated instruction.

Learning Progressions and Audience

There is a further characteristic of Learning Progressions worthy of consideration: the audience. Many learning progressions are written primarily for teachers and tensions can arise if a single learning progression attempts to serve too many purposes. For example, Heritage (2008) draws attention to the problems that can arise if it is assumed that the same degree of granularity will serve both planning and assessment. The degree of granularity in a learning progression designed to ensure that teachers have an overview of progress from novice to expert is very different from the degree of granularity necessary to enable teachers to support learning formatively: the latter would require a far more detailed analysis of progress in learning. She proposes that a possible way to deal with this issue would be to have different learning progressions serving different purposes. An overview learning progression to offer a multi-year picture of the journey from novice to expert. These could then be linked to learning progressions related to each of the key building blocks of what matters in the curriculum. These more detailed learning progressions would support teachers in formative assessment whilst their relationship to the multi-year learning progression would allow them to locate their own work in the bigger learning picture. This could also be helpful in offering support to teachers who are working with young people whose learning is outside the range of normal expectations for the group or year with whom they are working.

Learning progressions can also be written in ways which provide a framework for learners to understand the learning journey they are on. Heritage (2008) argues for the importance of learners being aware of longer term goals and the relationship between those and their day to day progress. It is unquestionably desirable for students to know what the longer-term goal is or what the final product of the learning will be. Increased involvement in learning occurs when teachers share with the students what their longer-term goals are and enable them to participate in evaluating the degree to which they have met the goals. The changing role of the learner within social constructivist and sociocultural theories of learning is highlighted by Baird *et al.* (2014, 2017). Within these overlapping theories, there are common learner characteristics. Learners are active in the learning process, involved in self and peer assessment, in social processes and interactions where there is a changed 'contract' around learning. If the aspirations for this new relationship, this new contract between the learner and society, as articulated in Baird *et al.* (ibid) are to be fulfilled, there are implications for the level of transparency in curriculum, progression, pedagogy and assessment. Learners need deeper and more meaningful understandings of what matters in learning and a voice in what matters. They would have the right to understand the longer-term journey in the domain being studied and the responsibility to work with teachers and others to engage in learning

processes and, crucially, in assessment as part of learning. Learning progressions are a crucial part of this process.

Progression and Assessment

There is strong research evidence that approaches to formative assessment can and do improve learners' attainments (Black & Wiliam, 1998; Wiliam *et al.*, 2004). Black *et al.* (2011) suggest that these approaches are based on principles of learning well informed by cognitive research. They define the principles as

- *'Start from a learner's existing understanding.*
- *Involve the learner actively in the learning process.*
- *Develop the learner's overview, i.e. metacognition – this requires that students have a view of purpose, have an understanding of the criteria of quality of achievement, and self-assess.*
- *Emphasise the social aspects of learning (i.e. learning through discussion) as these make a unique contribution.'*

There are strong areas of overlap between this definition and Heritage's (2008) conceptualisation of formative assessment:

- eliciting evidence about learning to close the gap between current and desired performance (Pellegrino (2001) would describe this as drawing inferences);
- providing feedback to students; and
- involving students in the assessment and learning process.

Both definitions privilege the role of the learner in learning and assessment.

Black *et al*. (2011) make a strong case for the centrality of teacher assessment. They suggest that teachers' in-classroom assessments offer opportunities to achieve far better standards of validity than national or state tests. The evidence they generate is richer and more meaningful. However, they caution that significant professional development (2001:106) is necessary, for teachers' professional judgements to be both valid and reliable. The authors present five steps essential to the design and implementation of any learning exercise. The exercise must have strategic aims that involve understanding concepts and methods of a subject or developing reasoning skills. Teaching has to be planned, involving what the authors describe as choosing the tactics for realising the strategy in order to '*help build a picture of learners' existing understanding, especially with respect to the learner's location on the learning progression, so that the next challenge can be framed to take that understanding further'* (2001:77). The plan then has to be implemented, reviewed and summed up. The researchers argue for the importance of a curriculum as an evidence-based model of the paths through which learning typically proceeds used to inform both pedagogy and assessment. These 'road maps' they describe as central for all five steps outlined above. And they offer an example of a road map for the scientific concept 'atomic-molecular theory of macro properties'. Through this example, the authors suggest that we can create roadmaps by synthesising several sources of evidence (2011: 85)

- research results about common pupil misconceptions
- internal logic of the concepts involved
- indications from learning theory about difficulty of the types of thinking involved

- results from assessment items that indicate problems/possibilities with the topic sequence

They argue that, although previous qualitative studies on this topic provide rich understandings of progression of learning, they are limited by the specific contexts in which they were developed. They propose larger scale and longitudinal studies to deepen understanding of trajectories of change of individuals.

Black *et al*. (2011) argue that progression is needed for formative assessment:

> *'(a) to formulate a task or test so that the responses can provide evidence of learning progression, (b) to formulate helpful comments, tailored to the individual needs of each student, and (c) to give clear guidance on how to improve, all require a clear road map, that is, a view of the learning aim and of the steps along the route, or routes, that the student needs to take to get closer to the aim in light of his or her position en route.*' (p. 75)

Pellegrino (2014, 2017) supports this view. He suggests that learning progressions are helpful ways to think about the assessment of student learning. Like Black *et al* (2011), he argues that learning progressions should contain multiple elements, including *Learning Performances.* These he describes as

> '*the kinds of tasks students at a particular level of achievement would be capable of performing. They provide specifications for the development of assessments by which students would demonstrate their knowledge and understanding. Such assessments allow one to observe and infer students' levels of competence for major constructs that are the target of instruction and assessment within and across grade levels. Thus, an adequately specified learning progression should include an approach to assessment, as assessments are integral to learning progression development, validation, and use'* (2017:362).

He also concludes (Pellegrino, 2017:363) that when detailed maps of learning progression exist at grain sizes to support teaching and assessment, these will form a conceptual base that can be used as evidence of longer term growth and change, evidence currently collected through large-scale assessments. This will improve the validity of the assessment because there is a clearer idea of the construct being measured and the level at which student learning and performance is understood.

In conclusion

There is recognition in both policy in Wales and research of the importance of learning being articulated progressively. Although in Successful Futures (2015) this is described as a *learning continuum* and in research as a learning progression, these terms share many common characteristics. For example,

- Curriculum, assessment and pedagogy should be seen as an integrated whole
- Progression should be continuous
- Progression is not linear
- The journey from the point a young person transitions into the curriculum until the point where the young person transitions into life beyond school education should be sufficiently clear to allow both teachers and learners to make sense of how day to day activities relate to the learning journey over time.

- Assessment for learning has the potential to enhance young people's learning but there are a number of areas to be considered as part of curriculum and assessment innovation if this potential is to be realised

The key messages emerging from the review of all the evidence sources examined in this research report and possible implications for how evidence from policy and research might influence emerging practice are considered in the next section of this report.

Section 2: Evidence in Areas of Learning Experience

Expressive Arts: Review of Frameworks

Purpose of the report

The report seeks to identify key issues and decisions relating to writing Achievement Outcomes which will constitute Progression Points in pupils' journeys through the learning process in Expressive Arts. It is a principle of *Successful Futures* and of the CAMAU Project that the Achievement Outcomes and any associated description of learning progression should enable teachers to know what kinds of knowledge, skills and aptitudes they should aim to develop with learners at all stages of their learning journey. Achievement Outcomes should enable both teachers and learners to see the next steps to be taken.

The report does not comment separately on each of the frameworks reviewed. Rather, it identifies characteristics of types of approach to describing progression and achievement and refers to relevant frameworks as representative of these approaches. These types of approach may offer potential models for proceeding in the CAMAU Project; the report notes factors which would come into play in deciding for or against particular ways of doing so.

Frameworks reviewed

Frameworks for arts or expressive arts education from the following sources were reviewed:

- Australia
- British Columbia
- New Zealand
- Ontario
- Quebec
- Scotland

In addition information about approaches taken in different national frameworks was derived from the National Foundation for Educational Research (NFER) 2004 publication *Curriculum and Progression in the Arts: an International Study*.

A Note on 'What Matters'

The complexity of the relationship between of 'what matters' and 'progression' became apparent during the review process. In some frameworks the 'main aims' of the curriculum are articulated at the start and then elaborated in detail in a description of the curriculum or in a description of learners' expected achievement (e.g. learning or achievement outcomes, standards, descriptions of progression) or in descriptions of both. It is to be expected that the achievement outcomes of a framework reflect or encapsulate what the designers of the curriculum most value in the process of educating young people. This is the justification for focusing in this review of curricular frameworks on the means by which progression has been described, without explicit treatment of what matters as a separate concept.

However, there is one important 'what matters' issue that requires decisions at a strategic level: specification of the contexts in which achievement outcomes and progression can be described. The issue here is the range of aspects of Expressive Arts with which any individual framework deals.

The frameworks reviewed identified similar arts subjects. All included *Dance, Drama, Music*, and *Visual Arts*; the Australian framework refers to *Music and Sound Arts* and the Scottish one to *Art and Design*. The Australian framework has in addition a *Media Arts* subject area.

Most of the frameworks also included more detailed indication of the constituent content of the subject areas. For example, the *Ontario* framework spelled this out as follows:

- Dance:
  Elements: body, space, time, energy, and relationship.
- Drama:
  Elements: role/character, relationship, time and place, tension, and focus and emphasis.
- Music:
  Elements: duration, pitch, dynamics and other expressive controls, timbre, texture/harmony, and form.
- Visual Arts:
  Elements: line, shape and form, space, colour, texture, and value;
  Principles: contrast, repetition and rhythm, variety, emphasis, proportion, balance, unity and harmony, and movement.

The NFER 2004 publication reported that about half of the 21 countries or states surveyed organised their curricula into broad groups of subjects rather than individual subjects: in these cases, there was a broad subject area called 'the arts' (or something similar); within that arts group, these countries also tended to identify, for example, music, dance and visual arts as specific areas of study. In other countries arts subjects were described and taught separately; typically in such countries dance was an aspect of physical education and drama formed part of the first language curriculum.

The *British Columbia* arts education curriculum presents a well-argued case for requiring teachers and students to give attention to both an integrated broad conception of expressive arts education and to the development of knowledge and skills in the individual subjects:

> *'Collectively, the curricula for Dance, Drama, Music, and Visual Arts are referred to as arts education. Because each subject is distinct – requiring unique knowledge, skills, and attitudes – each subject has its own curriculum document. However, all four arts education curricula do provide opportunities for growth in three common areas of learning:*
>
> - *creating, expressing, perceiving, and responding*
> - *knowledge, skills, and techniques*
> - *personal, social, cultural, and historical contexts.*
>
> *The common areas of learning make it easier for teachers to integrate instruction in arts education at the elementary level. Such integration offers many advantages for both students and teachers, provided the unique characteristics of each subject are respected and made evident to students. In planning instruction, teachers will also want to consider that the three common areas of learning are themselves closely interrelated — none can be properly addressed without reference to the others.'*

In other cases, the documents reviewed do not always reveal the justification for the ways adopted of setting out the broad structure of the framework. These strategic decisions depend on the intentions of the whole curriculum development. In Wales these intentions are primarily evident in *Successful Futures* (Donaldson, 2015) which states:

> *'The Expressive Arts Area of Learning and Experience will span art, drama, music, dance, film and digital media, encompassing wider creative aspects such as improvisation. The Review has taken account of the report of the review of Arts in Education in the Schools in Wales, which described 'the arts' as including the making, performance, expression or appreciation of one or more of: music; drama; dance; film and digital media; visual arts and design; literature and creative writing. All of these art forms will be addressed within the curriculum, mainly through the Expressive Arts Area of Learning and Experience, but outcomes for literature and creative writing will form part of the Languages, Literacy and Communication Area of Learning and Experience.'*

The aspects of Expressive Arts which the Expressive Arts AoLE group chooses to value and identify as the key components of what matters – whether broadly defined and/or defined as discrete arts subject areas – will inform the writing of achievement outcomes.

Possible Models for Writing Achievement Outcomes

The frameworks reviewed provide a number of models, the relevance, use, advantages and disadvantages of which can be considered by the Expressive Arts AoLE group. These models are considered in the next sections.

Almost all the frameworks considered include, in one way or another, very detailed descriptions of the knowledge, skills, capabilities and aptitudes that constitute successful achievement in the Expressive Arts. Learners show progression in these achievements as they move through stages of learning (whether specified standards to be achieved at particular ages or, in a few cases, descriptions of what learners can do at successive stages of a learning journey irrespective of age). This level of detail in descriptions of achievement is an important feature for the CAMAU Project to consider. One of the aims of the Project is to develop a progression framework that will help teachers and learners to see, and indeed to develop automatic awareness of, the appropriate next steps as dialogue and assessment for learning take place during the learning process. Key decisions for the Expressive Arts group arise concerning both the determination of the central aspects of achievement in the AoLE and the specification of the appropriate (that is, helpful and manageable) level of detailed description of achievement. Another necessary decision concerns the best location of detail. Should this information be situated within the curricular/progression framework itself or in associated material available to teachers as part of their continuing professional development?

Age-related descriptors/standards or steps in a learning journey?

The NFER 2004 review of the arts curricula in 21 countries or states identified teacher professional judgement as the predominant basis for assessing learners' performance and progression. Teachers commonly assessed progress in the arts through observation and assessment of portfolios or

samples of work. Three types of professional judgement were identified across the range of curricula reviewed**:**

- of attainment in relation to the content of the curriculum, as detailed for each year group
- of whether or not an individual pupil had achieved a certain specified standard by a particular age
- of the level to be assigned to an individual learner's performance, independent of age – using a developmental scale of attainment within a particular discipline, ranging from novice to expert (though typically as numbered levels).

The report included exemplification of both self-assessment and achievement of standards in various countries.

The third of these assessment models uses in principle a progression framework which describes a real learning journey, irrespective of age or stage of schooling, rather than specifying curriculum content to be covered or a standard to be achieved by year groups or particular ages or stages. The countries or states adopting this approach at that time included *Queensland*, *Victoria* and *England* and *Wales*. The National Curriculum of England and Wales set out a broad progression framework as numbered levels but it was understood that not all learners would achieve a particular level at the same time.

Among the more recent frameworks reviewed, the *Scottish* Curriculum for Excellence is based on the same principle. In *New Zealand*, too, there is an expectation that students will progress over 8 levels from years 1 to 13 but, to account for a normal variation in the rate of progression, each level spans up to three years; more extreme variance is acknowledged – not all children start in the same place and not all children will follow the same path or pattern of linear progression. Pupils with special learning needs, those who come from non-English-speaking backgrounds and those who are more able and talented may all progress at quite different pace. Even though a national or state framework may recognise formally that learners will progress at different speeds and through different pathways, the description of achievement outcomes and progression in documentation may not reflect actual progression steps in real learning.

Although the NFER review describes the provision made for arts education some 15-20 years ago, the approaches described still raise issues requiring resolution in the current development of the Welsh curriculum and progression framework. On the basis of consideration of the broad models found by the NFER researchers, the CAMAU group needs to take a key strategic decision whether to write achievement outcomes that specify Expressive Arts knowledge, skills, capabilities and dispositions

- as standards to be reached by particular year groups or ages
- as descriptions of learning that is essential for further learning, so producing a set of outcomes that constitute an empirically well-founded progression framework.

An associated strategic decision which is needed, whichever kind of framework is chosen, relates to the number of points at which achievement outcomes should be written. Ideally, in a 'learning' progression framework, as opposed to an age-related one, the number of such points should emerge naturally as crucial learning steps are identified. However, in the case of the CAMAU development, the Welsh Government requirement, articulated in *Successful Futures*, must be taken into account: that Achievement Outcomes constituting Progression Steps should be written for ages

5, 8, 11 and 16. The AoLE group will need to decide how to successfully design an achievement outcomes framework that both reflects real learning progression and provides a form of benchmark description of achievement at the specified ages.

More particularly, the fact that 15-20 years ago Wales was using a progression framework in the National Curriculum which was taking at least some account of pupils' varying pace of progress may encourage the AoLE group to consider the beneficial aspects of previous national developments where appropriate in moving towards the writing of new achievement outcomes.

Central Generic Ideas and Detailed Description of Subject Knowledge and Skills

The description of achievement is typically organised in terms of generic, central ideas or activities accompanied by detailed elaboration or expansion of the knowledge, skills, activities or capabilities expected at each stage of progress or development or each year group. All the frameworks reviewed spell out this detailed description of achievement in terms of knowledge, skills, activities, capabilities in the specific arts subject areas: Music, Drama, Visual Arts, Dance …

The *Ontario* curricular and progression framework identifies desirable achievement for arts education in considerable detail, specifying both knowledge and skills that students should achieve and the quite wide range of activity and thinking they should engage in. The framework spells out for every Grade (year group) Overall Expectations and Specific Expectations for all aspects of arts work:

(i) Creating and Presenting,
(ii) Reflecting, Responding and Analysing,
(iii) Exploring Forms and Cultural Context

Fundamental Concepts for each Grade are also specified. The thinking, communication and application skills which learners should demonstrate are detailed as:

- Knowledge & Understanding
  - Knowledge of content
  - Understanding of content
- Thinking
  - Use of planning skills
  - Use of Processing skills
  - Use of critical/creative thinking processes.
- Communication
  - Expression and organisation of ideas and understandings in art forms including media
  - Communication for different audiences
  - Use of conventions in the arts e.g. vocabulary orally and written forms
- Application
  - Application of knowledge and skills
  - Transfer of knowledge and skills
  - Making connections within and between various contexts.

There are thus many pages per Grade of detailed guidance on the expectations. Teachers are required to make an assessment judgement on each of these expectations. The judgement is recorded as a mark, where *1 = limited effectiveness, 2 = some effectiveness, 3 = considerable*

effectiveness and *4 = a high degree of effectiveness or thorough effectiveness*. The expected State Standard is 3.

The three overarching organising activities in Ontario (Creating and Presenting; Reflecting, Responding and Analysing; Exploring Forms and Cultural Context) are matched in other frameworks by similar structures of broad central ideas/activities.

In *New Zealand* the achievement objectives of each component of the Arts Curriculum are structured under four interrelated strands:

- Understanding the Arts in Context
- Developing Practical Knowledge in the Arts
- Developing Ideas in the Arts
- Communicating and Interpreting in the Arts.

These strands are 'what matters' at the highest level in the arts. Under each strand described, there are descriptors of what a learner is expected to achieve at each of the 8 levels of achievement. They begin as relatively simple broad statements of what a child knows or can do and become increasingly more sophisticated and specific with reference to higher order skills and complex concepts. For example, for the achievement outcome *Understanding dance in context* in Dance Level 1 a student would be expected to:

- Demonstrate an awareness of dance in their lives and in their communities.

At level 8, the skills, aptitudes and knowledge to be demonstrated in respect of this same outcome are:

- Investigate, analyse, and discuss the features, history, issues, and development of dance in New Zealand, including the contribution of selected individuals and groups.

In a separate linked document there are expansions of all the achievement outcomes which provide at every level much detailed description of what is expected.

The *Quebec* framework identifies 10 generic outcomes for learning in the arts:

- openness to the world of sensitivity, subjectivity and creativity
- expression of their own reality and vision of the world
- symbolic languages
- intuition and imagination
- discovery and construction of the meaning of things
- contribution to the transformation of cultural and social values
- awareness of the history and evolution of societies
- forms of intelligence
- communication through artistic production
- inspiration based on the cultural and social values of daily life.

It then develops a detailed account of skills and progression in Content Description and Elaboration sections. Three Competencies are identified for each 'subject area' (music, dance, drama, visual arts); as an example, the Competencies for Visual Arts are:

- To produce individual works in the visual arts;

- To produce media works in the visual arts;
- To appreciate works of art, traditional artistic objects, media images, personal productions and those of classmates.

A 'developmental profile' for each Competency is specified for each of the three cycles of learning. Each of these profile descriptions covers a number of aspects:

- Focus of the Competency
- Key Features of the Competency
- Evaluation Criteria
- End-of-Cycle Outcomes
- Essential Knowledges
- Vocabulary
- Suggestions for Using Information and Communications Technologies.

British Columbia uses a comparable, if somewhat different, model of the same 'generic ideas and activities plus detailed subject knowledge and skills' approach. There broad competencies are called 'big ideas'. They are not identical across all Grades (year groups), but become more complex and challenging as students progress from year to year; the detailed descriptions of what they mean also become more sophisticated as Grades advance. A notable point about the British Columbia framework is that, while the detailed exemplification of the meaning of the big ideas is clearly subject-related, it is not set out in separate 'boxes': ways in which the different subject areas contribute to the big ideas are listed in one box parallel to the big ideas statements.

The *Australian* arts curriculum identifies key principles and elements:

- making and responding
- languages, symbols, techniques, processes, skills of the arts
- creativity, critical thinking
- local and regional cultures
- design as a common fundamental strategy.

These elements are elaborated for each stage/band in Content Descriptions, Content Elaborations and examples of knowledge and skills for the band. A characteristic of the Australian approach is that what matters is clearly identified as the *curricular experiences* defined in the Content Descriptions. These in effect indicate for teachers and learners the pedagogical experiences that constitute high quality arts education and the understanding, skills, attributes and capabilities that students develop through them. Achievement outcomes are not as detailed as in the other frameworks reviewed. They are generic statements at each band directly related to the Content Descriptions as described above: e.g.

> ***Years 7 and 8 Achievement Standard***
>
> *'By the end of Year 8, students identify and analyse how the elements of drama are used, combined and manipulated in different styles. They apply this knowledge in drama they make and perform. They evaluate how they and others from different cultures, times and places communicate meaning and intent through drama.*
>
> *Students collaborate to devise, interpret and perform drama. They manipulate the elements of drama, narrative and structure to control and communicate meaning. They apply different*

performance styles and conventions to convey status, relationships and intentions. They use performance skills and design elements to shape and focus theatrical effect for an audience.'

The achievement outcomes are thus in effect statements about the curricular and pedagogical experiences students should have; they are not 'standards' which determine the curriculum but statements of expectations concerning the activities in which learners should have participated and the skills which they should have practised, which become more complex and sophisticated as they pass through the bands. This concept of achievement outcomes as experiences which become more complex and sophisticated over time may be an important one to keep in mind in making decisions about the nature of Expressive Arts achievement outcomes.

This idea is also found in the *New Zealand* documentation. It argues that, within each of the arts disciplines, learners develop literacies as they build on skills, knowledge, attitudes, and understandings at each level of the curriculum. Through arts practices and the use of traditional and new technologies, learners' artistic ideas are generated and refined through cycles of action and reflection. By building on and revisiting learning from previous levels, arts programmes in each discipline provide progressions of learning opportunities in all four strands. This spiral process ensures that students' learning is relevant, in-depth, and meaningful.

Graded or Ungraded Descriptions of Performance

The frameworks review has thrown up a further issue on which the Expressive Arts group will need to consider. Some frameworks seek to differentiate learners' performance at the same chronological or progressive stage by using a grading system or mark. For example, *British Columbia* places students' performance in one of the following categories (with detailed descriptors): *Not Yet Within Expectations*, *Meets Expectations* (minimally), *Fully Meets Expectations* and *Exceeds Expectations* at every year. *Ontario* applies a mark: *1 = limited effectiveness, 2 = some effectiveness, 3 = considerable effectiveness* and *4 = a high degree of effectiveness or thorough effectiveness*. The expected State Standard is 3. The NFER 2004 Report reported similarly graded systems in *Massachusetts* and elsewhere in the *USA* and in *Victoria*, *Australia*.

Other frameworks, such as *Australia's* current national one and *New Zealand's*, offer ungraded descriptions of complex achievement and interacting skills.

This matter is related to the number of stages of development it is appropriate to describe in a progressive framework. A possible justification for the kinds of grading or marks systems shown may be that descriptions of very broadly defined frameworks do not give teachers and learners enough detail in deciding on next steps in learning. An obvious potential disadvantage is the danger of labelling learners and the associated motivational issues. Approaches like that of New Zealand seek to provide desirable guidance and support for pedagogy and assessment for learning through additional associated material and encouraging continuing professional development activities. The Expressive Arts group will need to consider and decide for or against a partly graded system.

'I can' statements

Most of the Expressive Arts frameworks reviewed described achievement outcomes and progression without using 'I can' statements. *Successful Futures* proposes that the Welsh curriculum should use 'I

can' statements: it will be possible to write the achievement outcomes using that formula, once decisions have been made about the crucial nature of the achievements.

Decisions for the Expressive Arts Group Arising from the Review

The review identified a number of issues for consideration by the Group. The main issues considered by the Group included:

- What are the broad aspects of the Expressive Arts which the group chooses to value and identify as the key components which will determine the areas for which achievement outcomes will require to be written?
- In particular, will the group wish to develop a model which is based solely on generic ideas/activities/skills or one which is based on these plus subject-specific description?
- What lessons can be learned for the creation of a progression framework and steps from the models examined in this review and from the principles underpinning them?
- What are the relevance, advantages and disadvantages to development in Wales of the models reviewed?
- To what extent and in what ways can the AoLE group draw on beneficial aspects of previous experience of a progression framework in Wales, where appropriate, in moving towards the writing of new achievement outcomes?
- As the group develops an empirically well-founded learning-related progression framework where achievement outcomes describe learning necessary to make further progression, will it wish to refer to descriptions of achievement which are age- or stage-related?
  - This could imply developing learning-related outcomes and then deciding where in the resulting framework most pupils would be at ages 5, 8, 11 and 16.
  - Or it could imply developing draft achievement outcomes for the four age points and then checking and modifying the draft to ensure that
    - all key achievements necessary for subsequent progress have been included at each stage
    - the age-related statements do indeed represent what most pupils can do at each of the four stages.
- To what extent will the group adopt a concept of achievement outcomes defined in terms of the increasing complexity and sophistication over time of experiences and responses?
- Will the group wish to develop succinct broad, generic statements, either with or without more detailed expansion?
- Will the group conclude that descriptions of achievement be graded or ungraded?
- Where should detailed guidance for teachers about progression, next steps and pedagogy be best located: within the curricular/progression framework itself or in associated material available to teachers as part of their continuing professional development?
- Having decided on these and related issues, what are the practical steps to writing achievement outcomes and support material?

Expressive Arts: Research Review

Introduction

This review focuses on a limited number of key texts dealing in different ways with the idea of progression in Expressive Arts (and creativity) and means of facilitating and assessing it. The review principally addresses research and thinking related to generic characteristics of the Expressive Arts which are common across the arts subject areas (the NFER 2004 review of arts education in 21 countries or states, the ideas of Elliot Eisner and the consideration which the European Commission has given to ways of measuring creativity, reported in Spencer *et al*. 2012). However, the review also covers publications describing or commenting on assessment and description of progression in some specific aspects of Expressive Arts, in particular the visual arts or art and design.

Context

Ensuring that pupils are provided with the structure and mechanisms to support the development of knowledge, skills and understanding is an essential and critical component of any contemporary expressive arts curriculum. Consequently, progression and its sequential development is a key need for all pupils in order to ensure that they are well equipped to move from stage to stage in their learning and experience appropriate, logically conceived levels of challenge and difficulty. In order for this to happen it is assumed that subject leaders and teachers in general have a solid grasp of standards and a full understanding of how to enable pupils to make progress. In art and design, for example, Estyn (2016:45) maintain that most teachers have a sound understanding of the quality of standards in their subject and monitor pupils' work on a regular and systematic basis to measure progress, as well as to modify and develop schemes of work. However, Estyn also notes that, whilst pupils engage with a good variety of two dimensional materials and techniques, they rarely experience working in three dimensions or with digital media: such lacunae in their experience can hinder their progress and attainment in Key Stage 4 (Estyn, 2016 p. 4).

Estyn has also found, in an analysis of the creative arts in Key Stage 2, that there was over-reliance on the expertise of some teachers and generally a lack of sequential planning to enable pupils to build on existing skills and expertise with confidence and self-assurance in the next stage of their schooling (Estyn, 2015). This suggests there is a need for significant re-planning of all stages of the curriculum to ensure that pupils are able to move from year to year with increased confidence, a secure understanding of materials and techniques, a thorough awareness of the work of a range of artists, craftspeople and designers and a clear comprehension of how to work creatively and inventively to develop original creative outcomes.

Key Research Reviewed

Whitby, K (2005) Curriculum and Progression in the Arts: An International Study. National Foundation for Education Research. Paper presented at the British Educational Research Association Annual Conference, University of Glamorgan, 14-17 September 2005.

The National Foundation for Educational Research (NFER) undertook in 2004 a survey of evidence focused on curriculum progression in compulsory education in the arts in 21 countries and states. It

explored the content, organisation and progression mechanisms in the arts by evidencing the aims and assessment procedures enacted by the countries and states involved. This comparative research study discovered considerable overlap in the aims and content of curricula, whilst there were differences in the structure of curricula and in the ways in which progress was assessed.

Whitby (2005:1), in condensing the NFER's findings, investigated the idea that education within the arts could have 'personal, social and cultural aims and outcomes as well as purely artistic ones'. She states that pupils should be encouraged to develop their understanding of other cultures, share their experiences of the arts and aim to be confident art consumers and creators in addition to developing skills and techniques in the arts.

A key aim of Whitby's research was to identify whether countries and states which participated in the NFER survey shared similar ambitions and responses in relation to four main categories of Expressive Arts outcomes, 'artistic, personal, social and cultural' (Whitby, 2005:1). Most of the survey responses received did indicate that each of these four categories of outcome was valued. Cultural characteristics were tightly linked with artistic skills, so that enthusiasm for promoting a sense of national identity was often perceived as an intrinsic and crucial component of arts education.

However, regardless of the range of artistic, personal, social and cultural aims pinpointed within the curricula explored, none of the countries or states within the sample identified progression models to gauge outcomes or pupils' attainment in these key areas. The study showed that the focus for assessment in all participating countries and states was on creative outcomes linked to a specific specialism, such as fine art, textiles, etc. In most of the countries and states surveyed it was not a mandatory requirement for pupils to pass a particular grade and they were not assessed against increasing levels of difficulty in a logical, sequential or progressive way. The main requirement for pupils was to show that their skills and knowledge had progressed. In the majority of participating countries and states this was confirmed and endorsed through the teachers' professional judgements in relation to the aims and content of specific courses. In the case of some participants, progress was described in terms of careful age-related levels or a common standard.

Whitby (2005) argues that it would be unwise to:

> *'… generalise the results of this study to other countries or states. It is also important to point out that the documentation represents statements of intent, rather than a description of actual classroom practice'*.

The NFER 2004 survey showed that there were some notable differences in the organisation of the arts curriculum by participants, particularly in relation to integration and separation of 'subjects'. About half of the 21 countries or states surveyed organised their curricula into broad groups of subjects rather than individual subjects: in these cases, there was a broad subject area called 'the arts' (or something similar); within that arts group, these countries also tended to identify, for example, music, dance and visual arts as specific areas of study. In other countries arts subjects were described and taught separately; typically in such countries dance was an aspect of physical education and drama formed part of the first language curriculum. There were great similarities in the ways in which art and design, including specialist areas, was mapped out by all participants.

Without exception all of the 21 countries and states acknowledged the crucial contribution of the arts to the personal, social, cultural and artistic development of pupils, despite the fact that skill progression in these areas was not measured. All assessed the main components of specific arts disciplines carefully but few gauged pupils' performance against progressive indicators of achievement or required them to reach a defined grade or level. Teachers' professional judgement, whether reliable or not, was the principal means of recognising and recording learners' success.

It is worth noting that the Art and Design arrangements in the National Curriculum for Wales (Welsh Assembly Government, 2008) makes use of a similar approach to teacher assessment of pupils' achievement levels in terms of 'Understanding', 'Investigating' and 'Making' in Art & Design at Key Stages 2 and 3. The new GCSE arrangements (Welsh Joint Education Committee, 2016) also endorse a similar approach in relation to the following assessment objectives:

- AO1 Critical understanding
- AO2 Creative making
- AO3 Reflective recording
- AO4 Personal presentation.

Performance progression descriptor indicators are included in WJEC specifications through mark schemes at both GCSE (Welsh Joint Education Committee, 2016) and AS/A Level (Welsh Joint Education Committee, 2015) which could serve as exemplars for Art and Design within the AoLE of the Expressive Arts.

An emphasis on both generic, cross-subject skills and activities and subject-specific knowledge and skills is in harmony with key findings from a research review (Spencer 2010) commissioned jointly by Scottish Government and HMIE (Scotland) to provide guidance for teachers and other stakeholders in implementing or evaluating implementation of the Curriculum for Excellence advice about interdisciplinary learning. A particularly significant finding of the review was that the most effective kinds of interdisciplinary learning do not involve abandonment of disciplines but effective bringing together of knowledge and skills from different well defined areas of learning in very carefully planned work that explicitly links the particular aspects of different curricular areas to broader generic outcomes.

Eisner, E. W. (2005). Reimagining Schools. The selected works of Elliot W. Eisner. Oxford: Routledge.

The work of Elliot Eisner on the role of the arts in education is a significant source of important ideas about the nature of achievement and progression in the arts – and about the ways in which typical current trends in educational policy and practice can impoverish and constrain the quality of young people's experience of and achievements in expressive arts. The following points derive from Eisner (2005), the publication that most effectively draws together Eisner's thinking about the contribution of the arts to education.

Eisner strongly emphasises the importance for education in the arts – and for education more broadly – of the idea of individual creativity. Eisner (2015, pp. 7-16) presents the arguments for (and a practical project to implement) ways of measuring certain elements of creativity:

- Boundary Breaking
- Boundary Pushing

- Inventing
- Aesthetic Organization.

He reports that, in the research study undertaken, Boundary Breaking occurred much less frequently than the other types of activity. In a discussion of the value of specifically defined educational objectives (pp. 17-23) he suggests that such objectives 'can hamper as well as help the ends of instruction'. The use of objectives as criteria to measure the learning outcomes, he argues, may be quite inappropriate in relation to expressive arts:

> '*It is only in a metaphoric sense that one can measure the extent to which a student has been able to produce an aesthetic object or an expressive narrative. Here standards are unapplicable; here judgment is required'*. (p. 20).

Dominic Wyse (personal communication) extends this, arguing that creativity involves a process of collaborative judgement. There is therefore a need for curriculum theory that provides ways of describing success in modes of achievement that cannot be measured: 'Curriculum theory needs to allow for a variety of processes to be employed in the construction of curriculums' (p. 22). Such a change would enable the development of 'expressive' learning objectives, which would not simply focus on the acquisition of 'the known' (as do typical instructional objectives at present in many curricula) but encourage learners to elaborate and modify what they come to know and even at times to produce something entirely new (p. 35).

Eisner's emphasis on the importance of teacher judgement in recognising and describing quality in arts achievement derives from his championing of the concept of 'connoisseurship'. He describes this as a significant, valuable alternative to the scientific approaches to assessment represented by testing and data gathering. It is, he argues, an appreciative art that develops awareness of and describes characteristics and qualities in learners' achievements, rather than evaluating them in terms of whether correct or incorrect responses have been made. He regrets (p. 55) that in educational assessment and evaluation 'An ounce of data, it seems, has been worth a pound of insight'.

Another aspect of Eisner's thinking that harmonises effectively with his ideas about describing the qualities of achievements is the strong case he makes (in the chapter 'The celebration of thinking' (pp. 105-111)) for the integration in an individual learner's educational development of experience and achievement in the arts and thinking and cognition more generally. Artistic activity and cognition are interdependent: 'Traditionally we have separated mind from body… There is no competent work of the hand that does not depend on the competent use of mind' (p. 107). Elsewhere (pp. 76-85) he argues that thinking and expression in other curricular areas are weakened if learners lack awareness of and skill in visual and auditory forms of representation: 'The arts are not mere diversions from the important business of education; they are essential resources' (pp. 83-84). He sees the arts as contributing strongly to general development:

> *'What we do need to teach them (children) is how to engage in higher-order thinking, how to pose telling questions, how to solve complex problems that have more than one answer … The challenge in teaching is to provide the conditions that will foster the growth of those personal characteristics that are socially important, and at the same time, personally satisfying to the student. The aim of education is not to train an army that marches to the*

> *same drummer, at the same pace, toward the same destination… What this means is that children develop at their own distinctive pace.'* (pp. 169-170).

Eisner sums up this line of thought as follows (p. 213):

> *'…I am talking about a culture of schooling in which more importance is placed on exploration than on discovery, more value is assigned to surprise than to control, more attention is devoted to what is distinctive than to what is standard, more interest is related to what is metaphorical than to what is literal …. [a culture that] assigns greater priority to valuing than to measuring and regards the quality of the journey as more educationally significant than the speed at which the destination is reached*.'

One final point made by Eisner is particularly pertinent to the CAMAU project. He argues in a chapter on 'Educational reform and the ecology of schooling' (pp. 136-149) that effective reform engages teachers' commitment by involving them as action researchers or as co-researchers with university staff in the process of designing the changes. The teacher-researchers involved in CAMAU, and those who later, throughout Wales, will have the chance to evaluate, comment on and modify the draft achievement outcomes, as they design the curriculum and the assessment foci for Expressive Arts, may well wish to take account of Eisner's advocacy of rich, qualitative, descriptive approaches to defining progression benchmarks, rather than narrow specification of 'instructional objectives'.

Spencer, E., Lucas, W. & Claxton, G. (2012a). Progression in Creativity – developing new forms of assessment: a literature review. Creativity, Culture and Education. [retrieved from http://www.creativitycultureeducation.org/wp-content/uploads/Progression-in-Creativity-Final-Report-April-2012.pdf]

Spencer *et al*., (2012a), a literature review for the organisation Creativity, Culture and Education, highlights a range of factors related to ways of describing or measuring progression in creativity. Many of these have featured in relatively recent European thinking, in particular thinking stimulated by the European Commission's identification of 2009 as the 'year of creativity' and reflected in the European Commission publication *Measuring Creativity* (Villalba, 2009). The European Commission funded a further study of creativity and the curriculum in the then EU 27, the results of which were published in Wyse & Ferrari (2015) which found that, while 'creativity' was a frequently used term in curricular statements, its incidence varied widely. It was evident that 'creativity' was more often recognised in the arts than in other areas of the curriculum:

> *'it can also be argued that the role of creativity in artistic composition and enactment is qualitatively different, for example, from the creativity of problem framing and solving that is an important part of maths and sciences, and that this qualitative difference may be a sufficient rationale for the higher inclusion of creativity in arts subjects.' (p. 42)*

This study focused on curricular statements and these seem to have made limited reference to assessment or progression. Spencer *et al.* argue that it is important to give status to Expressive Arts through assessment and that there is a need to persuade users of assessment information to value assessment other than tests and examinations and to recognise the importance of assessment to show personal improvement, rather than to compare learners (and thus promote competitiveness). They report that, though there is much research associated with the nature of creativity, there is little addressing the question of how best to conceptualise *progression* in it. Some work is referred

to that relates progression in music (and in written composition) as related to a shift from supported and collaborative work to independent creation of new products (Craft *et al*. 2007). Wyse (2017) reports that a three year longitudinal study of creativity and writing provided some evidence of some broad patterns of creativity development in children age 8 to age 10.

Spencer *et al*., (2012a) argue that 'authentic' assessment, i.e. in context and qualitative in nature, is the most appropriate approach for creative activities, and, indeed, that this kind of approach is actually more important across the curriculum than testing because it is a better preparation for real life challenges beyond school. They note that the Assessment and Testing of 21st Century Skills group at the University of Melbourne locate creativity in their category 'Ways of Thinking' (the other categories are 'Ways of Working', 'Tools for Working' and 'Living in the World').

Spencer *et al*. also review a range of research and thinking associated with the report for the European Commission (Villalba, 2009) on how to *measure* creativity: i.e. how to develop a scientifically justifiable and commonly agreed single tool for measuring what is clearly a set of complex phenomena. They indicate that to develop such a tool would involve a long period of negotiation and statistical analysis of trials to integrate the many different aspects of creativity into an agreed framework of statements describing progress in it. In the light of the kinds of argument advanced by Eisner, the question arises whether there is a need for a single measure, as opposed to means of making judgements about creative achievements and describing them.

Beghetto, R. A., Kaufman, J. C. and Baer, J. 2015. Teaching for Creativity in the Common Core Classroom. Teachers' College, Columbia University.

Wilson, A. (Ed) 2005. Creativity in Primary Education. Exeter: Learning Matters.

These authors identify three key factors relevant to effective assessment of creativity.

1. The first need is to remember that curriculum, pedagogy and assessment are inextricably interrelated: good assessment depends on clear identification in the curriculum of the characteristics of creativity that we want pupils to develop and show. What is important *should* be assessed. Otherwise it loses status and receives less learning/teaching time and effort.
2. Beghetto *et al.* (2015) offer many useful advice points for ensuring that creativity is indeed given importance and status in the curriculum (in all areas). These ideas include:
    - Promoting and actively teaching divergent thinking. This could include, eg, generation of ideas through brainstorming activities in relation to particular purposes (including, of course, various types of expressive arts work)
    - Making sure that discussion activities encourage/require participants to take differing points of view, express varying/conflicting opinions.
    - Building expectations for creativity/imaginative thinking into tasks.
    - Praise efforts to think imaginatively/divergently.
    - Encourage *intrinsic* motivation, rather than, eg, 'success = a high grade'.

    Wilson (2005) contains much helpful guidance on promoting creativity across various aspects of the curriculum, including expressive arts areas.

3. Explain and actively promote the idea that *all* individual thinking is creative; all personal learning creates individual insights, personal grasp of what has been thought about.

All writing is, in a real sense, creative in this way. Equally, so is any personally or collaboratively invented 'outcome' of any expressive arts activity. The 2005 OECD report on formative assessment in secondary education includes a particularly interesting account of a Scottish mathematics teacher who achieved high examination success with his pupils by requiring them constantly to explain to one another how they, individually, would address mathematical problems. His pupils developed a very strong sense that alternative, different ways of thinking were both greatly interesting and very successful at achieving good examination results.

Spencer, E., Lucas, B. and Claxton, G. (2012b). Progression in Creativity: developing new forms of assessment. Centre for Real World Learning at the University of Winchester.

One interesting approach to ensuring that assessment criteria include expectations relating to creativity is explored (and tried out and evaluated) in Spencer *et al.* (2012b). This team worked from the premise that there are *learnable dispositions* that constitute crucial aspects of creativity and that the extent to which pupils demonstrate them, whether in general across all their work or in particular projects, can be described. They present these dispositions as '5 Habits' – Being

- Imaginative
- Inquisitive
- Collaborative
- Disciplined
- Persistent

Each can be further divided into 'sub-habits'.

The emphasis is principally on descriptive assessment – identifying and stating the extent to which the 5 habits are apparent in terms of strength, breadth and depth – and doing so normally for formative purposes. The project did, however, also look at the potential use of some 'measurement elements', considering, for example, the possibility of using a model resembling 'level' or 'grades' within each habit – eg, awakening, accelerating, advanced, adept. In field trials, however, teachers were not happy about this approach.

Some Concluding Points

The questions underpinning this selective review of research related to describing and assessing achievement and progression in expressive arts were the following:

- According to the literature, are the changes that children make qualitative jumps (with big steps at key moments) or more gradual sophistication (children seen to gradually add more of the same skills over time)?
- Is progression linear or could children move backwards and forwards?
- Do the researchers see children's progression as something that can be impacted on by the environment (including teaching) and open to change, or is it fixed?

- Is there one path that children seem to take in this area, or are there multiple paths? Do the researchers acknowledge that children may have different paths based on the context in which they grow up/learn?

It seems clear that some answers to these questions begin to emerge.

- The research suggests that progression in expressive arts and in creativity more generally is likely to grow out of gradual use and re-use of known skills, but also could on occasion present as a big qualitative jump.
- It is not a linear process and there is not one common pathway. Learners may easily move backwards and forwards as they experience expressive arts activities and different learners are likely to progress in markedly different ways.
- It is clear that the environment in which they are learning, including the quality of teaching is an important factor in facilitating progression.
- Above all there is a strong message from the research that qualitative, descriptive approaches to assessing achievements and progression are the most appropriate.

In addressing the decision points which have been identified at the end of the Expressive Arts Review of Frameworks, the Expressive Arts AoLE needs to be mindful of these indications from the research.

Health and well-being: Review of Frameworks

This report synthesises examples of how international and national curricular frameworks model progression in Health and well-being (H&WB). The following factors informed our country selection:

- inclusion of some form of progression
- recommendations from professorial consultants
- curricular materials provided in English
- when possible, bilingual contexts.

The countries/regions selected were: Australia, British Columbia, Ireland, New Zealand, Quebec and Scotland. This report is organised as follows:

- international curriculum structures
- what matters in relation to H&WB
- how progression is conceptualised
- the form and wording of progression statements
- alignment with *Successful Futures* and with Wales's vision for H&WB.

Weblinks to the curriculum documents are provided in Additional Document 2. Summaries for each country are available upon request from the CAMAU team.

Structure of the International Curriculum Frameworks

Differences in how the H&WB curriculum is structured across countries may have implications for progression. H&WB may be holistically combined into one learning area or split across subjects: e.g. in Ireland, physical education and social, personal and health education (SPHE) are separate areas. Other countries combine most elements of H&WB into one learning area: e.g. British Columbia's *Physical and Health Education* area and Scotland's *Health and Wellbeing* area include physical literacy and movement skills, healthy relationships, mental wellbeing, health and safety, and more.

Several countries include elements of H&WB as cross-curricular aims. For example, *managing self* and *relating to others* are 'key competencies' in New Zealand; *personal awareness and responsibility* is a 'core competency' in British Columbia; *constructing identity* and *cooperate with others* are 'cross-curricular competencies' in Quebec; and *personal and social capability* is a 'general capability' in Australia. Countries such as Australia provide guidance on how these cross-curricular aims can be applied to each learning area. When an aspect of H&WB is cross-curricular, the implied message is that this skill/capacity/understanding is sufficiently important or broad that it necessitates the responsibility of every teacher. However, if not assigned to a core learning area, then there is a potential risk of not having a designated teacher to take the lead on ensuring students are progressing in this area. Scotland's *Health and Wellbeing* is both a core curriculum area and the 'responsibility of all' staff, with separate but related curriculum documents of progression steps for H&WB as a core subject area and for H&WB across learning (the responsibility of all teachers).

Countries also differ in whether there are separate H&WB frameworks for different stages of schooling (e.g., primary and secondary) or one continuous curriculum. In Quebec and Ireland there are different curricula for primary and secondary levels. British Columbia has one curriculum for

kindergarten through grade 9 and is currently transitioning to a new curriculum for secondary level (grades 10-12). Ireland has separate curriculum and assessment documents for early, primary, junior cycle, and senior cycle levels. The Scottish, New Zealand, and Australian curricula have one combined description of progression of learning for children across ages 5-16. Having separate curricula and/or assessment guidelines for different stages of schooling may have implications for learners' transition into secondary school and for the extent to which the separate curricula complement one another. However, having one curriculum for all stages requires coordination across phases and schools.

Another important element of the curriculum structure with implications for progression is the number of levels included in the H&WB outcomes and whether these are related to grade/age. New Zealand and Scotland do not have levels tied to specific grade levels. New Zealand has 8 levels and each covers several years of schooling with a recognition that some pupils may attain stages earlier or later than expected. Scotland has 5 levels that are roughly 3-year bands but again not strictly tied to grade levels. The premise is that teachers meet each child at his/her current stage and provide learning activities to help support the child in moving forward at their own pace. In contrast, countries such as British Columbia have specific learning objectives tied to each grade level. Australia has two-year bands in the *Health and Physical Education* area. The language (e.g. 'Focus areas to be addressed in Years 1 and 2') suggests that learners must meet certain competencies by the end of each two-year period. When learning objectives are tied to a grade, there is a risk of focusing on covering a particular set of standards by a particular time, rather than concentrating on student learning (Heritage, 2008).

What Matters

Across the countries, H&WB curricula have a reasonable balance between understandings, competencies and skills. For example, British Columbia's curriculum is structured on a 'Know-Do-Understand' model; the learning standards within *Physical and Health Education* clearly designate competencies (e.g. Grade 5: Describe and apply strategies for developing and maintaining healthy relationships) and related content (e.g. Grade 5: Strategies to protect themselves and others from potential abuse, exploitation, and harm in a variety of settings). In Ireland, learning outcomes 'describe the knowledge, understanding, skills and values that students should be able to demonstrate' and include what 'students learn about' and 'students should be able to'.

Some countries explicitly recognise the interrelated nature of 'knowing' and 'doing'. For example, Quebec's competencies contain knowledge (concepts to be learned) and skills. Quebec's frameworks for the evaluation of learning use arrows to explicitly indicate 'that the evaluation of learning involves a process of going back and forth between the acquisition of subject-specific knowledge and the understanding, application and use of this knowledge'.

Several countries also have a set of overarching concepts that inform progression of learning. British Columbia lists 'big ideas' for each grade level, which are broad statements focused on understanding, generic personal skills and attributes, e.g. 'Learning about ourselves and others helps us develop a positive attitude and caring behaviours, which helps us build healthy relationships'. In Scotland, there are generic statements that seem, although not labelled 'big ideas', to inform the progression steps, e.g. 'experience personal achievement and build my resilience and confidence' or

'participate in a wide range of activities which promote a healthy lifestyle'. New Zealand's primary and secondary curriculum appears to define 'what matters' through their four 'underlying and interdependent concepts' at the heart of their *Health and Physical Education* learning area. The four concepts focus on broad attributes and capabilities rather than content knowledge, e.g. 'Attitudes and values – a positive, responsible attitude on the part of students to their own well-being; respect, care, and concern for other people and the environment; and a sense of social justice'.

Across countries there also tends to be a balance of 'what matters' in terms of the physical, mental/emotional, and social components of wellbeing. Across countries, early years or foundation curricula largely focus on all three. At the primary and secondary levels, physical education appears more prominent than emotional or social wellbeing, presumably since progression is easier to define within the physical realm. For example, Quebec's *Physical Education and Health* curriculum is focused on movement skills, physical activity, and an active lifestyle, while elements such as *cooperation with others* and *achieving one's potential* are cross-curricular competencies. However, most of the countries include aspects of emotional and social wellbeing within their core H&WB area of learning. Scotland's *Health and Wellbeing* curriculum focuses on mental, emotional, social, and physical wellbeing. British Columbia's curriculum *Physical and Health Education* includes concepts of physical literacy, healthy and active living, social and community health, relationships, safety, and mental well-being. Across countries, mental health is not a common feature of curricular frameworks and, if mental wellbeing is included in a framework, progression is not addressed in detail. Further, career development tends to be a separate curricular area or cross-curricular competency for most countries rather than included within H&WB, for example as in British Columbia and Quebec.

Determining 'what matters' in terms of progression in H&WB can be challenging in countries that have multiple layers of principles, aims and competencies. In Ireland, for example, the junior cycle consists of 8 underpinning principles, 24 Statements of Learning, 8 Key Skills, and 6 Indicators. Different elements of each component are related to H&WB, for example, relevant key skills include *managing myself*, *staying well,* and *working with others* and relevant indicators that may be of interest to the Wales H&WB AoLE include *active, responsible, connected, resilient, respected* and *aware*.

Finally, it is worth noting that in New Zealand, Māori terms are included throughout the English documents, making it clear that the Māori language is an important part of 'what matters'. For example, four concepts are considered to be at the heart of health and physical education, one being *Hauora*, a Māori philosophy of well-being. The extent to which cultural context is evident and explicit in the New Zealand documentation is of interest and relevance in the Welsh context.

Conceptualisation of Progression

Progression steps, the building blocks of students' learning trajectories, can be conceptualised in many ways (Heritage, 2008). Progression could refer to the development of understandings / skills / capacities (i.e. learning) within one lesson, across a unit, across a school year, across schooling, or across lifelong learning. Donaldson (2015) proposes a broad level, representing big 'steps' of progression across schooling. Progression takes different forms, such as moving from novice to expert (Heritage, 2008), learning a series of different concepts and/or skills that build upon one

another, increased sophistication within a particular concept and/or skill, increased independence in enacting concepts or skills. In *Table 4* below we provide hypothetical examples of progression for two H&WB concepts: running and understanding one's identity. Most of the countries we reviewed seem to use a model focused on increased sophistication within a particular concept or skill.

Table 4. Hypothetical examples of some forms of progression

Forms of progression	**Skill/Capacity: Running**	**Concept/Understanding: Understanding my identity**
Different concepts/skills that build upon one another	learning to stand up -> taking first steps -> walking -> running	understanding personal likes and dislikes -> understanding how I am unique from others -> understanding my goals for the future -> reflecting upon my identity
Increased sophistication within a particular concept/skill	running slow -> running faster -> being able to run fast on uneven terrain	describe myself in terms of a few elements -> describe and understand myself at a deep level on a wide range of elements -> evaluate myself on a range of elements
Increased independence in a concept/skill	run with support and guidance -> run with minimal encouragement given -> run on one's own	others can help me describe my identity -> I can describe who I am with some help from the teacher to prompt me -> I can independently describe myself

In the countries reviewed, some implicitly included progression whereas others made it central and explicit. In New Zealand, progression is defined implicitly within the primary and secondary curriculum through achievement objectives. These outline learning processes, knowledge and skills across eight levels of learning which 'represent progress towards broader outcomes that ultimately amount to deeper learning'. Similarly, in British Columbia, progression is defined implicitly through statements that increase in complexity as learners progress through the different school grades although some 'big ideas' span across grades. In Scotland, on the other hand, progression is defined clearly and explicitly.

Quebec also explicitly includes 'progression' within the name of its curriculum. The documentation denotes when students are expected to move from completing a task with the help of the teacher, through applying knowledge on their own, to a stage where knowledge is 'reinvested'. This suggests a Vygotskian influence as children move from being able to do something with the support of the teacher to on their own. However, when exploring the H&WB curriculum documents, it is not always clear how skills and knowledge form a narrative of learning across ages 5-16. Through careful inspection, one can determine which skills are expected to come earlier or later and thus infer the nature of progression. For example, 'uses language that shows respect for his/her partner' is expected to be applied by the end of cycle one elementary school whereas 'uses language that shows respect for opponents' is expected to be constructed in cycle two and not applied until the end of cycle three. Therefore the curriculum suggests that using language to show respect for partners is a pre-requisite for using language that shows respect for opponents.

Australia is another interesting example. The curriculum is initially described as 'a progression of learning', but the main documentation makes little reference to this term after that. Within each level students are categorised as 'below satisfactory', 'satisfactory', or 'above satisfactory'; supplemental portfolios of pupil work are provided to demonstrate each categorisation. This could suggest a micro model of progression as students move from less satisfactory to more satisfactory within a level. Further, comparing standards across levels can provide a sense of the expected macro model of progression over time, but, since this is not explicitly brought together within one document, it is unclear whether teachers would view it as a progression of learning. For example, we can compare achievement standards for Y1-2 with Y3-4:

> *'By the end of Year 2, students describe changes that occur as they grow older. They recognise how strengths and achievements contribute to identities.'*
>
> *'By the end of Year 4, students recognise strategies for managing change. They identify influences that strengthen identities.'*

The implicit progression here is moving from describing changes to recognising how to manage that change, and from recognising influences on identity to identifying influences that can strengthen one's identity.

Importantly, some of the curricula note that for an area such as H&WB, progression may naturally take a spiral rather than a linear form. Some learners may need to revisit different parts of a progression model. For example, with a movement skill such as running, a child who does not engage in any physical activity for some time and loses that skill may need to revisit through building up strength and engaging in some running with encouragement from others. For example, Scotland's curriculum document states, 'Because of the nature of development and learning in health and wellbeing, many of the experiences and outcomes are written to span two or more levels. They should be regularly revisited through a wide range of relevant and realistic learning experiences to ensure that every child and young person is progressing in his or her development and learning.'

Form of Progression Statements

Examples of curriculum statements indicating progression from each of the countries are included in Additional Document 3.

There are interesting similarities and differences across the countries. One difference is in whether the statements are written for the teacher or the pupil. In New Zealand and Quebec, the statements are written for teachers following 'the student will…' format; at the primary level in Ireland, they are written as 'the student should be enabled to…'. In Australia the statements are written for teachers, but in a paragraph format and follow the same format such as 'students recognise…' or 'students apply…'; the statements are structured consistently with one paragraph on what students are expected to understand and the second on what students should be able to do. Alternatively, statements for Scotland are written for pupils following an 'I am…' or 'I can…' format.

Despite these differences, the statements themselves are often quite similar. Consider British Columbia, New Zealand, and Scotland (see *Table 5* below). The statements describe progression in a topic common to all – movement skills; the statements use similar descriptions of progress (*develop,*

will develop, am developing); all specify a variety of contexts or various play or physical activities. They differ in that British Columbia specifies *demonstrate a variety*; New Zealand specifies *will develop a wide range* of skills, which provides a more concrete definition and implies that some mastery is expected and multiple evidence needed; Scotland refers simply to *developing*. However, all three statements expect teachers to use their professional judgement as they consider such matters as: which movement skills are the necessary ones so that the child can progress to the next level? how many skills should be developed? does the child need to show mastery consistently before moving to the next level?

Table 5. Examples of progression statements for movement skills

British Columbia – K, 1, 2	**New Zealand – Level 1**	**Scotland – Early Level**
Develop and demonstrate a variety of fundamental movement skills in a variety of physical activities and environments	Students will develop a wide range of movement skills, for example, manipulative and gross motor movements, walking, running, hopping, … climbing, kanikani, balancing…	I am developing my movement skills through practice and energetic play

Another interesting element of progression across countries is the level of specificity of the progression statements. Quebec's statements are specific and it would be quite clear whether a student has met the statement or not, e.g. 'indicates a few ways of synchronising his/her movements' or 'names a few offensive action roles'. Statements in Scotland's Curriculum for Excellence are worded very openly in order to offer teachers and learners opportunities for personalisation and choice, e.g. 'Opportunities to carry out different activities and roles in a variety of settings have enabled me to identify my achievements, skills and areas for development. This will help me to prepare for the next stage in my life and learning.' Identifying the extent to which a student has met this statement or not would require it to be interpreted by teachers in different contexts to meet individual needs and interests. However, the Scottish statement may engage the pupil by explaining the purpose of moving the pupil forward. In British Columbia there appear to be two levels of detail: while the statements for the curricular competencies are quite broad, the standards and expectations themselves are quite specific, although the latter are for voluntary use in schools.

In general, the countries use a mix of verbs to indicate how pupils should demonstrate their skills or knowledge. For example, Ireland uses statements such as 'develop an appreciation of' or 'identify and talk about…' and British Columbia uses statements such as 'explore the impact of…' or 'describe factors that…'. In general, the statements seem to represent increasing complexity in line with a framework such as Bloom's taxonomy. In Australia, for example, foundation and years 1-2 use key words of *identify, describe, recognise, participate*; years 3-6 use words such as *explore, describe, apply, investigate*; years 7-10 use *evaluate, practice, investigate, critically analyse*. However, it is important to acknowledge that all levels of knowledge may apply at all levels in the progression of learning, as new concepts and constructs may be introduced at all times. For example, pupils could

just as easily describe their identity at age 5 as they could at age 14; it may be the nature of the output that differs, not the essence of the task itself.

Often what is written alongside the progression statements is just as meaningful as the statements themselves because of the implications for how the progression statements should be used and interpreted. For example, in Ireland, the junior cycle statements are written for the teacher but there is a move to include students in the reporting of progress, and interestingly all statements appear to be assessed in light of the six themes of *active, responsible, connected, resilient, respected, aware*. As another example, in Quebec, there are three labels applied to each statement of progression: 1) student constructs knowledge with teacher guidance, 2) student applies knowledge by the end of the school year, and 3) student reinvests knowledge. In Australia, there are sample portfolios of work (containing written work, pictures, videos, etc.) that are rated as *satisfactory, above satisfactory,* and *below satisfactory* alongside the achievement standards, which provide concrete examples of progression in terms of becoming more sophisticated within a particular area.

Alignment with Successful Futures and Wales's Vision

This section provides a broad evaluation comparing ways in which the national and international frameworks included in this review appear to align with or differ from Wales' vision for their H&WB curriculum and with the recommendations in *Successful Futures* (Donaldson, 2015).

Te Whāriki and the New Zealand primary and secondary curriculum are useful to consider. Emphasis is placed on cross-curricular learning, e.g. links between Health and Physical Education and Science and Technology are made explicit. The curriculum acknowledges the need for a holistic approach to learning and teaching. The 'vision' for 'confident, connected, actively involved, lifelong learners' underpins all learning, which bears similarity to Donaldson's 'four purposes' and may be useful for ideas on how to incorporate the 'four purposes' within progression steps. In terms of progression, Donaldson (2015, p. 52) emphasises 'consolidation and depth in learning as a sound foundation for further progress'. This concept is also emphasised explicitly within New Zealand, where the curriculum documents highlight the need for learners to re-visit concepts in order to consolidate their learning in what appears to be a spiral approach to progression. However, Donaldson (2015) proposes 'steps' rather than 'levels' of progression, the term used in that curriculum. Although these levels span across the school years similarly to the proposal in *Successful Futures*, the New Zealand documentation acknowledges that many learners do not fit this pattern, e.g. those with special educational needs, the more able or speakers of English as an additional language. Donaldson (2015) on the other hand proposes a more inclusive approach to progression. Finally, it is worth noting that the New Zealand curriculum is inclusive of Māori cultural values, and consequently some terms, particularly within the Te Whāriki curriculum, may be difficult to interpret. The extent to which cultural context is evident and explicit in the New Zealand documentation is of interest and relevance in the Welsh context. Values are also a prominent feature of the curriculum and according to Benade (2011) these are nationally and politically based in order to empower learners to develop into lifelong learners and knowledgeable citizens.

The British Columbia curriculum is informative as this Canadian province has undertaken a similar process to Wales in developing curriculum and assessment. This ongoing process is informed by research into national and international practice, subject specific disciplines and assessment design.

The assessment framework is developed in consultation with educators and validated and tested by both the educators and experts. The focus on 'big ideas' within the subject themes is similar to that in Wales. Although the concept of progression can be tracked within the learning standards, these standards lack the clear continuum proposed by Donaldson. While elements of the four purposes appear sporadically across the learning standards, again there is lack of clarity or clear pathway. However, in much the same way as *Successful Futures*, this curriculum emphasises the importance of cross-curricular learning and suggests a spiral approach to learning whereby learners need to re-visit concepts in order to progress and achieve. It is worth noting that 'personal and social' skills are one of the core competencies within this curriculum rather than specific to H&WB, an issue that has been raised by the Welsh H&WB AoLE group.

Scotland's Health and Wellbeing curriculum documents align very closely with its national policy of *Getting it right for every child*, commonly known as GIRFEC, that emphasises the need to tailor the support and assistance that children, young people, and their parents are offered to ensure their wellbeing (Scottish Government, 2017). The approach uses eight areas of wellbeing in which children and young people need to progress in order to do well now and in the future. These eight areas are set in the context of the 'four capacities', which are at the heart of the Curriculum for Excellence (Scottish Government, 2012). Commonly referred to by their initial letters – SHANARRI –, the eight wellbeing indicators are safe, healthy, achieving, nurtured, active, respected, responsible and included. These eight wellbeing indicators, represented through the *Wellbeing Wheel*, 'are the basic requirements for all children and young people to grow and develop and reach their full potential' (Scottish Government, 2012, p.10).

Furthermore, similar to the aims of *Successful Futures*, this Health and Wellbeing curriculum focuses on developing for all learners: knowledge of social, physical and emotional health in their own lives; skills and attributes for successful participation; understanding of the health consequences of their actions; knowledge of how to keep safe in a range of circumstances. Progression steps are defined in five broad levels and recognise that children and young people progress at different rates. The documentation acknowledges that although children and young people generally develop knowledge, skills, and capacities in a certain order, there is no strict timetable for this. Progression statements are worded in a pupil first person language. Learners are expected to be involved in metacognitive processes around their learning and future expectations and aspirations. As noted elsewhere in this document, health and wellbeing is uniquely included as both a specific area of learning and as a responsibility of all teachers, with progression steps provided for both.

In Ireland, the recently reviewed Junior Cycle aligns in several ways with *Successful Futures*, whereas the Primary School framework does less so. The aspects in the Junior Cycle that align to Donaldson's (2015) recommendations include the recognition that children and young people will progress at different rates and the purpose and nature of assessment. In terms of progression, assessment is described as mainly formative in nature and is specified to serve as reference points and not universal expectations of the performance of all children and young people at fixed points. There is also an explicit emphasis in the curriculum documents of the recognition of all children's achievements, remembering that they will progress in different ways. Despite recent reviews of the curriculum, it could be argued that a clear definition of 'progression' and of how children progress is still missing from this country's specifications, guidelines and supporting materials. Instead, the focus of any changes appears to be the assessment of progress with a shift from summative to formative assessment strategies. Abundant materials support teachers in underpinning teaching and

learning with effective AfL tools, yet guidance on what progress looks like is woolly. Finally, statements of learning/achievement outcomes use pupil-first language. Interestingly, in the Senior Cycle SPHE curriculum, students can select learning outcomes that are relevant to them, which tailors it to individual needs and interests. Also noteworthy is that teacher well-being appears in the Junior Cycle Framework: 'Wellbeing in school starts with the staff. They are in the front line of the work and it is hard for them to be genuinely motivated to promote emotional and social wellbeing of others if they feel uncared for and burnt out themselves.'

Australia's curriculum has a balance between skills and content, as recommended in *Successful Futures*. However, there seems to be a significant focus on achievement rather than progress. Concerns about the pressures of standardised testing remain. The health and physical education area seems to incorporate the notion of learning progressions and has conceptualised learning as a process of increasing sophistication in skills, knowledge, and understanding. There does, however, remain an aspect of 'horizontal learning' as standards apply to each year level, though the notion of development over time is captured through the use of 'bands' (Heritage, 2008). Teachers are encouraged to combine content descriptions across numerous sub-strands to plan opportunities for progression in learning which is tailored to their pupils' needs, interests and contexts, but also ensure that content is drawn from both strands. Miller (in Callcott *et al*., 2015) notes the possible danger in using strands to structure H&WB, as this could be viewed as conceptually divided. She also notes historical tendencies in Australian schools to outsource provision of Physical Education as a result of lack of expertise, particularly in Primary schools. This leads to the risk that one strand is favoured over the other or that a disparity of resourcing means that schools are unable to provide high quality provision. This may risk children in less affluent areas being denied the opportunities needed to sufficiently gain the knowledge, skills and understanding outlined in the sequence of content. Given the socio-economic status of many children in Wales, this is also a pertinent warning here, too.

Health and Well-Being: Research Review

Nature of Progression in H&WB

Successful Futures (Donaldson, 2015:45) defines the Health and Well-being (H&WB) Area of Learning and Experience (AoLE) as including: subjects and themes from PE, mental, physical and emotional well-being, sex and relationships, parenting, healthy eating and cooking, substance misuse, work-related learning and experience, and learning for life. This review examines published research that might inform understanding of how young people's learning progresses within H&WB. The review groups some of the major themes listed in *Successful Futures* into four broad areas of health and wellbeing: physical, emotional, social, and intrapersonal. This review does not review research on important school-wide efforts to support health and wellbeing, as this is outwith individualised learning progressions.

Progress in well-being across nations has been linked to Gross Domestic Product (GDP) and, more recently, to employment, health and physical activity, productivity, subjective well-being, civic participation, risk and safety and life expectancy (Bradshaw, Hoelscher, & Richardson, 2007; Hall & Matthews, 2008; Trewin & Hall, 2010). However, empirical examinations of learning progression by individual learners in many areas of H&WB are underexplored. Studies on progression from other disciplines such as science document pupils' progression in learning core concepts (e.g., Black *et al*., 2011) and may offer useful insights into identifying learning progression in H&WB.

When considering progression in H&WB, links can be made to research in child development. While child development differs from progression in learning within a domain, developmental stages are closely tied to achievement within H&WB: a young child typically cannot run, regulate emotions, navigate social situations or demonstrate self-control as well as an older child. Teachers may draw on knowledge of child development to understand what typical development looks like within the physical, mental, and social domains, identify when pupils seem to be developing atypically and provide support to help children progress. For example, as noted in Scottish documentation, 'Progression in many aspects of health and wellbeing will depend upon the developmental stage of learners as well as their social environment' (Education Services, NHS Greater Glasgow & Clyde, 2015).

Learning Progression within Specific Areas of H&WB

Heritage (2008:4) defines learning as the 'development of progressive sophistication in understanding and skills within a domain'. Progression within H&WB involves children moving from novices to experts in terms of their knowledge, skills, and competencies in relation to healthy lifestyles. It should also include supporting students' lifelong journeys to thrive and reach their future potential. When teachers have a clear, well-articulated roadmap of children's learning in H&WB and understand pupils' current achievement, they can decide where they need to develop next. As noted by Heritage (2008:2), 'learning progressions that clearly articulate a progression of learning in a domain can provide the big picture of what is to be learned, support instructional planning, and act as a touchstone for formative assessment.'

Theme 1: Physical

Within the 'physical' theme we reviewed learning progressions in physical education and physical literacy, nutrition and eating, and substance use. Donaldson (2015:45) refers to children and young people's physical development as 'physical well-being', 'physical activity', 'physical health' and 'physical education' (PE). A more theoretical paradigm in this area is 'physical literacy' (PL) (Dudley, 2015; Edwards *et al.*, 2016; Robinson *et al*., 2015). PL can be defined as 'the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the life course' (Whitehead, 2010:11). The Welsh Government's 2013 commitment to physical literacy was based on extensive research which established the links between physical development and cognitive, emotional and social competency and the significance of a holistic approach to ensuring life-long physical activity (Lu & Buchanan, 2014). As noted by Carse *et al.* (2017), conflicting schemas (related to education, psychology, health, and sport) must be addressed within the PE curriculum and considered when mapping progression.

Milestones for children's physical development, particularly within the early years, are well documented and focus on an age-related linear acquisition of fine and gross motor skills (Sheridan, 1981; Bee and Boyd, 2013). However, other literature suggests that progression should be spiral where skills are acquired, developed and consolidated in a holistic approach (Woodfield, 2004). Research focusing on human development identifies issues (e.g. gender, puberty) which can impact on learning and progression but recognises that a lack of early proficiency may also be an inhibiting factor in the development of more complex skills in adolescence (Jurbala, 2015). This has been well documented within the disciplines of psychology, health and social sciences, less so within education. The rate of development will vary, depending on individual needs, experiences and opportunities (Thomas & Thomas, 2008). Other factors may impact on development and progression, for example motivation, effort and participation. However each of these factors is defined in multiple ways and assessment of achievement in these areas has often been subjective as measuring competence, understanding and application in these areas is challenging and contested (Callcott *et al.,* 2015).

A range of literature relating to PE focuses on the development of skills, in particular Fundamental Movement Skills (FMS), which are defined by Barnett *et al.* (2016) as 'the most representative of salient skills that, if mastered, will give children the best possible chance to successfully and persistently participate in a range of health-enhancing physical activities'. Stodden *et al.* (2014) provides further evidence of the importance of such skills to health related fitness but recognises that these relationships may be dynamic and may change across childhood. However, the research indicates that '*the development of object control skills in childhood may be important for the development and maintenance of HRF across childhood and into adolescence'.* (p. 231)

While there is much debate about the concept of FMS it is commonly accepted that these do not refer to culturally specific groups of skills but rather to a broad notion of fundamental movements that underpin all later context specific skills. Thus, Jarvis *et al*. (2018:90) in a study or children aged between 9 and 12 in South-East Wales make use of an established checklist which includes

> *skills from all categories of FMS (locomotor, manipulative, and stability) ... is valid for use with both children and adolescents... [and] contains eight individual FMS, including four locomotor skills (run, vertical jump, side gallop, leap), three manipulative skills (catch, overhand throw, kick), and one stability skill (static balance).*

Jarvis *et al.* conclude that the children displayed FMS proficiency levels which were low and in line with results in other UK-based studies with similar aged children. In particular they report:

> *This is concerning given the importance placed on FMS in enhancing physical literacy and promoting health (Tompsett et al., 2014). It is generally believed that most children should master the less complex FMS (i.e., sprint run, vertical jump, catch, side gallop, and over-arm throw) by 9-years-old and more complex FMS (i.e., leap and kick) by 10-years-old*. (p. 96)

This checklist has been developed in Australia for use in the regular New South Wales Schools Physical Activity and Nutrition Survey (SPANS); the most recent survey (Hardy *et al.* 2016) makes a similar claim for expected levels of attainment of FMS but does not clearly provide evidence for this.

> *children should demonstrate skill mastery of the less complex FMS (such as the sprint run, vertical jump, catch, side gallop and over-arm throw) by the end of Year 4, and more complex FMS (including the leap and kick) by the end of Year 5.* (p. 388)

However the report in comparing achievement in the 2015 cohorts with those of 2010 provides clear evidence that it is possible to raise significantly levels of achievement in the skills included in these FMS (pp. 391 & 429)

Literature that focuses specifically on PE tends to concentrate on particular themes, e.g. movement, dance, gymnastics, games, athletics. Frameworks to identify progression exist in some of these areas. These are mainly skills-focused with links to developing knowledge and understanding in tandem (Ward, 2012; Griggs, 2012; Maude, 2009; Gagnon, 2016); however links are not always explicit and progression is mainly identified through exemplification of activities. Australian research suggests a 'backward design' model for identifying steps in progression, i.e. setting developmental goals for learning before choosing learning activities or content to teach (Callcott *et al.,* 2015). Haydn-Davies (2012:30) suggests that 'children need time to make progress' through practice, exploration, development and application and need to re-visit, again suggesting a spiral approach to consolidating learning.

There are developmental models that recognise the complex relationships between motor competence, perceived competence, fitness and physical activity and as such predict lifelong health trajectories. Recent research in the field of motor development evidences strong links between this area of development and improved attention, executive functioning and cognitive development as well as physical health and there is clear evidence of positive impacts on neural changes. (e.g. Pesce *et al.* 2017). Such research recognises that our holistic nature as embodied beings must imply that the development of the brain and body are inseparable and that, in consequence, the importance of movement in supporting a wide range of learning and well-being needs to be acknowledged: this requires more than experience of narrowly defined sporting activities but a variety of interactions with the environment and a range of affordances. Such research may, as yet, not readily inform the development of progression frameworks for use in schools.

Even when research focused on the health and well-being aspects of physical activity reports psychosocial and physical assessment instruments, these do not provide a complete and detailed overview of how children and young people develop holistically and tend to focus on linear skills progression. In contrast, Dudley (2015) suggests a conceptual model for identifying progression that focuses on metacognition, behaviour and motivation, which he believes to be three core elements of PL. This theoretically based model applies Bloom's Taxonomy and Hattie's 'visible learning' approach

to these core elements and leads to the development of *'A Rubric of Observed Learning in Physical Literacy*' which covers 4 broad domains of movement and 4 dimensions as seen in *Table 6*.

Table 6. Rubric of Observed Learning in Physical Literacy

Domain	Dimension
personal and social attributes	unistructural
motivation and behavioural skills	multistructural
rules, tactics and strategies	relational
competencies	extended abstract

Adapted from Dudley (2015)

Whereas PE frameworks tend to consider meso- and micro-levels of learning and progression, Dudley's model appears to take a macro- approach to life-long learning and progression in physical literacy. Further research is needed into the effectiveness of this model. Measuring progress is an important aspect of learning and progression and needs to be considered in terms of how children and young people establish the links between their physical, psychological and cognitive development (Wójcicki & McAuley, 2014).

The Australian Sports Commission has published detailed work on the development of physical literacy at https://www.ausport.gov.au/participating/physical_literacy. This concept is here defined as:

> *Physical literacy is the integration of physical, psychological, cognitive and social capabilities that help us live active, healthy and fulfilling lifestyles:*
>
> - *Physical – the skills and fitness a person acquires and applies through movement*
> - *Psychological – the attitudes and emotions a person has towards movement and the impact these have on their confidence and motivation to move*
> - *Cognitive – a person's understanding of how, why and when they move*
> - *Social – a person's interaction with others and the environment in relation to movement*

Following a lengthy Delphi process which considered definitions, standards and a framework for physical literacy, the Australian Sports Council developed *'a Draft Australian Physical Literacy Standard (the Standard)'.* As can be seen in Figure 1 which illustrates this Standard each of the four domains is constituted of a number of elements. To support the application of the Standard, Development Milestones for physical literacy have been created. These represent aspirational milestones drawn from the Standard that promote lifelong participation in movement and physical activity. Each milestone includes suggested levels of proficiency for all elements within the Standard as a target for development to support a participation pathway for all. This is illustrated in Figure 2.

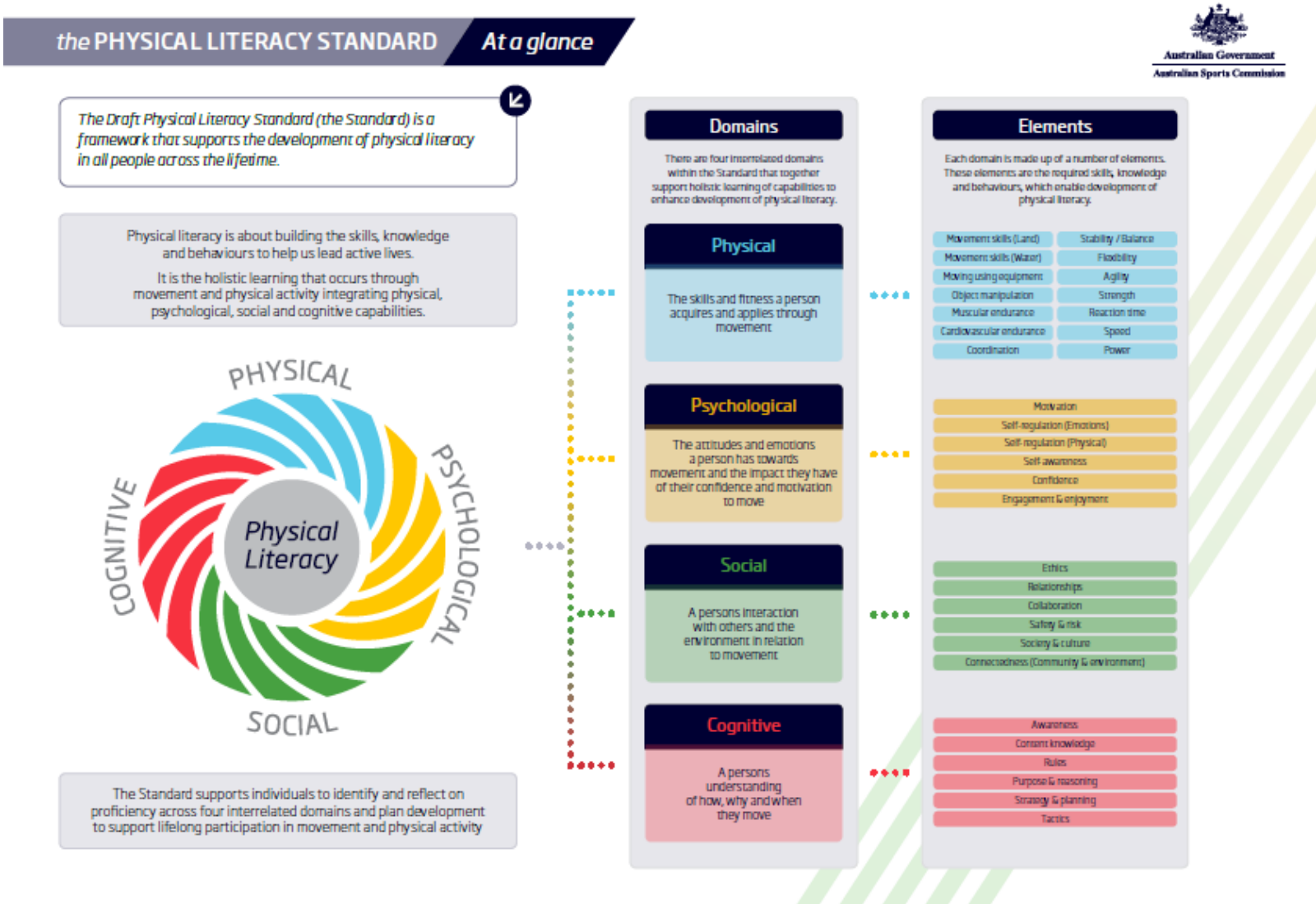
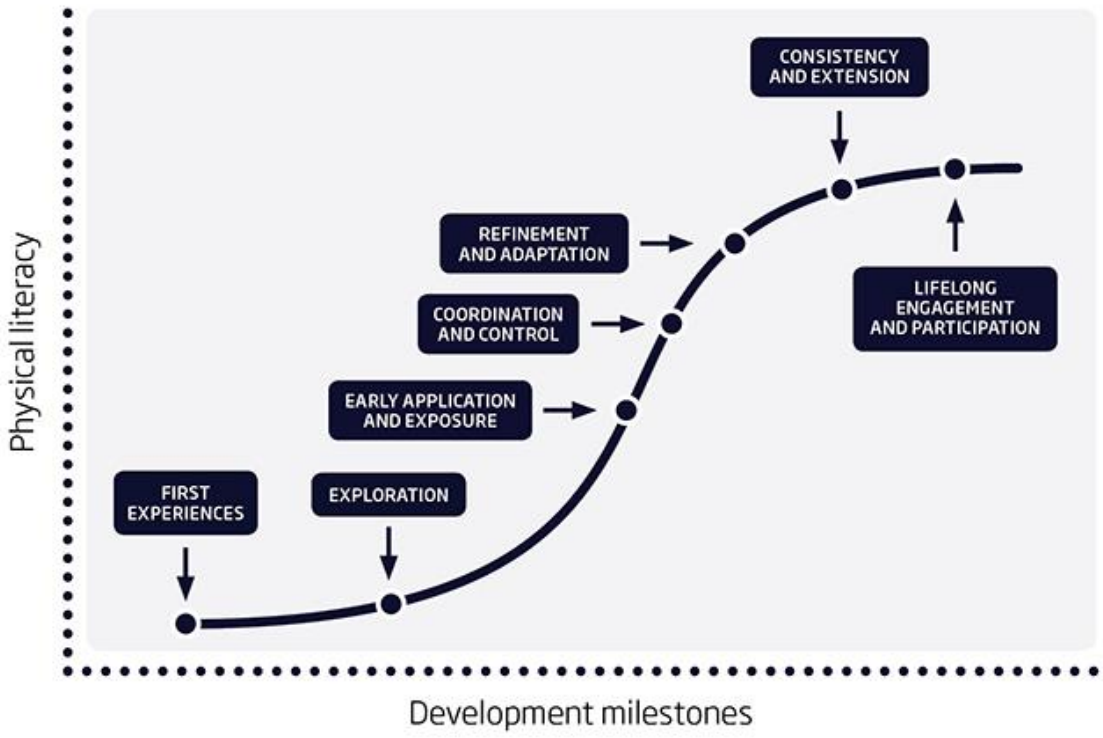


Figure 1: Australian Sports Commission: Draft Australian Physical Literacy Standard

Figure 2: Australian Sports Commission: Draft Australian Physical Literacy Standard



While this approach to developing a standard and associated milestones was developed within the context of sports, it provides a model which could inform the development of physical literacy and recognise progression in this within school education.

Nutrition and healthy eating are another important element of the body theme. Başkale *et al*., (2009) propose nutrition education programmes appropriate for the developmental stage of preschool-aged children based on work by Piaget. Messages in nutrition education for young children in the preoperational stage of cognitive development should be simplified and concrete, use pictures and avoid abstract terms. Schools play an important role in teaching children about nutrition (Young, 1997); the food preferences of children as young as ages 2-6 are negatively impacted by the media (Borzekowski & Robinson, 2001), suggesting that school-based health programmes should begin early.

There are behaviour change models related to nutrition counselling outside of the school context. Prochaska and DiClemente (1982, 1992) propose a 5-stage model of change:

1. precontemplation – not intending to change in the near future
2. contemplation – considering a change but not making a firm commitment
3. preparation/decision – commitment to change and making small steps
4. action
5. maintenance – behaviour change sustained over 6 months.

Mhurchu *et al*. (1997) cite studies showing the success of this model. Parallel to how a progression model can support student learning, Mhurchu *et al*. (1997, p. 11) note that 'to facilitate the successful movement of a person through the stages of change, the person's stage of change must first be elucidated and then the appropriate processes of change should be applied.' The stages of

change model has been shown to be useful across a range of areas beyond healthy eating, such as smoking cessation, reducing adolescent delinquent behaviours, and safer sex (Prochaska *et al*., 1994).

Substance abuse, including alcohol and drug use, is another aspect of the body theme. Engagement with substance misuse is heightened in late adolescence and twenties (UNODC, 2012), which clearly correlates with the developmental stage. Neuroscientific research has made significant discoveries about the development of the adolescent brain; at this stage the thrill and pleasure seeking zones are heightened (Winston, 2017; Siegel, 2014). Reviews examining provision in schools for the prevention of substance misuse find that programmes need to be context sensitive to maximise impact (Bangert-Drowns, 1988; Dietrich *et al*., 2015). Champion *et al*., (2013) met with some success from using online resources and offering choice, a key component of effective well-being education (Bradshaw, 2015).

There does not appear to be research specifically on progression of learning in this area. Drug Abuse Resistance Education (DARE) (www.dare.org), a widely used programme in the United States, has different curricula for elementary, middle, and high school. The original programme was ineffective (Lynam *et al*., 1999); research on the modified DARE curriculum shows mixed evidence of its effectiveness (Singh *et al*., 2011). Topics appear to be introduced when they have relevance for pupils rather than as a progression of learning; at primary school the focus is on decision making and self-awareness, at middle school on risks, consequences and refusal skills, and at high school on media literacy and how to enjoy celebrations (e.g., prom, graduation) safely. It is worth considering whether there is an appropriate roadmap for developing understandings and skills in this area. Clearly there is also overlap with other areas of H&WB such as emotional wellbeing (e.g. managing anxiety, self-control) and relationships (e.g. peer pressure).

Theme 2: Emotional

Within the 'emotional' theme we examined learning progressions within mental wellbeing and mental health. Research literature relating to progress in mental wellbeing can be found across the disciplines of psychology, health and education. There is a lack of clarity about the definition of the term 'mental wellbeing' (used interchangeably with 'emotional' and/or 'social wellbeing') and differences between the three fields (Glover *et al.*, 1998; Barblett and Maloney, 2010). Health literature predominantly deals with mental wellbeing within the context of mental health; psychological research predominantly explores characteristics of good mental wellbeing. This field offers scales which can be adopted in settings, including schools, to measure the wellbeing of children. However, whilst there are some useful definitions of key terms, there is little research into the process or stages of the development of mental wellbeing by children and young people (Glover *at al.*, 1998; Liddle and Carter, 2015).

A number of frameworks regard progress in mental wellbeing as a continuum e.g. from maximum health to maximum disease/death. Antonovsky (1987, cited in Keyes, 2002) offers the salutogenesis model which views mental health as a dynamic process of developing and maintaining health; progress depends on how well individuals can cope with the challenges of life and how competent they feel to take care of their own health. This model of well-being development has been adopted by curriculum frameworks, e.g. Australia's Health and Physical Activity curriculum (Callcott, Miller and Wilson-Gahan, 2015).

Keyes (2002) offers a continuum of mental health from 'flourishing' to 'languishing', but does not describe progression points along that continuum. Flourishing is being filled with positive emotion and functioning well psychologically and socially – living the 'good life' (Keyes, 2002; Kern *et al.*, 2015). Kern *et al*., (2015) stress the importance of focusing on the positive, rather than negative, development of mental wellbeing. Benson and Scales (2009), cited in Kern *et al.*, (2015) describe this process of 'thriving' as a dynamic interplay between multiple dimensions of a person and multiple developmental contexts. The wider environment impacts on the development of the child, from attachment with caregivers (Gus, Rose and Gilbert, 2015) to positive regard with teachers and peers (Glover *et al.*, 1998). Culture provides a context for children to develop their sense of identity and make meaning from the world around them (Glover *et al*., 1998). Bronfenbrenner's ecological systems theory (1979, cited in Gus, Rose and Gilbert, 2015) centralises the role of relationships and interactions in all aspects of a child's development. The role of the adult (particularly the teacher) is vital in supporting children's development of competencies related to mental wellbeing, echoing a Vygotskian approach to progress (Gus, Rose and Gilbert, 2015; Eames, Shippen and Sharp, 2016).

Children and young people with higher levels of emotional wellbeing have higher academic attainment and there is a close link between the ability to regulate emotion and the ability to learn (Barblett and Maloney, 2010; Durlak *et al.*, 2011; Lavis, 2014; Popordanoska, 2016). Eisenberg *et al.,* (1997, cited in Popordanoska, 2016) find that self-regulated children are able to better cope in unpredictable or stressful situations. Popordanoska (2016) argues that regulation is integral to healthy child development, leading children to 'manage their own emotions effectively, empathise with others and make sensible decisions about their behaviours' (p. 499). The capacity to control emotions appears during the early years with significant advances between the ages of 5 and 7, linked to neurological developments (Denham, Bassett and Wyatt, 2007 cited in Popordanoska, 2016). In mastering these competencies, children's development moves from being controlled by external factors to autonomous responses based on internalised values, leading to caring, good decision making (Bear and Watkins, 2006 cited in Durlak *et al*., 2011).

Finally, progress in mental wellbeing is unlikely to be linear in nature. Children may have 'growth spurts' which impact on neural development in the early and adolescent years and competencies are constantly evolving. Because of social and contextual framing of knowledge and skills in this area, development is unlikely to be uniform and may be uneven across sub-areas (Moore, Lipman and Brown, 2004; Gus, Rose and Gilbert, 2005). The early years offer a significant period where qualitative jumps can be made, but within the area of mental wellbeing concepts become increasingly more sophisticated over long periods of time. Progress may not follow normative standards of cognitive development and Kern (2015) warns that it is important not to confuse 'normative immaturity' with low wellbeing.

There is good evidence for the impact of outdoor education in general and outdoor adventure education in particular on development in several domains of well-being; this impact is not only immediate but longer lasting. Thus Williams and Wainwright (2017) in what they describe as an 'advocacy paper' (p. 496) conclude from a literature review of an extensive range of research:

> *'Our review identifies pupil learning in the affective domain to be the most prominent impact of OAE, particularly in relation to developing a positive self-concept closely supported and inter-linked with learning in the cognitive and physical domains. From this we identified the major theme for the model to be personal growth through adventure.'* (p. 496)

Drawing on a more limited range of evidence (statements from provider organisations as well as peer reviewed research), Natural England (2016) concludes:

> *'There is now a substantial body of evidence which tends to demonstrate a positive association between learning which takes place in the natural environment and delivery of a diverse range of learning processes and outcomes, including cognitive outcomes and attitudinal, social and developmental outcomes in people of all ages.'*

There is, however, little evidence directly related to progression, either in descriptions of outdoor learning itself or in descriptions of the impact of outdoor learning on other aspects of learning.

Theme 3: Social

The development of healthy relationships with peers is a necessary pre-requisite for the effective social functioning of individuals across the lifespan. Arguably, the roots of the social relationships we enjoy as adults lie in early childhood; infants are born to be sociable (Lawrenson 2011). Empirical findings have enhanced understanding of the development of children's social relationships, as briefly summarised below.

There are large developmental shifts in children's social participation in early childhood. For example, between the ages of 2 and 4 children's play progresses through the stages from 'unoccupied'; onlooker; solitary; parallel; associative; and 'cooperative' (Parten, 1932). Rubin, Watson and Jambor's (1978) work later combined these findings with those of Smilansky (1968) in their description of the progression of children's play through levels: 'functional', 'constructive', 'dramatic', and 'games with rules' (Smith, 2011).

Children who have difficulty in forming effective social relationships with their peers may differ in their capacity for Social Information Processing. Dodge, Pettit, McClaskey, & Brown (1986) devised a model of social interaction exchange, which involves five steps (encoding; interpreting; searching for the appropriate response; evaluation; and enacting) involving the interpretation of the behaviour and motivations of others. Some children who lack social skills may show a deficit in interpretation of others' motives. Sutton, Smith and Swettenham (1999) have demonstrated that children's maladaptive behaviour is not always enacted by children lacking in social understanding; in fact, aggressive children often perform well in Theory of Mind tests. These findings suggest that, while antisocial, aggressive children may lack empathy, they have a strong awareness of the weaknesses of others (Smith, 2011).

Therefore, when considering how children typically develop in terms of their interpersonal relationships with others, we may also consider their moral development. Much research has been conducted to understand prosocial and antisocial tendencies and their link to social cognition in the individual. Eisenberg (e.g. 1983), building upon previous work by Piaget, proposed a five-stage theory of prosocial development. As shown in *Table 7*, children's prosocial behaviour follows a series of development steps, which could potentially be linked to a model of progression. Eisenberg's stage theory has been supported by longitudinal research (Eisenberg *et al*., 1991) and is seen as an improvement upon earlier theories of moral development (e.g., Kohlberg, 1981).

As children and young people enter primary and secondary schooling, peer relationships take on increasing importance. Among young children, friendships are marked by sharing common activities

(Bukowski, Motzoi, & Meyer, 2009). In primary school, children increase in amount of time spent with peers, begin to share interests and beliefs, and have more intimate interactions (Hartup & Stevens, 1997). By adolescence, youth seek independence from authority figures and desire to spend more time with peers (Lam, McHale, & Crouter, 2014; Larson et al., 1996), and by ages 16-18, late adolescents perceive that friend support exceed both teacher and parent support (Bokhorst, Sumter, & Westenberg, 2010).

Table 7. Eisenberg's Stages of Prosocial Reasoning

Age	**Stage**	**Description**
Pre-school	Hedonistic orientation	Individual is concerned with self-oriented consequences rather than moral considerations. Reasons for assisting/not assisting another - consideration of direct gain to self, future reciprocity, and concern for others who the individual needs and/or likes (due to the affectional tie).
Late pre-school and primary school	Needs of others orientation	Individual expresses concern for physical, material; and psychological needs of others even though the other's needs conflict with one's own needs. Concern is expressed in simplest terms, without clear evidence of self-reflective role taking, verbal expressions of sympathy, or reference to internalized affect such as guilt.
Primary and some secondary school children	Stereotyped approval-focused orientation	Stereotyped images of good and bad persons and behaviours and/or considerations of others' approval and acceptance used in justifying prosocial or nonhelping behaviours.
Secondary school children	Empathic orientation	Individual's judgments - evidence of sympathetic responding, self-reflective role taking, concern with the other's humanness, and/or guilt or positive affect related to the consequences of one's actions.
Rare in children/youth	Internalised orientation	Justifications for helping/not helping based on internalized values, norms, or responsibilities, the desire to maintain individual and societal contractual obligations, and belief in the dignity, rights, and equality of all individuals.

Note. Descriptions are taken verbatim from Table 1 (Eisenberg et al., 1983, p. 850). Transitional stage of empathic orientation removed for brevity.

Theme 4: Intrapersonal

Within the 'intrapersonal' theme we focused on learning progressions within learning for life, decision making, and character development.

Research by the Centre for Real World Learning has identified the development of 'Habits of Mind' as a means of supporting and recognising progress in the domain of engineering (Lucas, Hanson, Bianchi, & Chippindall, 2017). To develop an 'engineering mindset' (p. 5), teachers identified six *Habits of Mind* which they strove to cultivate in their pupils. Subdividing the habits into twelve sub-habits allowed teachers to monitor pupils' progress and recognise any small changes (p. 43). The research concluded that 'dispositional teaching using appropriate pedagogies could develop in young people the habits of mind most valuable for engineers' (p. 69). How pupils progress within a particular domain relies foremost on teachers' approaches to teaching and learning. The research found that other learner outcomes were enhanced: 'As well as acquiring more confidence and capability in the target habits, there were significant improvements in terms of mindset (perseverance, learning from mistakes, playful experimentation) and the development of confidence as independent learners' (p. 71). Though these findings relate to engineering, they might offer an insight into how pupils progress in the domain of health and well-being in a way that prepares them for learning for life. The improvements identified in perseverance, learning from mistakes and independent learning resonate with the competencies of reflectiveness, resilience, resourcefulness and responsibility.

'Character education' is a problematic term, but research in this area is relevant to the competencies deemed critical by the H&WB AoLE, such as resourceful, respective, and resilient. Although there is extensive research on how to assess mental health, emotional well-being and character traits such as resilience, there is little empirical evidence of how children's capacities in these areas progress over time in educational settings although it is clear that schools have an important role to play in supporting children in this area.

As noted by Berkowitz (2002, p. 49), character is multifaceted, each trait has its own developmental trajectory, children develop at different rates, and the developmental sequence and profile of the components of character differ across individuals. Berkowitz (2002) describes the typical trajectory of the development of children's character, using examples such as sense of self-control, guilt, and perspective-taking, and highlights four school practices that have empirical support for promoting students' developing character. Closely related to the development of character are developing moral and prosocial reasoning (Eisenberg, 1983) and the development of children's ability to delay gratification (Mischel, Shoda, & Rodriguez, 1989). Longitudinal research demonstrates that children who were able to delay gratification at a young age developed into more cognitively and socially competent adolescents, achieved higher academically, and coped better with stress (Mischel, Shoda, & Rodriguez, 1989). The New Pedagogies for Deep Learning Global Partnership (2014) provide a learning progression map for character education, detailing what learners look like at five different levels, but it is unclear whether there is empirical support for this approach.

The Interrelated Nature of H&WB

Areas within H&WB are closely intertwined. For example, there is evidence of strong links between physical activity and wellbeing (Abdallah, Main, Pople and Rees, 2014; Lu and Buchanan, 2014). Lu and Buchanan (2014) suggest that physical activity can provide a meaningful context in which children can develop emotional competence. Emotions can be displayed through physical movement and interaction and physical activity can provide a setting for students to develop cognitively, socially and emotionally. Through physical activity, children and young people can understand that they are vulnerable to emotions and that it is possible to learn emotion regulation skills in such a context (Bergin and Bergin, 2012, cited in Lu and Buchanan, 2014). *Figure 3* is an adapted model of emotional development applied to physical activity. This framework posits progress as moving from understanding of self to being able to apply that understanding to others.

Figure 3. Bosacki's Framework for Developing Emotional Competence

Framework for Developing Emotional Competence

Metacognitive Skills	Learning Goals	Learning Activities
Self Connections *Learning questions: What am I thinking? Why?*		
Intrapersonal understanding	Develop the ability to attribute mental states to self	Reflect on performance completed (e.g., games, dance, outdoor pursuit)
Learning questions: What am I feeling? Why?		
Affective	Develop an activity to trust, care, and accept oneself	Eurhythmy, guided meditation/mindfulness
Social and Transcultural Connections *Learning questions: What are others thinking? Why?*		
Conceptual role-taking	Understand the beliefs and intentions of others	Cooperative games, peer teaching and learning
Learning questions: What are others feeling? Why?		
Empathetic sensitivity	Understand the emotional worlds of others	Creative games, group dance, conflict mediation

(Bosacki, 2008 in Lu and Buchanan, 2014)

In summary, developing a road map of progression for H&WB helps teachers (and learners themselves) assess where learners currently are within their trajectories of learning and make pedagogical decisions about where they need to be supported to go next (Black *et al*., 2011; Heritage, 2008). This review suggests that progression in H&WB is likely to be spiral rather than linear. Given the interconnections between children's physical, mental, and social development, it is worth considering that children's developing skills, understandings, and competencies (or difficulties in progression) in one area of H&WB, such as relationships, may in turn support (or stifle) their progression in another area, such as mind and body (*Figure 4*). The evidence for social and emotional learning programmes in schools highlight the importance of moving away from fragmented workshops and lessons toward more comprehensive and research-based approaches focused on 'whole school' changes (Greenberg et al., 2003).

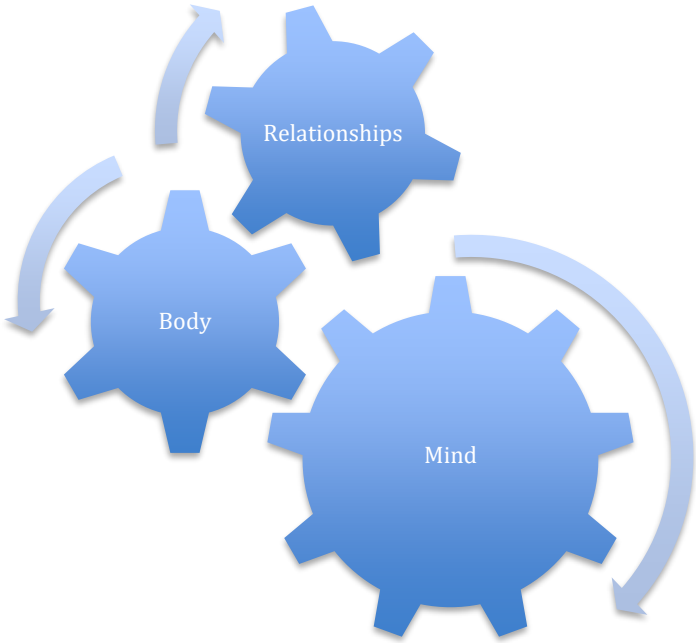


Figure 4. The cyclical and interconnected associations between children's social, physical, intrapersonal, and emotional health and well-being

Humanities: Review of Frameworks

This report synthesises findings from an examination of national examples of curricular progression in the Humanities. The following factors informed our country selection:

- the curriculum includes a model of progression
- recommendations from professorial consultants
- curricular materials provided in English, and when possible, bilingual contexts.

The following countries/regions were examined: Alberta (Canada), Australia, British Columbia (Canada), New Zealand, Northern Ireland, Ontario (Canada), Scotland and Singapore.

This report is organised into the following sections synthesising findings on:

- how the curriculum is structured
- what matters in the Humanities area
- how progression is conceptualised
- the form and wording of progression statements
- a note about religious education.

Weblinks to further information for each country are provided in Additional Document 4.

Structure of the Curriculum Frameworks

The countries that we reviewed differ in how their curricula are structured, including in the labels used, in whether there are separate frameworks for different stages of schooling, in the number of levels of progression and in whether there are learning outcomes specified for each year or grade, and in the extent to which different Humanities subjects are taught separately or as one learning area.

One element of the curriculum structure with implications for learning progression is the number of levels included in the Humanities curriculum and whether the levels and their associated learning outcomes are specified for each grade or age. New Zealand, Northern Ireland, and Scotland do not have levels tied to specific grade levels. New Zealand has 8 levels, called stages, and each stage covers several years with a clear recognition that some pupils may attain stages earlier or later than expected. Northern Ireland and Scotland both have a total of 5 broad levels spanning early years through to the end of compulsory schooling. Scotland's documentation makes it very clear that students do not need to be at a certain age within a certain level, while Northern Ireland's stages seems to be more closely tied to ages. On the other hand, Ontario, Alberta, Australia and British Columbia specify learning outcomes for each grade or year level. Arguably, when learning objectives are tied to a grade or age then there is a risk of pressure to cover a particular set of standards by a particular time, rather than concentrating on student learning.

A second distinction is in the extent to which there is a separate curriculum for primary and secondary levels. Scotland has one curriculum that spans all levels of schooling with no clear division between primary and secondary. Ontario, Australia, Alberta, Northern Ireland, Singapore and British Columbia have separate elementary and secondary Humanities curriculum. For example, Northern

Ireland has the *World Around Us* at foundation and key stage 1 and 2, and *Environment and Society* at key stage 3 and 4. In British Columbia, there is one Social Studies curriculum from Kindergarten through grade 9 which is currently transitioning in to a new curriculum for secondary level (10-12). The curriculum emphasises acquiring and developing key disciplinary thinking skills built around six major historical and geographical thinking concepts: significance, evidence, continuity and change, cause and consequence, perspective and ethical judgement. Students are expected to study key topics including Canadian society and identity, Canadian history, world history, Canadian and world geography, Canadian politics and government as well as major economic systems. In Singapore the humanities are taught through *Social Studies* (geography and history) and *Civics and Moral Education* (incorporating religious education*)* in primary schools and through specific subjects in secondary schools for example Geography. There are also two distinct curriculums for each subject in secondary, for example Lower Secondary History and Upper Secondary History (British Columbia Government, 2016/2017). New Zealand provides a combination where subject specificity emerges around level 6 out of 8; however, New Zealand's curriculum is presented in a coherent way as part of one overall learning area with achievement outcomes listed in one location for all levels. Having separate curricula and/or assessment guidelines for different stages of schooling may have implications for learners' transition into secondary school and for the extent to which the separate curricula complement one another.

Countries also differ in the extent to which the learning outcomes cover the entire Humanities area or are subject specific. Where subject specificity exists, it often emerges in secondary school. New Zealand has a single Social Studies learning area through levels 1-5, and then separate subjects of Geography, History, Sociology, and Economics through levels 6-8. Australia adopts the same approach as: the area is called Humanities until year 8 and thereafter separated into separate subjects of History, Civics and Citizenship, and Economics and Business. Northern Ireland uses common theme names for the learning area, although within the last key stage there are separate guidance documents for history and geography. Ontario stands out as having a curriculum that increases in fragmentation at multiple levels. There is a single subject called Social Studies for grades 1-6; this is split into History and Geography in grades 7-8; and then further split into Economics, Geography, History, Law, and Politics (within an umbrella area called *Canadian and World Studies*) by grade 12. At the secondary level there is also a Business subject and a separate learning area called *Social Sciences and Humanities* that includes equity studies, family studies, general social sciences, philosophy, and world religions. The proposed secondary draft curriculum in British Columbia (to be implemented in 2018/19) also has a single subject called Social Studies for grade 10-12, although in grade 12 there are separate learning areas such as Genocide Studies, Asia Studies, Social Justice, Law, and Comparative World Religions. Religious education, included in Humanities within Wales, is a separate learning area in Scotland and Northern Ireland and not included as a major learning area in Australia, Alberta, New Zealand and Singapore**.** In Singapore, for example, Civics and Moral education was introduced in 1991 to replace religious knowledge and is no longer a compulsory subject. However, the Civics and Moral education syllabus strengthens inter-ethnic and inter-religious tolerance, instils a deeper sense of civic and social responsibility and fosters stronger commitment and loyalty to the nation. In British Columbia, religion is included only in grade 7 and 8 as a topic; as an example, in grade 7, '*representations of the world according to the religions'* is tied to the content section titled, '*origins, core beliefs, narratives, practices, and influences of religions, including at least one indigenous to the Americas'*.

Two of the countries reviewed have one interdisciplinary Humanities learning area that remains throughout schooling. In Scotland, there is one subject called Social Studies across all levels, as history and geography are included in the progression steps in an integrated fashion. Similarly, in Alberta, there is one subject called Social Studies throughout all of schooling. Although the online resources are separated into K-6, 7-9, and 10-12, the learning area retains an integrated nature as defined in the Alberta documentation: 'an issues-focused and inquiry-based interdisciplinary subject that draws upon history, geography, ecology, economics, law, philosophy, political science and other social science disciplines.'

What Matters

There are interesting distinctions in 'what matters' within the Humanities area across countries that have implications for decisions related to modelling progression. One element is the balance between Humanities skills and content, which seems to be fairly balanced in the countries that we reviewed. For example, Australia gives equal weighting to 'inquiry and skills' (what students should be able to do) and 'knowledge and understanding' (what students are expected to understand). The Humanities and Social Sciences achievement standards listed for each grade level include a paragraph devoted to each. This is similar in the Singapore curriculum with the focus of the learning outcomes based on knowledge and understanding, skills and values and attitudes. In British Columbia as well, there is a reasonable balance between understanding, competencies and skills. The primary goal of Social Studies education is to provide students with the knowledge, skills and competencies necessary to be active, informed citizens. As such, all areas of learning are based on a 'Know-Do-Understand' model to support a concept-based, competency-driven approach to learning. The Content, detailing with the essential topics and knowledge at each grade level, constitutes the 'Know' of the Know-Do-Understand model of learning. The subject-specific curricular competencies, underpinned by core competencies, are the skills, strategies, and processes that students should develop over time and reflect the 'Do'. For example, the learning standards within *Global Issues and Governance* in grade 6, has a clear curricular competency (e.g. '*Develop a plan of action to address a selected problem or issue')* and related content (e.g. Grade 6: global poverty and inequality issues, including class structure and gender). Furthermore, throughout the Social Studies K-9 curriculum, most of the Content and Curricular Competencies have Elaborations that take the form of key skills, key questions, and sample topics (Ministry of Education, British Columbia, 2015).

There is a tendency to emphasise the 'inquiry' skill across countries. in New Zealand the Social Sciences learning area highlights the 'social inquiry approach' which includes sub-skills such as asking questions, gathering information, exploring perspectives, and reflection and evaluation. In Singapore, 'inquiry' is used as a pedagogy for developing historical and geographical understanding, for example, 'the use of historical inquiry is … at the heart of history instruction and learning, and students must be provided with the opportunities to learn the skills required through practice and engagement in historical inquiry.' British Columbia also adopts an 'inquiry and question based approach' in which learners are encouraged to form questions that can provide teachers with insights into their thinking. Throughout the Social Studies curriculum, learners examine big, open-ended questions so that they can make informed decisions.

As another example, Ontario has a strong focus on the 'inquiry process' which includes five elements:

- interpret and analyse
- gather and organise,
- formulate questions,
- evaluate
- draw conclusions and communicate.

Each of these five elements or skills is applied to subjects such as geography and history, with specific ways listed to describe how students can approach each element of the inquiry process within the subject area.

A second point for consideration of 'what matters' in Humanities is the extent to which there are 'big ideas' that drive the area and whether these are subject-specific or broad.

- In Scotland, the Social Studies 'experiences and outcomes' lay out some key areas of progression, for example, evaluating evidence, understanding local environment, personal responsibility, understanding the weather and climate, what it means to be a citizen, managing money, and more (22 ideas in all).
- In Singapore, a thematic approach, structured along the key themes of identity, culture and heritage and people and environment, frames the primary syllabus, with the syllabus organised into three broad clusters titled Discovering Self and Immediate Environment, Understanding Singapore in the Past and Present, and Appreciating the World and Religion We Live In. However, these are not as visible in the secondary syllabuses.
- Australia has four 'key ideas' that underpin their Humanities area, for example, one is 'How societies and economies operate and how they are changing over time.'
- Ontario's Humanities curriculum for Grades 1-8 has *Big Ideas* that underpin the content and learning (e.g. for 'cause and consequence' in social studies, the big idea is that 'global issues require global action').
- Ontario also has more specific big ideas at each grade level, for example at Grade 4 under the strand 'heritage and identity: early societies' there are big ideas such as 'By understanding the past, we can better understand the present' and 'The environment had a major impact on daily life in early societies'. Important to progression is the extent to which a big idea seems to be integrated across learning stages, in other words, whether there is a map of the progression of learning that leads to the development of these important big ideas in the Humanities.
- In British Columbia, 'big ideas' consist of generalisations, principles and the key concepts important in an area of learning. The big ideas are understood through activities that examine content topics through the use of key disciplinary skills found in the Curricular Competencies. They are intended to endure beyond a single grade and contribute to future understanding. Within the learning standards '7th Century to 1750' in grade 8, two of the big ideas are '*Human and environmental factors shape changes in population and living standards'* and '*Exploration, expansion, and colonization had varying consequences for different groups'* (British Columbia Government Core Competencies, n.d.).

Many of the Humanities curricula reviewed also contain competencies or broad conceptions. Some are cross-curricular and expected to be developed alongside Humanities skills or knowledge, some are specific to the Humanities area, some aim to direct *how* children should progress within Humanities. For example, Ontario defines six concepts of social studies thinking:

- significance
- cause and consequence
- continuity and change
- patterns and trends
- interrelationships
- perspective

These underpin all thinking and learning in social studies within the context of a vision statement that seems similar to the four purposes of the curriculum in Wales. British Columbia has two levels of competencies: Core Competencies develop across the curriculum whereas Curricular Competencies, as pointed out earlier, are specific to each grade level in each area of learning. The three core competencies are communication, thinking, as well as personal and social.

As another example, Australia has seven Humanities concepts of interdisciplinary thinking (e.g. significance, continuity and change, place and space) and five interdisciplinary inquiry and skills (e.g. researching, analysing).

Northern Ireland's curriculum documents describe how 'thinking skills and personal capabilities' can contribute to areas such as history and geography and help teachers in planning for learning and assessment. For example, in history for key stages 1-2, there are skills such as managing information, thinking, problem solving and decision making, being creative, working with others, and self-management. An example for 'being creative' as applied to History is shown in *Figure* 5. Arguably, maps with only two stages do not provide enough steps to support a comprehensive narrative of progression.

Being Creative

Demonstrate creativity and initiative when developing ideas and following them through	FROM **By the end of Year 4 pupils can:**	TO **By the end of Year 7 pupils can:**
Curiosity	Use imagination to explore how people acted as they did in the past and how they may have felt, for example, 'How might Florence Nightingale have felt about her work?' or 'How an evacuee felt leaving home'.	Use imagination to explore different points of view people had about events in the past, for example, Victorian mill owner, half timer or factory - reformer.
Exploration	Take part in role-play, including the use of, for example, story sacks or finger puppets, to act out how characters in stories may have felt. Use all the senses to help pupils experiment with questions and ideas about people and events in the past using artefacts, stories, photographs, multimedia as stimulus or during a local history trail. Look for clues about the past and begin to classify and make connections between them by choosing, for example, what would be the best artefacts, pictures or stories to tell us about jobs in our locality in the past/present. Use a variety of forms of creative writing, for example, writing simple diary entries or design a leaflet to advertise a holiday in the past.	Participate in a role-play simulation to debate an issue about the local environment, for example, save our local monument or preserve a local building. Use all the senses to explore and generate questions combining their own knowledge with a range of given sources. Use a variety of forms of creative writing to demonstrate empathy with the past, for example, a diary account 'My first day at the Workhouse', devise recipes for rich or poor Victorian households or an eye-witness account of a Viking raid.
Flexibility	Generate different ways to 'show what we know' about the past, for example, a poster, diagram, collage or presentation.	Construct their own representation of the past through the use of music, art, collage, and ICT, for example, designing a panel for a heritage centre on Child labour in Victorian Belfast.
Resilience	Use play to experiment with the past, for example, set up a dramatic play area with old objects, clothes or equipment.	Collect and experiment with evidence that give clues to the past, for example, select items to put into a museum shelf on Victorian schools or a time-capsule.

Figure 5. One of the skills/capabilities highlighted in Northern Ireland's 'The Progression Framework: The World Around Us – History – Key Stages 1 and 2' retrieved from http://ccea.org.uk/sites/default/files/docs/curriculum/area_of_learning/the_world_around_us/progression_framework_history.pdf

Finally, it is also worth noting that in New Zealand, Māori words and phrases are included throughout the English documents, making it clear that the Māori language and culture is an important part of 'what matters' within the curriculum. For example, one of the 'social science' achievement objectives at level 2 is: 'Understand how the status of Māori as tangata whenua is significant for communities in New Zealand.' The Alberta Social Studies documents make significant reference to the importance of Aboriginal and Francophone perspectives and experiences, as do those of British Columbia. These three examples may provide illustrations for the use of Welsh culture and language within the development of the Humanities area in Wales.

Conceptualisation of Progression

Progression steps, the building blocks of students' learning trajectories, can be conceptualised in many ways (Heritage, 2008), such as moving from novice to expert, learning a series of different concepts and/or skills that logically build upon one another, increased sophistication or depth within a particular concept or skill, or increased independence in enacting concepts and skills. Progression could refer to the development of understandings, skills and/or capacities within one lesson, across a unit, across a school year, across schooling, or across lifelong learning. Donaldson (2015) recommends a broad level representing big 'steps' of progression across schooling.

The countries we reviewed differ in the extent to which they explicitly or implicitly define progression and how they describe the development of children's learning within the Humanities. Scotland, Northern Ireland, and Australia mention progression. For example, Scotland's curriculum document states, 'Those who teach a particular stage will be able to see where their contributions to a child's learning and development sit in the span of progression.' Similarly, Northern Ireland specifies levels of progression in relation to the broad cross-curricular skills of literacy, numeracy and ICT skills. According to Northern Ireland's documentation, 'Progression in learning is not just about the amount of subject content that pupils know. Progression is about moving pupils from shallow, surface learning to deep learning' (p. 43, Guidance on Teaching Learning and Assessment at Key Stage 4). Also, within key stages 1-2, Northern Ireland documentation explicitly mentions progression within Geography and History. While Australia mentions progression in its curriculum ('is presented as a progression of learning from Foundation - Year 10'), it is difficult to clearly see how progression is conceptualised if looking at yearly learning objectives. A comparison of learning statements across years, from separate documents, begins to provide a picture of the expectations for progression of learning. Alberta's curriculum does not use the word progression, but does refer to 'linkages and sequencing' across years, which provides a type of progression framework although arguably it is so worded as to focus more on content presented each grade level rather than on true development in learning (e.g., 'Grade 3 continues to build on the knowledge of community and citizenship by examining diverse communities in the world'). British Columbia also does not employ the word progression. However, it mentions how, at each stage, students should maintain and enhance competencies from previous stages, while developing new skills. Additionally, it also points out how students should move from basic to increasingly sophisticated competencies. Although the word progression is not visible in Singapore's curriculum, students are admitted at the end of the primary 6 to an express, normal academic or normal technical track, based on attainment in English, mathematics, mother-tongue language and science. There are then Express and Normal Syllabuses within the humanities in the Singapore curriculum.

One of the most common models of progression in these examples is increased sophistication or depth within a particular concept or skill, as indicated through a series of statements that begin with a verb indicating an increasingly complex level of knowledge in relation to the same concept or topic. Often this seems to take the form of a model such as Bloom's taxonomy. For example, in Ontario, for the topic of *heritage and identity*, a Grade 1 learning statement begins with 'describe some of the ways…', a Grade 3 begins with 'compare ways of life among…', and a Grade 5 begins with 'analyse some key short- and long-term consequences…': progression is described in terms of moving from describing to comparing to analysing. As another example, in Scotland, within the topic of *people, past events and societies*, some of the progressive statements are 'I am aware that different types of evidence can help me to find out about the past' (early), 'I can use primary and

secondary sources to research events in the past' (second), and 'I can evaluate conflicting sources of evidence to sustain a line of argument' (fourth): progression is described in terms of moving from being aware to using to evaluating. Arguably, this strategy may ignore the relationship between essential aspects of the content (Brant, Chapman, & Isaacs, 2016). Use of a Bloom's taxonomy approach to model progression is also problematic in that it makes an assumption that 'higher' levels such as evaluation are more advanced than 'lower' levels such as understanding. In reality, both a 5 year old and a 15 year old may show the ability to remember or to apply or to create knowledge, and students may often move back and forth between the different levels (e.g. remembering, understanding, evaluating) throughout the learning process.

Another way progression is modelled in the countries reviewed is through guidance on the order in which particular content may be learned. It is important to consider that the ordering of particular *concepts* could be understood as a map for a progression of learning, whereas the ordering of particular *content* is not necessarily a learning progression. For example, the ordering of *concepts* can be seen in Northern Ireland, e.g. moving students from sequencing events and objects on a timeline in chronological order (at key stage 1) to developing a sense of change over time and how the past has affected the present (at key stage 2), which suggests a learning progression as students need to first understand that events have a particular chronological order before then understanding how the events relate to one another over time. In contrast, ordering of particular content to be learned is not the same thing as a learning progression. In a traditional standards-based Humanities curriculum content in history may be presented in chronological order (from ancient history to more modern) or content in geography may be presented from local to national to global, but this represents *content* and, perhaps, breadth in understanding, rather than a focus on having greater depth through a more expert understanding of *concepts* within the area.

Interestingly, Ontario's curriculum includes a description of learning progression across Grades 1-12, but only in relation to one specific set of Humanities skills: geographic map and globe spatial skills. Benchmarks are provided regarding how these geographic spatial skills are expected to develop over time. One example from this multiple-page progression chart is shown in *Figure 6* below, with five clear progression steps listed for the concept of *map types* within the spatial representation skill. This progression seems to be based on a model that shows a series of different concepts/skills that logically build upon one another. Importantly, at all levels students are expected to engage in the same skills (extracting information, creating) and instead it is the content itself that seems to increase in sophistication. Unfortunately the Ontario curriculum does not provide similar progression maps for a wider range of concepts/skills within the Humanities.

1. MAP AND GLOBE SKILLS *(continued)*						
B. Spatial Representation						
CATEGORY	**Grade 1**	**Grades 2–3**	**Grades 4–6**	**Grades 7–8**	**Grade 9**	**Grades 11–12**
	The student:					
Map types (e.g., sketch, thematic, topographic)	• extracts information from and creates sketch maps (e.g., showing a local neighbourhood, the layout of a classroom) • creates 2D maps of familiar surroundings • creates 3D models using blocks and toys					
		• extracts information from, analyses, and creates thematic maps, including the following: – political (e.g., Canada's political regions, countries of the world) – physical (e.g., climate, landforms) – historical (e.g., settlement patterns) – land use (e.g., community features) • extracts information from, analyses, and creates digital maps (e.g., online interactive)				
			• extracts information from, analyses, and creates thematic maps, including the following: – demographic (e.g., population distribution) – flow (e.g., movement of people) – issue-based (e.g., pollution or poverty in Canada) – annotated (e.g., illustrating an aspect of student inquiry)			
				• extracts information from, analyses, and creates increasingly complex thematic maps, including the following: – demographic (e.g., population density, literacy rates) – physical (e.g., frequency of natural events) • extracts information from and analyses topographic maps		
					• extracts information from, analyses, and creates increasingly complex thematic maps, including the following: issue-based maps layering two or more themes (e.g., population density and CO_2 emissions; population settlement and weather events)	

Figure 6. A progression map of spatial representation for map types; from Ontario Canadian and World Studies Grades 9 and 10 curriculum (2013, p 166) http://www.edu.gov.on.ca/eng/curriculum/secondary/canworld910curr2013.pdf

A final issue relating to the conceptualisation of progression is the extent to which it follows a linear model, a spiral model (children are expected to revisit previous concepts/skills as they develop), or some other type of model representing a development from novice to expert. Within New Zealand, the curriculum documents highlight the need for learners to re-visit concepts in order to consolidate their learning in what appears to be a spiral approach to progression. Similarly, Ontario espouses the historical inquiry process (e.g. in grades 7-8) and suggest this process is not linear in nature:

> *'the historical inquiry process, guiding students in their investigations of events, developments, issues, and ideas. This process is not intended to be applied in a linear manner: students will use the applicable components of the process in the order most appropriate for them and for the task at hand'* (p. 132 Ontario The Ontario Curriculum – Social Studies Grades 1 to 6 and History and Geography Grades 7 and 8).

British Columbia espouses cross curricular learning and a spiral approach encouraging learners to revisit concepts and make connections between big ideas. Scotland's experiences and outcomes, on the other hand, imply that learning in Social Studies may be linear.

Form and Wording of Progression Statements

There are interesting similarities and differences across countries in the statements of progression. Statements differ in how broad or specifically they are worded. In New Zealand, although progression is apparent in the statements, they are quite broad: for example, for history, at Level 1 pupils 'Understand how the past is important to people', whereas at Level 2 they 'Understand how time and change affect people's lives'. While this shows some progression in terms of sophistication, no further detail as to how learning is developed to make the shift in understanding. When progression statements are worded very broadly, the intricacies of learning progression at a level that is useful for the teacher in planning a lesson may not be covered and thus these may need to be developed as optional supporting materials for teachers.

Other countries, such as Canada, tend to use much more specific statements. For example, Ontario has very specific statements, such as 'compare key aspects of life in a few early societies (3000 BCE–1500 CE), each from a different region and era and representing a different culture, and describe some key similarities and differences between these early societies and present-day Canadian society.' When progression statements are worded too specifically there is a risk of teaching becoming overly scripted and prescribed, as well as not giving flexibility for developing learners' understandings or skills related to local or context-specific issues.

Despite these differences, there is generally a lot of overlap in statements across countries. As shown in the examples in *Table 8* below, common themes such as how individuals in the past have influenced current events seem to be present in most Humanities curricula. Interestingly, comparable statements have been drawn from different ages or levels; there is variation in which understandings and skills are expected at which general ages, an issue worth exploring in more depth. Another difference is in the types of actions that are expected by students, for example, in Scotland, Ontario, British Columbia, Australia and Singapore, there is a general action required of students (to identify or contribute to a discussion) whereas in New Zealand it is left open as 'understanding' and in Northern Ireland it is described as 'become aware', both of which are quite vague. In all of the cases, it could be contended that there are many ways in which to interpret the

statement: for example, Alberta states that students will demonstrate an understanding of the people and the stories of Canada; one could argue that students at any age could do this but of course to varying degree and with varying sophistication. Humanities teachers and students will need to have discussions to come to common agreement about how to interpret the statement and to decide whether a student has demonstrated an adequate enough understanding that they can then progress to the next step; perhaps samples can be provided to show varying levels of understanding.

Table 8. Example Progression Statements Across Countries

Country/Region	**Level**	**Example Statement**
Alberta	Grade 5 – Social Studies	Students will demonstrate an understanding of the people and the stories of Canada and their ways of life over time, and appreciate the diversity of Canada's heritage.
Australia	Year 3 - History	Students identify individuals, events and aspects of the past that have significance in the present.
British Columbia	Grade 5 - Social Studies	Differentiate between intended and unintended consequences of events, decisions, and developments, and speculate about alternative outcomes.
New Zealand	Level 5 - History	Understand how the ideas and actions of people in the past have had a significant impact on people's lives.
Northern Ireland	Key Stages 1 & 2 – The World Around Us - History	Pupils can become aware that there were reasons/causes why people in the past acted as they did and there were also consequences of those actions.
Ontario	Grade 8 – Historical Significance	Students will identify a variety of significant individuals and groups in Canada during this period and explain their contributions to Canadian heritage and/or identity
Scotland	First - Social Studies	Having selected a significant individual from the past, I can contribute to a discussion on the influence of their actions, then and since.
Singapore	Year 6 – Social Studies	Pupils will explore identity, culture and heritage of individuals and groups and appreciate how these change over time.

Another difference is the intended audience: whether the statements are written for the teacher or the pupil. Most of the countries examined word the statements for the teacher. For example, in Australia, there are paragraphs that begin such as 'By the end of Year 1, students identify and describe important dates and changes in their own lives...'. A similar model is employed in Singapore. In Scotland, on the other hand, the statements called 'experiences and outcomes' are worded for pupils and list how pupils' learning is expected to progress through each of the five

levels. However, Scotland has also recently provided benchmarks for Social Studies that are used 'to support practitioners' professional judgment of achievement of a level.' While the experiences and outcomes are worded for the pupil, e.g., 'I can investigate a Scottish historical theme to discover how past events or the actions of individuals or groups have shaped Scottish society', the corresponding benchmarks are worded for the teacher, e.g., 'Describes at least two ways in which past events or the actions of individuals or groups have shaped Scottish society.' In British Columbia, the core competencies are written from a student's perspective, although the curricular competencies are intended for the teachers. An example of a core competency statement is, 'I ask and respond to, simple direct questions'. Wording the statement for pupils may make it more meaningful for them to assess their own development and learning, although arguably it is critical to ensure that the words used within the phrases (e.g., identify, explore) are understood by students.

As a final point, it is critically important to read curriculum documents in full as the advice listed next to the progression steps may have an important impact on how the statements themselves should be interpreted and used. For example, see *Table 9* below for advice on 'Planning learning, teaching and assessment using the Benchmarks' that is listed in the latest Benchmarks for Social Studies from Scotland (March, 2017). It is made explicitly clear that the 'benchmarks' that represent students' progression of learning should be used in a formative and pedagogical way and not be reduced to a tick box exercise. These benchmarks are listed alongside the 'experiences and outcomes' specified for Social Studies.

Table 9. Scotland: Planning learning, teaching and assessment using the Benchmarks

KEY MESSAGES – WHAT TO DO	KEY MESSAGES – WHAT TO AVOID
• Use literacy and numeracy Benchmarks to help monitor progress towards achievement of a level, and to support overall professional judgement of when a learner has achieved a level.	• Avoid undue focus on individual Benchmarks which may result in over-assessing or recording of learners' progress.
• Become familiar with other curriculum area Benchmarks over time.	• Avoid the requirement to spend time collating excessive evidence to assess learners' achievement.
• Use Benchmarks to help assess whether learners are making suitable progress towards the national standards expected and use the evidence to plan their next, challenging steps in learning.	• There is no need to provide curriculum level judgements in all curriculum areas – stick to literacy and numeracy.
• Discuss Benchmarks within and across schools to achieve a shared understanding of the national standards expected across curriculum areas.	• Do not create excessive or elaborate approaches to monitoring and tracking.
	• Do not assess Benchmarks individually. Plan periodic, holistic assessment of children's and young people's learning.
	• Do not tick off individual Benchmarks.

Education Scotland Benchmarks Social Studies March 2017 (p. 4) [retrieved from https://education.gov.scot/improvement/Documents/Social%20StudiesBenchmarksPDF.pdf]

A Note about Religious Education

As noted already, none of the humanities or social studies frameworks reviewed included religious education. In Scotland, social studies and religious education are separate areas of the curriculum. Some points relevant to provision in Wales are afforded by an examination of the frameworks for religious education in Scotland.

There are two frameworks: Religious and Moral Education (RME) (for use in non-denominational schools) and Religious Education in Roman Catholic Schools (RERC). These have the same legal status as the other curriculum frameworks. It is notable that documentation in this area shows similarities or parallels to the documentation in the other curricular areas in Scotland.

Structure of the Curriculum Frameworks

The analysis above of the Scottish Social Studies framework is equally applicable to the two religious education frameworks, with the exception, of course, that religious and moral education (or, as appropriate, religious education) forms one integrated area of the curriculum

What Matters

What matters is defined both through the statements of Principles and Practice papers and through the five level statements of Experiences and Outcomes.

The RME Principles and Practice paper refers to the importance of developing learners' knowledge and understanding, skills and dispositions, including:

- *explore and develop knowledge and understanding of religions, recognising the place of Christianity in the Scottish context*
- *investigate and understand the responses which religious and non-religious views can offer to questions about the nature and meaning of life*
- *…*
- *develop respect for others and an understanding of beliefs and practices which are different from their own*
- *explore and establish values such as wisdom, justice, compassion and integrity and engage in the development of and reflection upon their own moral values*
- *…*
- *develop the skills of reflection, discernment, critical thinking and deciding how to act when making moral decisions…*

The parallel statement in the RERC Principles and Practice paper has similarly wide-reaching aims, including:

- *develop their knowledge and deepen their understanding of the Catholic faith*
- *investigate and understand the relevance of the Catholic faith to questions about truth and the meaning of life*
- *highlight, develop and foster the values, attitudes and practices which are compatible with a positive response to the invitation to faith*
- *develop the skills of reflection, discernment, critical thinking, and deciding how to act in accordance with an informed conscience when making moral decisions…*

This commitment to developing a range of educational outcomes is not reflected in the structures of the Experiences and Outcomes, structures which could be described as content based. Within RME

there are three major organisers: Christianity: World Religions; Development of Beliefs and Values; the first two of these each have sub-strands: Beliefs; Values and Issues; Practices and Traditions. The RERC Experiences and Outcomes are structured under two main headings: Catholic Christianity; Other World Religions; the latter has the same three part substructure as the parallel RME organiser while Catholic Christianity has eight sub-strands such as In the Image of God, Son of God, Signs of God, Hours of God. In both RME and RERC all organisers and almost all sub-strands extend across all five curriculum levels.

While the structure may appear to be content defined, the statements of experiences and outcomes refer to a breadth of learning experiences. RME statements frequently use such phrases as: *through reflection and discussion, through investigating and reflecting, I can describe, I can explain, I can express reasoned views, I can show my understanding, I can apply my developing understanding*, which together imply a range of knowledge, skills and dispositions. There is a similar implication in the use in the RERC experiences and outcomes of such phrases as: *I have explored, I have reflected, I can describe, I can identify, I can confidently express.*

Conceptualisation of Progression

Progression is structured across five levels from the early years from age 3 to the end of broad general education at age 15. In general, the approach taken is one in which learners engage at deeper levels of sophistication with more complex content. The choice of verbs at different levels suggests an implicit use or at least influence of a taxonomy such as Bloom's. An example from RME: *I am becoming familiar > I can describe > I can show my understanding >I can explain > I can express reasoned views.* This may be less the case in RERC but there are examples such as: *I have examined > I can reflect > I have explored > I have researched.*

Statements, particularly in RME, often include such qualifiers as *some, increasing, developing,* or *key,* which may be open to varying interpretation.

It is notable that the RERC document often includes the word *how* in such statements as*: I have explored the belief that the Holy Spirit inspires and empowers the Church to fulfil its prophetic and missionary role in our world today. I have researched into situations which bear witness to this. I can describe how I and others can contribute to this work*. These typically link understanding with action.

Form of Progression Statements

As in all of the Scottish curriculum statements of experience and outcomes are first person pupil statements. It is notable that in the RME example, the number of statements tends to increase through the level; this is typical in RME. This is not the case in RERC although statements there tend become longer and more complex as learners progress through the levels. Examples are provided in Additional Document 5.

Humanities: Research Review

Introduction

Successful Futures describes the Humanities as providing:

> '*fascinating contexts for children and young people to learn about people, place, time and belief. It will give them an understanding of historical, geographical, political, economic and societal factors and provide opportunities to engage in informed discussions about ethics, beliefs, religion and spirituality. Children and young people will learn to consider how these different factors interrelate, and develop an understanding of themselves and other people, their own locality, Wales and the world in a range of times, places and circumstances.*' (Donaldson, 2015, p. 46).

This review focuses on evidence related to progression in learning across the Humanities and within each of the major subject areas: History, Geography, Religious Education and Civics.

Progression in the Humanities

Progression is a development towards a more advanced state; learning by its very nature is progression (Heritage, 2008). A curriculum with learning at its core should therefore be structured to show how understandings, skills and capacities typically progress and develop. A list of standards or catalogue of outcomes can inhibit pedagogy and weaken assessment by directing focus on content delivery, whereas a curriculum moulded on an evidence-based model of the paths through which learning typically proceeds helps teachers to set aims and plan for teaching and informs formative assessment (Black *et al*., 2011). Using models of progression, teachers (and learners) can assess where learners currently are within their trajectories of learning and make pedagogical decisions about where they need to be supported to go next (Black *et al*., 2011; Heritage, 2008).

Progression in learning within the Humanities area has unique features. Brant, Chapman and Isaacs (2016, p. 72) note:

> '*Unlike mathematics or science where the subject content intrinsically gets more complex, in the social studies it is possible to ask students to address the same question – for example, "What were the causes of the First World War?" or "What are our responsibilities as citizens?" – at ages 10 and 18 and expect qualitatively different answers*.'

The Humanities AoLE is tasked with creating progression maps that are evidence-based, co-developed by teachers, tried out within schools and suitable for the Welsh context. This context-specific approach is supported by research.

> '*… resulting schemes of progression can vary between cultures and can be changed by innovations in teaching. Given this variation, an overall aim of research on learning progressions might be to produce methods–with examples–to explore the particular learning progressions that emerge in any one context rather than to arrive at an ideal map of progression to which pedagogy should conform in all contexts*.' (Black *et al*., 2011, p. 72)

Research can highlight potential advantages and disadvantages of different approaches to modelling progression. For example, a review of Social Studies in six countries that perform well on PISA (Australia, Canada, China, Finland, Japan and Singapore) examined the extent to which the social studies subjects are taught separately or together, the balance between concepts and skills, the balance between teacher-based assessment and external assessment and, notably, how progression is defined (Brant, Chapman & Isaacs, 2016). The authors (p. 72) summarise four different approaches to modelling progression within Social Studies, noting some of the challenges to be aware of when using each approach:

- Modelling increasing challenge in terms of 'generic cognitive objectives' similar to Bloom's taxonomy; this essentially 'contentless' strategy may have the disadvantage of ignoring the relationship between essential aspects of the content and ignoring domain specific dimensions.
- Modelling subject-specific concepts such that the student is mastering the concepts and processes that embody disciplinary thinking (VanSledright, 2011, cited in Brant *et al*., 2016); this may have the disadvantage that competencies (e.g. using evidence) are not unique to social studies.
- Modelling by beginning with content similar to a 'core knowledge' approach (Cain & Chapman, 2014, cited in Brant *et al*., 2016); this may have the disadvantage of taking an aggregated rather than integrated approach.
- Modelling the equal importance of knowledge 'as body and form', for example using models of 'historical literacy' (Lee, 2005, 2011, cited in Brant *et al*., 2016).

This review merits further consideration by the Humanities AoLE.

The UK Geographical Association (2014) also proposes several different approaches to modelling learning progression, based on Rawling's (2008) work:

- Increasing breadth of study
- Wider range of scales studied
- Greater complexity of phenomena studied
- Increasing use made of generalised knowledge about abstract ideas
- Greater precision required in undertaking intellectual and practical tasks
- More mature awareness and understanding of issues and of the context of differing attitudes and values in which they arise.

Rawling's (2017) report, *The Welsh Curriculum Review*, lists possibilities for 'big ideas' within the Humanities. Rawling recommends that rather than viewing progression as 'knowing more' content, it is valuable to focus on how big ideas develop over time. The report provides an example of one way in which progression may be modelled in Geography (Appendix 1.3):

- 'By age 11, children should know about:
  - my country – an overview of the UK and a basic understanding of the shape and character of the countries, main regions, physical features and rivers, important cities
  - the wider world – locational knowledge and overview of the continents, oceans, key nations and major features such as hot/cold climates, hazard regions etc.
- By age 14, young people should know about:
  - the UK in the wider world – greater depth of knowledge and understanding about the

physical, economic, social and political geography of the UK within the context of their own community and its place in the wider world.'

This example of a suggested progression step from age 11 to 14 implies that pupils should first understand the country and the world independently before bringing them together, although it is vague regarding how those conceptual connections are made. There is a qualitative jump to a new understanding of economic, social, and political geography. A challenge is that there could be various interpretations of such phrases as 'greater depth of knowledge and understanding'. Adding too much specificity, however, may become prescriptive. Rather, supplemental materials, professional development and teacher expertise may well support the development of micro-level roadmaps to support students in progressing within a lesson, a unit, or across a school year.

There is a wide range of ways to model progression; there is a need for balance between content and skills, depth and breadth, logical order of different concepts to be learned and increasing sophistication within each concept, and the extent of flexibility across contexts. Sequencing content to be learned is distinct from progression of learning unless that content is specifically linked to a learning roadmap. A further issue for consideration is the extent to which learning progressions in Humanities are intertwined with progressions in other AoLEs, such as Science & Technology or Health & Wellbeing.

History

Some key themes emerge from research on progression in history. Foremost is that relatively little empirical evidence is available on understanding the progress of pupil understanding of historical concepts. While the work of Lee and Shemilt (2003) is arguably the gold standard in this regard, some of the ideas may be incompatible with the proposals in *Successful Futures*, not least the requirement for progression steps at regular intervals.

One key theme that appears in a number of studies is that understanding of 'progression' in history has moved from being primarily based on knowledge acquisition towards being based on 'thinking skills'. For example, Colyer (2012) points to 'The Historical Thinking Project' in Canada, which proposes that 6 thinking concepts:

- establishing historical significance
- using primary source evidence
- identifying continuity and change
- analysing cause and consequence
- taking historical perspectives
- understanding ethical dimensions of History

should be used as a framework for progression. These 'thinking concepts' may be regarded as similar to big ideas in history, though their broad focus may be more akin to skills rather than ideas.

The theme of creating categories against which progression can be shown is also noted by Hawkey *et al.* (2015) who cite work within a school that created a system within which progression is assessed in terms of knowledge and five categories of understanding:

- causes
- change and continuity

- significance
- interpretations
- source enquiry.

This implies that a framework of categories can be used to assess progression though the author states that mark schemes need to be created for individual pieces of work in order for progression to be measured.

Perhaps the most relevant body of literature regarding the current situation in Wales is the literature that tracks the 'life after levels' development in England. According to Brown and Burnham (2014), the level system in England (and Wales) has two major problems: 1) they are built on the assumption that pupils reach an equal level of development in all aspects of a topic at the same time and are therefore judged to be working at a single level for many concepts and skills at once; and 2) the level system has been broken down into sub-levels in order to provide evidence of short term progress. Lee and Shemilt (2003) argue that the level system was never designed as a model for progression as it does not identify key shifts in learner understanding. Furthermore, the authors note that the 'levels' can be restrictive since words like 'evaluate' occur only in the higher levels although, in reality, learners can 'evaluate' at earlier levels. This final point would seem to be particularly important when considering levels based taxonomies such as Bloom's as the assumption that one level (e.g. evaluation) is inherently more advanced than another (e.g. understanding) may be flawed.

Much of the international work seems to be several years behind that in England and Wales in terms of developing an agreed framework of progression. Developments in England following the abolition of level descriptors in 2014 offer perhaps the most useful lessons. The importance of mark schemes and progression models for specific pieces work is a recurring theme. Kennet and Fletcher (Hawkey *et al*., 2015) provide a useful example of a framework in this context; this may be too specific as a model of progression steps but could be a useful example of what schools could develop within the national framework. The language used within any framework should not reflect possibly flawed assumptions about increasing complexity within a taxonomy-based system.

An example of a progression model from Lee and Shemilt (2003) regarding the use of 'evidence' within history is provided in *Figure 7* (reading from top to bottom).

Figure 7: An example of a progression model from Lee and Shemilt (2003)

Figure 5: Progression in ideas about evidence

Pictures of the past

The past is viewed as though it were the present, and students treat potential evidence as if it offers direct access to the past. Questions about the basis of statements about the past do not arise. Stories are just stories.

Information

The past is treated as fixed and known by some authority; students treat potential evidence as information. Given statements to test against evidence, students match information or count sources to solve the problem. Questions arise about whether the information offered is correct or incorrect, but no methodology is attributed to history for answering such questions beyond an appeal to books, diaries or what is dug up. These, although sometimes seen as being connected with the past, provide transparent information that is either correct or incorrect.

Testimony

The past is reported to us by people living at the time. Like eyewitnesses today, they do this either well or badly. Questions as to how we know about the past are regarded as sensible: students begin to understand that history has a methodology for testing statements about the past. Conflicts in potential evidence are thought appropriately settled by deciding which report is best. Notions of bias, exaggeration and loss of information in transmission supplement the simple dichotomy between truth-telling and lies. Reports are often treated as if the authors are more or less direct eyewitnesses: the more direct, the better.

Scissors and Paste

The past can be probed even when no individual reporter has told us truthfully or accurately what happened. We can put together a version by picking out the true statements from different reports and putting them together. In one student's words: 'You take the true bits out of this one, and the best bits out of that one, and when you've got it up, you've got a picture.' Notions of bias or lies are supplemented by questions about whether the reporter is in a position to know.

Evidence in isolation

Statements about the past can be inferred from sources of evidence. We can ask questions of sources that they were not designed to answer, so that evidence will bear questions for which it could not be testimony. Many things may serve as evidence that do not report anything. (Nineteenth Century rail timetables were not constructed for the benefit of historians.) This means that historians may 'work out' historical facts even if no testimony survives. Evidence may be defective without questions of bias or lies. Reliability is not a fixed property of a source, and the weight we can rest on any piece of evidence depends on what questions we ask of it.

Evidence in context

A source only yields evidence when it is understood in its historical context: we must know what a source meant to those by and for whom it was produced. This involves the suspension of certain lines of questioning and a provisional acceptance of much historical work as established fact (a known context). We cannot question everything at once. Contexts vary across time and place and thus a sense of period is important.

Geography

A key message from research appears to be that progression in geography is difficult to determine. However, there is some support for identifying 'domains' in which progress can be identified and tracked, which moves beyond a curriculum that merely prescribes content. For example, Wertheim and Edelson (2013) refer to 'key geographical practices' which are essentially skills that a 'good geographer' would develop (e.g. posing geographical questions or communicating geographical information). Hopkin and Weedon (2014) note 'domains of geographical knowledge' (contextual,

understanding, and procedural) and imply, without specifying details of content, that subject content should also be key. These attempts at categorising geography into areas for progression would seem consistent with the level system that is currently used in Wales in which geography is divided into 'Locating', 'Understanding', 'Investigating' and 'Communicating'. It is interesting that within these domains for progress both knowledge and skills are evident, though not always considered in tandem. Bennetts (2005) helpfully distinguishes 'sequence' from 'progression':

> *'Sequence, in the context of the curriculum, is essentially about the order in which content and activities are introduced and organised… progression in learning is not an inevitable outcome. Progression focuses attention on the quality of students' learning... Although it can be applied to different time scales, the idea becomes especially pertinent when applied to long periods, during which students' cognitive abilities, depth of understanding, and development of value systems are affected by maturation processes, as well as by experience.'* (p. 113)

Muñiz Solari *et al.* (2017) argue that geographers can and should learn from approaches to articulating progression developed by their colleagues in the field of science. In particular they note the possibilities afforded by models which simultaneously describe progression in terms of two dimensions or axes, one of content and the other of such processes as enquiry and reasoning. Interestingly, they note that the granularity of each of these may differ: typically conceptual progression will be described in finer-grained detail than progression in reasoning or argumentation. They express concerns (p. vii) that

> *'[if] learning progression is an attempt to meld the relationship between knowledge and thinking in a process of making evidence-based explanations, there is very limited empirical research on whether such a tool, developed for a relatively 'vertical' science such as biology, will be useful for investigations of learning processes in relation to geographical subject matter, such as urban environments, cultural landscapes, social justice, or economic interdependence. These and many other topics do not constitute a clear hierarchical arrangement (progression) of knowledge that may constitute a prerequisite for reaching more complex levels of conceptual understanding and higher cognitive thinking.'*

Bennetts (2005) recognises that the nature of 'geography' has changed greatly over time and that the geography curriculum draws on several disciplines (e.g. geology, ecology, sociology, economics) and that lists of key concepts in geography curricula often lack any clear selection rationale. Having considered various approaches to defining progression (e.g. Bloom's and SOLO taxonomies, behaviourist hierarchies, conceptual structures in geography as an academic discipline), the author concludes that progression in learning can be best described in terms of dimensions such as complexity, abstraction, precision, making connections and developing structures, and breadth of context.

Some research provides a clearer focus on progression within domains. Thus, Hopkin and Owens (2015) cite the Geographical Association's (2015) 'dimensions of progress', which seem to promote an increasing depth of engagement with geographical issues and skills: for example, a learner progresses by moving from the 'concrete' to the 'abstract' or by increasing the range and accuracy of investigative skills. It would seem logical therefore, that if content and/or skill 'domains' are to be identified, then a clear reference to the actual progression within these domains is key.

Mohan *et al.* (2015) argue that the first step in developing a learning progression is to define the domain by drawing on existing work in the field, both research and practitioner informed. The size and complexity of a domain is very likely to allow for several learning progressions through it, each with a different focus (in terms of different aspects of content and/or skills and the balance between concepts and skills). However this is not the result of random choice: each learning progression will represent a journey from novice to expert and will have a lower and an upper anchor; the lower anchor represents emerging knowledge at entry and the upper anchor the expectations held by society for a young person at the end of schooling. The authors argue that both the lower anchor and progression between that and the upper anchor must be informed by classroom research into children's actual learning. Further they argue (p. 13) that within a domain (e.g. 'spatial thinking') geographers will employ 'a set of fundamental constructs and practices that encompass a great deal of spatial thinking more broadly (e.g., location, direction, distribution, scale, hierarchy)'. To map a progression framework it is necessary to identify constructs that are both used in this way and that are measurable. These then act as 'progress variables'). *Figure* 8 (Mohan *et al.* p. 14) illustrates the development of progress variables (items in the left hand column) across stages of learning; these would then be employed within specific learning progressions in the field of spatial thinking (e.g. Spatial Aspects of Conflict).

Figure 8: p. 14 Mohan, l., Mohan, A. & Uttal, D. (2015) Research on Thinking and Learning with Maps and Geospatial Technologies

Table 2. Synthesis of the progression of spatial concepts ages 3-12. Modified from Mohan and Mohan (2013). Reprinted with permission from National Geographic Society.

Spatial Concepts	Student Understandings and Possible Misconceptions and Challenges		
	Ages 3-6 (Pre-K through Grade 1)	Ages 7-9 (Grades 2-4)	Ages 10-12 (Grades 5 and 6)
Identity and Location	Students in this age group can typically identify places on maps, landscape features on maps and aerial photographs, and can locate familiar places on maps. While children at this age can identify places, they may be limited by vocabulary development. Students might also use landmarks as a way to identify where places or items are located on a map, but they can easily confuse locations on maps if the map is not well aligned to their real world. **Studies of Interest:** Blades and Spencer 1990; Blaut and Stea 1974, 1971; Blaut, Stea, Spencer, and Blades 2003; Bluestein and Acredolo 1979; Downs, Liben, and Daggs 1988; Huttenlocher, Newcombe, and Vasilyeva 1999; Liben 2008; Liben and Downs 1993; Presson 1982; Sowden, Stea, Blades, Spencer, and Blaut 1996	Students can accurately locate places and landscape features on a map, but perform better with familiar locales as opposed to foreign locales. Map alignment issues also improve at this age. However, students inconsistently use landmarks to verify locations. **Studies of Interest:** Blaut and Stea 1971; Golledge, Battersby, and Marsh 2008a; Kastens and Liben 2010, 2007	Students need to be primed to use all the resources available to determine locations, and encouraged self-explanation of decisions, to cue thinking more about landmarks, distances, and directions. Students do not readily use map scales, metric distances, or cardinal directions to help determine locations, but can do so if prompted during instruction. Accuracy on these tasks is better for familiar places and becomes less accurate for more foreign or large-scale tasks. **Studies of Interest:** Blaut and Stea 1971; Golledge and Stimson 1997; Liben 2008; Liben and Downs 1993; Tretter et al. 2006
Magnitude	Students seem to innately understand magnitude of objects (bigger, smaller), but they might confuse the size of an object with the number of objects (numerosity). **Studies of Interest:** Golledge, Battersby, and Marsh 2008a; Mix 1999; Rousselle, Palmers, and Noel 2004		
Distance and Direction	Understand relative distance, such as near, far, next to, and can begin using relative direction on maps, such as navigating mazes. Struggle with knowing which way to "hold a map" and easily get confused if it is not aligned to the real world; Students also do not intuitively think about distances without being prompted to do so. **Studies of Interest:** Blades, Sowden, and Spencer 1995; Blades and Spencer 1987; Liben 2008; Liben and Downs 1993; Rutland, Custance, and Campbell 1993	This is a transition period between topological (e.g., near, far) concepts of distance to metric measurements; by 4th grade, students should readily use metric distances. They will still need guidance to transition to metric measurements though. Students also frequently use landmarks and relative direction, but some ready to learn cardinal directions. **Studies of Interest:** Kastens and Liben 2010	
Frames of Reference and Perspective Taking	Children at this age view the world from an egocentric frame of reference (i.e., how they see the world rather than how another perspective might see it, such a bird flying over a house). **Studies of Interest:** Newcombe and Frick 2010; Newcombe and Huttenlocher 2000;	Students can begin to understand grid systems (coordinate system) and begin learning absolute location. Students might get distracted by features that are not useful and neglect useful features on maps. **Studies of Interest:** Bell 2000; Liben 2008; Kastens and Liben 2010; Newcombe and Frick 2010	
Scale	Students at this age can handle scale better using smaller, familiar spaces, such as a classroom. Students do not have a systematic way to handle scale- they cannot move between scales easily, such as the size of the school in real life v. the size of a school depicted on a map. **Studies of Interest:** Liben 2008; Uttal 2000		
Symbols	Abstract, unrelated symbols are not understood well at this age level. Students might also confuse the colors used on representations and expect those colors to be the same in the real-world (e.g., a red road on a map should be red in real life). **Studies of Interest:** Liben 2009, 2008; Myers and Liben 2008	During this age, students transition between iconic real-world symbols to abstract symbols, but they still make significant errors; explicit guidance needed on what symbols mean. **Studies of Interest:** Golledge, Battersby, and Marsh 2008a; Liben 2009, 2008; Myers and Liben 2008	Students can use abstract symbols and understand symbols do not always "look like" the referent. **Studies of Interest:** Golledge, Battersby, and Marsh 2008a; Liben 2009, 2008; Myers and Liben 2008
Hierarchies		Concept of hierarchy (or nesting) is not well established innately with this age group, but can possibly be introduced with close guidance. **Studies of Interest:** Lowes 2008	
Overlay and Other Complex Spatial Tasks			About half of all 6th grade students incidentally understand the concept of overlay without formal instruction Guidance using map overlays can likely improve student success. Students can also move onto complex spatial concepts such as distribution, patterns, overlays, and projection with support if mastery of the basic spatial concepts of location, distance, direction, boundaries, regions achieved. **Studies of Interest:** Battersby, Golledge, and Marsh 2006

Hopkin and Weedon's (2014) criticisms of the current level system in England and Wales are relevant to consideration of progression: levels have too often been used against specific pieces of work, in effect creating a series of mini summative tests which are not formative (as they tell learners where they are, not what needs to be done to improve); and levels are sub-divided to produce ever more detailed evidence of progression, in a process based on arbitrary information rather than real understanding of progression. Lambert (2011) raises a further issue: the actual understanding (and perhaps even the actual relevance) of the level descriptors is questionable. Lambert cites the difficulties that teachers have in identifying work to exemplify certain levels, implying an uncertainty about what constitutes a level (and therefore arguably progression). Despite these criticisms, Hopkin and Weedon (2014) note that the level system provides a 'rough hewn' language for progression that is useful for professional dialogue, implying that such a system is productive if it is used as a guideline for discussion about progression rather than as a tool for accurately measuring learner progress. In terms of 'life after levels' in England, Hopkins and Weedon (2014) caution against an approach that is based on 'Blocks of Knowledge' as this can prevent both a focus on progression in skill development and synthesis between themes. This seems to indicate that any future framework should be based on underlying 'big ideas' that can be tracked across topics and year groups, perhaps echoing the notion that domains for progress should be identified.

It is worth referring to the potential of 'learning progressions', as outlined by Huynh *et al*. (2015); the authors describe how learning progressions can be developed through tracking the actual development of thinking/learning during a sequence of learning or topic. The authors refer to work that has been ongoing in science and mathematics and to some early work on map skills and GIS within geography education. The premise of these 'learning progressions' is that they allow the teacher to understand the ways in which learners progress in their thinking/skill development in order to track progress. This would seem to have the potential to produce evidence based learning progressions which would act as a usable version of level descriptors and would support a genuinely formative process of checking current attainment against a known progression and the setting of targets for improvement. This may be a positive alternative to the current level system that is a 'blunt system on which to base week to week marking' (Lambert, 2011, p.24). However, it should be noted that such progressions are extremely complex (taking 2-3 years to produce) and that a large number of these may be needed in order to cover 'big ideas' within any curriculum subject.

Kerawalla *et al.* provide a different type of example of the development of learning progressions through classroom focused research. This took the form of a case study of a class of 12 to 13-year-old learners who were using nQuire, a Web-based tool to support them through the processes of inquiry on learning within a single topic (microclimates). The research focused not only on the development of content learning but on how the tool supported the development of inquiry skills.

The UK Geographical Association provides a list of further reading on progression which is worth exploring: http://www.geography.org.uk/download/GA_PRMGHProgressionFurtherReading.pdf

Religious Education

Religious Education (RE) contributes to pupils' academic and personal development and plays a key role in promoting social cohesion, respect and empathy, which are important in a diverse society (Ofsted, 2013). To fulfil this, a clear understanding of what is meant by progression within the

subject is needed. In the past, curriculum planning and assessment has often focused more on sequencing the content to be covered and less on how children become better learners of religious education, i.e. progression. This can result in repetition of content rather than developing understanding of knowledge and concepts of religious education. Whilst progression in learners' concept development is important, there is also a need to consider learners' RE skills.

The Review of the National Curriculum in England (2010-2014) was highly critical of the previous levels-based system. Best-fit judgement failed to recognise major gaps in children's knowledge and contributed to superficial coverage of the curriculum because the levels-based system encouraged learners to move on to new content without secure grasp of key areas. New guidance, 'Assessment and Progression in Religious Education' (NCFRE, 2016), provides information on assessing progress in RE in a context that has moved beyond levels, presenting a new progression model for RE which integrates positive aspects of previous models and balances knowledge and skills. Levels were removed to encourage new assessment models focused on learning 'fewer things in greater depth'. However, this may imply a reduction in the number of key RE concepts to be covered. This guidance aims to help teachers make day-to-day judgements about progress focusing on assessing rich, deep learning and understanding of key knowledge in RE; it is important to ensure progression in both 'knowledge' (key ideas or concepts in religions and belief) and 'skills' (skills need to handle 'religious' materials – questioning, interpreting, analysing, evaluating). Dimensions such as:

- extending vocabulary from the 'familiar to the unfamiliar'
- moving from the concrete to the abstract
- recognising divergences of opinion about and the controversial nature of religion and belief
- increasing the range and sophistication of questioning and investigative skills
- advancing students' ability to select and apply skills with increasing independence

should be embedded within progression in RE. Teachers may benefit from a framework that balances specificity with generalisation and prescription with teacher freedom.

The aims and/or objectives of the curriculum (e.g. the Four Purposes [Donaldson, 2015]) and cross-curricular responsibilities should be considered when planning for progression; the risk should be recognised that too much emphasis on these may lead to inaccuracy in mapping progression of learners' attainment in RE (Robertson *et al*., 2017).

When considering the 'big ideas', 'areas of enquiry' and 'concepts' in RE, there is a need to identify the overarching ideas that pupils should encounter that will enable them to engage with and understand the power of religion and belief in people's lives, i.e. the 'big ideas' about life, death, human behaviour and identity. Using the big ideas/areas of enquiry in planning provides a clear structure for pupils to revisit elements and build on previous achievements. A spiral curriculum can be planned so that pupils can deepen their knowledge and understanding of the traditions being studied, e.g. by examining a familiar story from perspectives that differ in level of sophistication.

Progression may be considered at three levels: day-to-day, medium term and long term. For example, progress can be shown on a day-to-day basis through formative assessment strategies such as better questioning, feedback, and effective self- and peer-assessment (Black and Wiliam, 1998). Thought-provoking and challenging questions can guide students in their study of religion (Grant & Matemba, 2013). Inspection evidence notes that in the best RE practices, assessment foci, criteria and approaches are clear and applied consistently (Catling, 2017). A variety of assessment

opportunities (e.g. end of unit project) may be used in the medium-term to identify broad progress, identify curriculum targets and monitor progress towards expected benchmarks. These can focus on the extent to which pupils can apply skills, link ideas together and move from the particular to the general, thus demonstrating their progress as RE thinkers. Bloom's taxonomy may be useful in improving questioning for assessment but should not be used to devise a new tyranny of levels (Brine, 2016).

Progression in RE is rarely linear and an approach based on a series of 'blocks of content' provides few opportunities for skill development or for synthesis through linkages between themes or areas of learning. Progression in RE should include opportunities for learners to revisit concepts and skills as and when appropriate (Catling, 2017), thus reflecting a spiral rather than a linear progression. Teachers need to plan teaching so that intrinsic and contested issues such as values can be assessed. RE should not remain at lower levels of cognitive demand (e.g. describing), but should 'raise the bar in teaching and assessment so that students are able to discover, critique, demonstrate, challenge and so on as emphasized in the CfE [Curriculum for Excellence]' (Grant & Matemba, 2013, p. 11).

RE needs to retain its distinctiveness while simultaneously making meaningful links to all other aspects of learning. Robertson *et al*. (2017), writing of experience in Scotland, note the importance of the development of the whole person in any curriculum and express caution: whilst progression grids and exemplar materials provide support in recognising achievement of a level in Religious and Moral Education, 'perhaps due to the emphasis placed on the 'responsibilities of all' and other curricular areas, accurate mapping of learners' achievement and attainment in RME remains in its infancy'. To do this effectively would involve the totality of learners' experiences across the whole curriculum. The authors stress that narrowing the curriculum or unduly stressing aspects of one part over another may narrow learners' experience.

Civics

Civics education is critical since democracies cannot survive without citizen participation (Sherrod, Flanagan & Youniss, 2002). Civics education not only involves understanding government, history, law and democracy but also learner engagement in discussions of current events (locally and globally), service learning, involvement in schools and communities and simulations of democratic processes and procedures; deep learning can help promote civic outcomes and strengthen a country's democracy (Levine and Kawashima-Ginsberg, 2015). The authors point out that requiring students to pass a standardised test on civics is superficial and has little impact on students' learning about civics or how to behave as citizens.

Civics education currently tends to focus on increasing content knowledge rather than on the critical development of skills and dispositions (Levine & Kawashima-Ginsberg, 2015). Knowledge about government systems, including knowing one's rights and responsibilities (Sherrod, Flanagan, & Youniss, 2002), is necessary for civics engagement but insufficient (Jansen, 2011). Students need organisational, communication and leadership skills, verbal and composition competency, the ability to listen to others who have different experiences and opinions and the necessary resources, agency, and self-confidence to exercise their civics skills in public (Sherrod, Flanagan & Youniss, 2002; Verba, Schlozman, & Brady, 1995, cited in Jansen, 2011; Wilkenfeld, Lauckhardt & Torney-Purta, 2010). While researchers have proposed a set of understandings, skills, and capacities for

civics engagement, it is less clear how these elements relate to one another and whether they need to be learned in a particular order or whether each skill itself contains a learning trajectory. Unfortunately, there is a dearth of empirical literature on progression in civics learning, motivating the need to develop and test models of progression.

Developmental theory is relevant to progression in civics education because understanding the cognitive, social, and moral development of children has implications for the appropriate order or increasing complexity of skills and understandings necessary to become a citizen. For example, a young child who thinks concretely would tend to view a 'good citizen' as obedient and law-abiding, while an adolescent with the capacity and emotional maturity to think abstractly will have developed a more sophisticated understanding that responsible citizens should be critical of the status quo and not blindly follow laws (Sherrod, Flanagan, & Youniss, 2002). A review by Wilkenfeld, Lauckhardt and Torney-Purta (2010) provides examples of how developmental theories may inform civic development. Selman's theory of role taking and social awareness (Selman, 1981, 2003, cited in Wilkenfeld *et al*., 2010, p. 202) may help identify and refine competencies needed in the political domain. Similarly, Sherrod *et al*. (2002) suggest that more work is needed to understand the developmental precursors necessary for political engagement. These authors (p. 270) pose the following questions on citizenship that may inform a progression framework for civics education:

> '*When does it need to begin? What early experiences can contribute? Are there developmental windows for achieving maximal impact?... How do different experiences at different ages have different effects?... On what abilities does it rest? What abilities does it promote?*'

Watts, Griffith and Abdul-Adil (1999) provide a theory of socio-political development, also cited in the Wilkenfeld *et al*. (2010) review. The Watts *et al.* (1999) model (*Figure* 9), proposes five stages of socio-political development moving from being oblivious to social inequity, through becoming more aware of inequity and understanding processes that maintain inequity in society, to finally being strongly motivated to take action to improve society and reduce inequity and oppression. This model was developed within the context of African American oppression within the United States but could be applied to other contexts. These stages may provide a broad understanding of the steps students take as they become more politically involved; however, it does not describe the specific skills and conceptual knowledge needed to move from one stage to another.

Figure 9

Table I. Stages of Sociopolitical Development and Their Associated Coaching Questions

Stage of Sociopolitical Development	Key Action Concepts for Enhancing Critical Consciousness
Acritical stage: Resource asymmetry is outside of awareness, or the existing social order is thought to reflect real differences in the capabilities of group members. In essence, it is a "just world" (Rubin & Peplau, 1975).	Challenge internalized oppression: *What contributions have African Americans made to the U.S. and the world?* Critical thinking on class and race inequity: *Why can't kids in this (impoverished all-Black) school take their books home when kids in other (affluent White) schools can?*
Adaptive stage: Asymmetry may be acknowledged, but the system maintaining it is seen as immutable. Predatory, antisocial or accommodation strategies are employed to maintain a positive sense of self and to acquire social and material rewards.	Encourage critical thinking about socialization agents and psychic alienation: *What do rap videos tell us about Black men and their lifestyles?* Decision-making and values clarification: *What's the connection between choices of lifestyle and quality of life and neighborhood?*
Precritical stage: Complacency gives way to awareness of and concerns about asymmetry and inequality. The value of adaptation is questioned.	Cognitive reframing: *How many explanations can we come up with for the differences in the quality of high and low income communities?*
Critical stage: There is a desire to learn more about asymmetry, injustice, oppression, and liberation. Through this process, some will conclude that the asymmetry is unjust and social-change efforts are warranted.	Critical consciousness: *What events now and in the past maintain the differences in the quality of life in some Black and White communities?* Moral reasoning: *Is the inequity a sign that something is wrong with society? Why? Why not?*
Liberation stage: The experience and awareness of oppression is salient. Liberation behavior (involvement in social action and community development) is tangible and frequent. Adaptive behaviors are eschewed.	Community activism, solidarity, and liberation behavior: *What can you do (personally and as a group) to improve the situation?*

Figure 9. Watts et al. (1999) stages of socio-political development; this image is from the table on p. 263 in Watts et al. (1999)

Models of civics progression may also benefit by incorporating Internet skills and knowledge. Use of the internet for political engagement provides easy access to information, can reduce gaps in students' civic engagement by social class, increases offline civic participation, increases exposure to diverse perspectives and empowers students, although it is also susceptible to superficial actions such as 'liking' a comment on social media (Jansen, 2011; Levine & Kawashima-Ginsberg, 2015). Similarly to other aspects of the Humanities, civics education is cross-curricular in nature and has cross-curricular benefits.

Languages, Literacy and Communication: Review of Frameworks

Purpose of the report

The AoLE Group will develop the Progression Framework within the context of a 'continuum for communication and language acquisition and learning which will encompass Welsh (for Welsh medium, bilingual and English medium settings and schools) English and EAL, international languages and non-verbal communication'. This will recognise that 'Progression Steps will differentiate according to how much contact a child has with a particular language, how long they have been acquiring or learning the language and the nature of the provision' (A new Curriculum for Wales: The story so far… pp. 14-15). The review of frameworks was conducted keeping in mind the intention of the Languages, Literacy and Communication AoLE Group to develop a common curricular and progression framework for all language study in the contexts listed above The researchers were aware of discussion within the AoLE Group about practical issues in ensuring that students learning Welsh but not speaking it regularly at home or in their community could develop their abilities as well as Welsh first language speakers, but did not address this particular issue fully in the review. The focus of the review work was specifically to find evidence relevant to ways of describing progression in Languages, Literacy and Communication in any language or languages. It was understood that the AoLE Group would be considering later the question of how generic descriptors of progression might be differentiated to take account of learners' varying experience of the language. However, the review did consider some factors relevant to developing Languages, Literacy and Communication, drawing on evidence from contexts which have experienced similar language histories, display similar linguistic demography and are developing similar approaches to language policy to those of Wales.

The report seeks to identify key issues and decisions relating to writing descriptions of learning which will constitute a Progression Framework charting pupils' journeys through the learning process in Languages, Literacy and Communication. It is a principle of *Successful Futures* and of the CAMAU Project that description of learning progression should enable teachers to know what kinds of knowledge, skills and aptitudes they should aim to develop with learners at all stages of their learning journey. The Progression Framework should enable both teachers and learners to plan ahead and to see the next steps to be taken.

The report does not comment separately on each of the frameworks reviewed. Rather, it identifies characteristics of types of approach to describing progression and learning and refers to relevant frameworks as representative of these approaches. These types of approach may offer potential models for the CAMAU Project; the report notes factors which would come into play in deciding for or against particular ways of doing so.

Frameworks reviewed

Frameworks relating to the development of language and literacy in classrooms where the home language and the language of education are the same were reviewed from the following sources:

- Australia
- British Columbia

- England (Centre for Literacy in Primary Education (CLPE) Scales for Reading and Writing)
- New Zealand
- Ontario
- Singapore
- USA (Common Core State Standards (CCR) in English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects)
- Wales (the current national Literacy Framework and the Programmes of Study for Foundation Phase and each Key Stage).

Consideration was given also to some aspects of how the Finnish education system describes progression.

Four frameworks relevant to the development and teaching of modern languages were reviewed:

- the American Council on the Teaching of Modern Languages (ACTFL) Performance Descriptors For Language Learners (2015)
- the Common European Framework of Reference for Languages (CEFR) (1996)
- PEPELINO (European Portfolio For Pre-Primary Educators) - Plurilingual And Intercultural Dimension (2015)
- FREPA: A Framework of Reference for Pluralistic Approaches to Languages and Cultures (2012).

Frameworks were also reviewed from educational contexts which could provide information relevant to Welsh policy and practice in ensuring equality of status between Welsh and English. These frameworks were those of:

- Scotland (Literacy and Gàidhlig, Literacy and English, Gaelic (Learners) and Modern Languages)
- Republic of Ireland (Gaeilge, English)
- Basque Country (Basque, Spanish, English)
- Netherlands/Friesland (Frysk, Dutch, English)

In addition, limited information was obtained from Austria and Flanders about relevant aspects of language learning provision and consideration was given to ideas of progression in the context of Content Language Integrated Learning (CLIL) pedagogy (with exemplification specifically from Spain).

A Note on 'What Matters'

It became apparent during the review process that 'what matters' and 'progression' overlap. In some frameworks the 'main aims' of the curriculum or language programme are articulated at the start and then elaborated in detail in a description of the curriculum or in a description of learners' expected achievement (e.g. learning or achievement outcomes, standards, descriptions of progression) or in descriptions of both. It is to be expected that the achievement outcomes of a framework reflect or encapsulate what the designers of the curriculum most value in the process of educating young people. This is the justification for focusing in this review of curricular frameworks on the means by which progression has been described, without explicit treatment of what matters as a separate concept.

However, there is one important 'what matters' issue that requires decisions at a strategic level: the *range and types of aspects* of Languages, Literacy and Communication that are explicitly included in a framework. This review of frameworks demonstrates variations in strategic decisions about what matters. As examples:

- *Singapore* identifies six Areas of Language Learning:
  - Listening and Viewing
  - Reading and Viewing
  - Speaking and Representing
  - Writing and Representing
  - Grammar
  - Vocabulary
- *Ontario* covers:
  - Oral Communication
  - Reading
  - Writing
  - Media Literacy
- the *New Zealand* and *Wales* frameworks comprise (New Zealand's wording is slightly different from that of Wales):
  - Oracy
  - Reading
  - Writing
- the *USA* framework covers:
  - Reading
  - Writing
  - Speaking
  - Listening
  - Language
- the CLPE Scales cover only Reading and Writing (though they make it clear that development of oral abilities is an important part of the richness and complexity of language education and growth).

Some of these frameworks, such as those of Australia and New Zealand, explicitly signal the importance of cultural awareness in developing language knowledge and skills. Through Australia's *Speaking, Writing, Creating and Listening, Reading,* and *Viewing* activities learners should develop language skills which allow them to function in society – language is placed in its social context and the diversity of this context is recognised. Digital and visual literacies are integral. There is an emphasis on engagement with an audience through both speaking and the written word in diverse social contexts. From an early age opinions and comprehension – meaning-making – are valued.

The modern languages frameworks reviewed also expand what matters beyond the traditional oracy, reading and writing to identify competences relating to linguistic knowledge and pragmatic and sociolinguistic aspects of language use (CEFR) or to Communication, Cultures, Connections, Comparisons, and Communities (ACTFL).

Certain aspects recognised elsewhere are not visible in the frameworks reviewed. Firstly, given that the third element in the AoLE (Languages, Literacy and *Communication*) is not necessarily linked to

language, the issue has been raised of the need to attend to 'multiliteracy', which goes beyond traditional spoken and written verbal communication to include communication and texts which make use of a range of graphic tools, of digital means or vehicles of communication such as blogs, of video and film, and of non-verbal aspects of communication such as gesture.

Secondly, in a bilingual society such as Wales, consideration should be given to the inclusion in the framework of Communicating across Languages (translanguaging, translating, cross-languaging, etc.) and Comprehension (moving from passive language acquisition to active orientation to interaction and communication in more than one culture) (communication from Professor Mererid Hopwood). FREPA provides an approach to at least some aspects of these last aspects of language learning.

The documents reviewed do not reveal much about justifications for one or other of the ways of setting out the broad structure of a framework. These strategic decisions depend on the intentions of the whole curriculum development. In Wales these intentions are primarily evident in *Successful Futures* (Donaldson, 2015).

The review of frameworks throws up the variations in strategic decisions about what matters as an issue for consideration and resolution. Whichever broad aspects of Languages, Literacy and Communication the group chooses to value and identify as the key components of what matters will inform the writing of descriptions of learning.

Possible Models for Writing Descriptions of Learning

The frameworks reviewed provide a number of models, the relevance, use, advantages and disadvantages of which can be considered by the Languages, Literacy and Communication AoLE Group. These models are considered in the next sections.

Almost all the frameworks considered include, in one way or another, very detailed descriptions of the knowledge, skills, capabilities and aptitudes that constitute successful achievement in language education. They show progression in these achievements as learners move through stages of learning (whether specified standards to be achieved at particular ages or, in a few cases, descriptions of what learners can do at successive stages of a learning journey irrespective of age). This level of detail in descriptions of learning is an important feature for the CAMAU Project to consider. One of the aims of the Project is to develop a progression framework that will help teachers and learners to see, and indeed to develop automatic awareness of, the appropriate next steps as dialogue and assessment for learning take place during the learning process. Key decisions for the Languages, Literacy and Communication group arise concerning both the determination of the central aspects of learning in the AoLE and the specification of the appropriate (that is, helpful and manageable) level of detailed description of it. Another necessary decision concerns the best location of detail: within the curricular/progression framework itself or in associated material available to teachers as part of their continuing professional development?

Highly Detailed Prescription

Several national or state frameworks incorporate a large amount of detail into the descriptions of achievement or the specified standards in the framework itself.

In *British Columbia* key progression points are identified as expected state standards for specified ages. Expectations of performance are spelled out in considerable detail (e.g. for both literary and information texts in Reading) under headings that in effect specify what matters: e.g. for Reading and for Writing: Purposes, Strategies, Thinking, Features (of text). Each of the main headings has further sub-divisions, which identify other aspects that matter – e.g. under Comprehension in Reading, there are s*tory elements, predictions, inferences, details, theme.*

The *Ontario* framework identifies desirable achievement in considerable detail, specifying both language knowledge that students should have and a quite wide range of thinking, communication and application skills they should demonstrate. It spells out for every Grade (year group) Overall Expectations and Specific Expectations for all aspects of language work. There are thus 10+ pages per Grade of detailed guidance on expectations. The teachers are then required to make an assessment judgement on each expectation. The judgement results in the application of a 1-4 mark, where 1 = limited effectiveness, 2 = some effectiveness, 3 = considerable effectiveness and 4 = a high degree of effectiveness or thorough effectiveness. The expected 'State Standard' is 3.

Singapore divides each of the six Areas of Learning (such as *Listening and Viewing*) into Focus Areas, each of which has three or four learning outcomes; these LOs are then further sub-divided: for example, the LO *Demonstrate positive listening and viewing attitudes and behaviour by showing attentiveness and understanding* has the sub-headings

- *Listening and viewing attitudes and behaviour;*
- *Perception and recognition of sounds and words in context;*
- *Listening and viewing for understanding;*
- *Critical listening and viewing;*
- *Listening and viewing widely.*

Under these sub-headings, particular skills are nominated, ranging from those expected at Primary 1 level, e.g. *identifying the gist/main idea and key details* to those covered at Upper Secondary level, e.g. *understand abstract ideas when concrete examples are used*. This process is repeated for each of the six Areas of Learning, resulting in a very detailed document of skills and sub-skills.

The *USA* framework specifies Standards with detailed descriptors for each Grade (year group). Students advancing through the Grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades. Some of the individual skills, called Language Progressive Skills, are identified in a progression table with expectations for each Grade. These skills are identified because they are particularly likely to require continued attention in higher Grades as they are applied to increasingly sophisticated reading, writing and speaking.

The *CEFR* modern languages framework contains a much detailed description of the characteristics of learner competences in Speaking, Reading and Writing across Linguistic, Pragmatic and Sociolinguistic dimensions at each of its six levels. The levels, A1, A2, B1, B2, C1 and C2, span the whole journey from Basic User to Proficient User of a language; normally only A1, A2 and B1 are relevant to the period of school education.

The *ACTFL* framework provides descriptions of standards of performance using broader statements than the CEFR for nine levels (Novice, Intermediate and Advanced, each sub-divided into High, Mid and Low) spanning pre-kindergarten to post-school learning. The ACTFL framework is more

manageable, though less descriptive, than the CEFR. It recognises the significance in the development and assessment of language of such factors as whether the learning is taking place in a formal setting (like school) with explicit teaching or a naturalistic one where the learning is more informal; the importance of age and cognitive development in the learning process; and the relative significance of extrinsic and intrinsic motivation.

The highly detailed specifications of standards or expected achievements described in preceding paragraphs do include descriptions of knowledge, skills and capabilities needed for further progression in learning and the documentation in some cases includes exemplification of appropriate activities to develop the desired knowledge or skills.

It is difficult to judge the extent to which the specified standards may reflect actual learning in real classrooms, but in the case of *British Columbia* the documentation claims that these have been developed out of the professional judgments of a significant number of educators about standards and expectations.

There is a clear intention in all of these sets of standards to give teachers (and perhaps learners) very full guidance about learning aims and criteria learners are required to meet. In principle, these kinds of detailed description and exemplification of performance at different levels of quality could be used effectively to support assessment for learning. They might, however, be too detailed for teachers to manage its use comfortably. A question arises, for instance, whether Ontario teachers can actually make assessment judgements for all the many Specific Expectations listed for a year group. In Singapore there is an expectation that teachers should plan balanced assessment in the six Areas of Language Learning, using tasks in authentic settings and contexts which allow pupils to use language in a meaningful manner. Tasks might include informal tests, portfolios of written work and performance assessments of oral work; the assessment should be both formal and informal, using different modes and at a frequency decided by the school. The potential danger is, however, that the very large number of detailed points to be assessed could lead easily into a fragmented 'tick-box' approach, failing to match the complexity of pupils' varying real learning processes and real grasp and use of language.

Existing Welsh Frameworks

The existing *Welsh* national *Literacy Framework* (LF) and the *Programmes of Study* for Welsh and English exemplify highly detailed prescription of standards/expected achievement. Literacy Framework statements (relevant to cross-curricular learning and to the use of language skills in daily activities at school, at home, at work, and in the community) are readily distinguishable from those referring specifically to the subjects of Welsh and English (which engage young people in study of language as an art, response to literature and analysis of style and tone). The Literacy Framework identifies age-related expected outcomes (by school year). In the Programmes of Study Expected outcomes for Oracy, Reading and Writing are defined at the end of the Foundation Phase and at the end of each Key Stage. The Foundation outcomes range from 1-6, with 6 including, for example for Reading:

> *'Children read independently and use appropriate strategies to establish meaning, reading fluently and expressively. They can identify different purposes of texts and how they are organised, skim content and select texts based upon their needs. They identify the topic and*

main ideas of a text, deducing information by making links between texts and using information beyond their personal experience'.

The *Foundation Phase Profile* is a tool for providing a national baseline which aligns with the specified outcomes. The *Profile Handbook* provides details of all the skill ladders included within it along with supporting information.

At the end of Key Stages 2 and 3, standards of learners' performance are set out in eight level descriptions of increasing difficulty, with an additional description above Level 8 to help teachers in differentiating Exceptional Performance. These standards describe the types and range of performance that learners working at a particular level should characteristically demonstrate. In deciding on a learner's level of attainment at the end of a Key Stage, teachers are prompted to judge which description best fits the learner's performance. Unlike the LF statements, expected outcomes for levels are not are not explicitly age-related: it is recognised that learners at the same Key Stage could attain different levels. There is, though, a clear sense of 'expected' performance at the end of each Key Stage.

The relationship between the LF and levels systems is not entirely clear, but there is potential for either or both to be used for assessment. Both are written in language that, clearly, could be used summatively. The levels descriptors could contribute to identification of next steps. The LF documentation explicitly advocates the use of the LF in assessment for learning. The stated aim is explicitly formative: year-by-year expectations should not be used to 'judge whether a learner is working at/above/below the expected level for their age' but rather to 'describe' next steps.

Two issues arise from this. *Successful Futures* explicitly states that the achievement outcomes and progression framework for Languages, Literacy and Communication should take appropriate account of the national Literacy Framework. There are therefore important decisions to take about how the development of the Languages, Literacy and Communication Progression Framework and descriptions of learning relate to the new Literacy Framework. Consideration may also be given to the appropriateness of drawing critically on the levels descriptors in the existing Programmes of Study as the LLC Progression Framework and associated descriptions of learning are developed.

Welsh, English, Modern Languages

As noted above, an encompassing and inclusive language development continuum will recognise the range of language experience of our learners. It may helpful to consider the differences and similarities in progression frameworks in jurisdictions with more than one official language and/or more than one language of education. The intention of the AoLE to develop a common progression framework for all languages seeks to address the concern that use of different frameworks and means of describing learning in different languages may contribute to inequality of status between/among languages.

Both Scotland and Ireland are similar to Wales in having two statutorily recognised languages used as a medium of education. Both Scotland and Ireland recognise that the less common language (Gàidhlig or Gaeilge) may be used as the language of instruction or may be taught as a second language. In both these countries the less common language is the first language of only a small proportion of the population.

Table 10 below compares the structures of the four Scottish languages frameworks: Literacy and English, Literacy and Gàidhlig, Gaelic (Learners) and Modern Languages.

High level organisers	**Sub-organisers**		
	Literacy and English **Literacy and Gàidhlig**	**Gaelic (Learners)**	**Modern Languages**
Listening and talking	Enjoyment and choice	Listening for information	Listening for information
	Tools for listening and talking	Listening and talking with others	Listening and talking with others
	Finding and using information	Organising and using information	Organising and using information
	Analysing, understanding and evaluating	Using knowledge about language	Using knowledge about language
	Creating texts		
Reading	Enjoyment and choice	Reading for interest and enjoyment	Reading for interest and enjoyment
	Tools for reading	Reading for cultural appreciation	Reading to appreciate other cultures
	Finding and using information	Finding and using information	Finding and using information
	Analysing, understanding and evaluating	Using knowledge about language	Using knowledge about language
Writing	Enjoyment and choice	Organising and using information	Organising and using information
	Tools for writing	Using knowledge about language	Using knowledge about language
	Finding and using information		
	Creating texts		

Table 10: derived from the relevant statements of experiences and outcomes (accessible at https://education.gov.scot/scottish-education-system/policy-for-scottish-education/policy-drivers/cfe-%28building-from-the-statement-appendix-incl-btc1-5%29/Experiences%20and%20outcomes#lang)

The two literacy frameworks share a common structure, within which the statements of experiences and outcomes through which progression is described are almost identical. The one significant difference is that, since the Gàidhlig framework is used to support the learning not only of children whose first language is Gàidhlig but also of children in Gàidhlig medium immersion classes, it includes an additional line of development within 'Tools for listening and talking'.

The structures of the two frameworks for learners of a language are almost identical; however, there are few common statements in the two papers. The Modern Languages framework is linked to CEFR levels in that level of proficiency expected at age 11 equates approximately to level A1 (Breakthrough) and the level expected at age 14/15 equates to level A2 (Waystage).

In Ireland there is a clear distinction made in the primary school curriculum statement between teaching Gaeilge in schools in which Gaeilge is a second language and teaching Gaeilge in all-Irish schools and those in the Gaeltacht. The Scottish parallelism between English and Gàidhlig is not apparently reflected in a parallelism between English and Gaeilge in terms of the statements describing expected learning at each stage within primary school.

In very many countries different standards and/or progression frameworks apply to second language learning than to the first language of education. As examples:

- Provision in Austria is typical of many countries. The expected standards in the 8th year of education are notably different for German and English: the standards statements in the latter are explicitly tied to the CEFR levels (almost all statements are equated with either A2 or B1).
- Provision in Flanders is less typical. The expected standards at the end of primary school for Flemish and for French, the other principal official language, are distinct. In secondary education the expected standards for each year maintain this distinction but the situation is more complex: distinct standards continue to be provided for Flemish and French in the early years of secondary education in both the A-stream and the B-stream; in addition, within the A-stream provision is made for English and standards for this language are matched to the standards for French. These standards are supplemented by detailed standards for Flemish for newcomers to the school system who speak a language other than Flemish.

However, some educational systems have moved towards common descriptions of learning in different languages where education is bi- or multi-lingual.

In Friesland some 20% of primary schools are trilingual, with Friesian, Dutch and English as languages of instruction; in the other schools Frisian is typically taught as a discrete subject. in trilingual schools, Friesian is used as the language of instruction for 50% of the curriculum in the first six years and 40% in years 7 and 8; Dutch accounts for 50% of the teaching in the first six years and 40% in years 7 and 8; English is used as language of instruction for 20% of the time in the last two years. The progression framework used to assess progress in Frisian is derived from the Common European Framework of Reference (levels A1 to C1) adapted to match the already existing progression frameworks for Dutch; within this framework (Referinsjeramp Frysk) statements have been recast in 'I can' form. There are assessment tools, including tests and observation schedules, available on-line linked to this progression framework.

San Isidro (2017) provides a summary of language policies in those autonomous communities in Spain with two co-official languages), noting that:

> *'Throughout the last three decades, since the respective autonomous institutions were created, a wide range of language policies have been implemented. The particularities of these policies have to do with specific sociolinguistic contexts, the civic and political resources engaged in implementing them, and the diverse historical and ideological backgrounds the issue of language has in every place.'* (p. 3)

In summary, while Spanish is the official language of the country, other languages are recognised as co-official in six autonomous communities and different educational approaches to recognising this have been developed. More recently, these communities (as with the rest of Spain) have been facing the challenge of combining these language policies – aimed at the use and the standardisation of previously minoritised languages – with new needs related to multilingualism.

- In the region of Catalonia, the education system is based on either total or partial immersion policies.
- The Galician model is underpinned by a tri-lingual policy, with Galician, Spanish and English used as languages of instruction (33% each).
- In the Basque Country three different models exist in the different geographical areas, reflecting the different socio-linguistic situations. In Model A, the language of instruction is Spanish and Basque language is studied as a discrete subject. In model B some subjects are taught in Spanish and half of the curriculum is taught in Basque. In model D, the language of instruction is Basque and Spanish is taught as another language.

Cenoz (2009) points out that, though there is still a tendency for teachers in multi-lingual contexts to continue to work with a 'monolingual approach', some practices in Basque multi-lingual education adopt a common framework for the three languages used (Basque, Spanish and English), based essentially on the CEFR Modern Languages framework.

Two other characteristics of multi-lingual education in Spain and the Basque Country may be relevant to consideration of effective ways of describing progression in learning in Welsh, English and Modern Languages in Wales. One is the 'perfiles linguisticos' approach (used in the Basque Country) in which necessary levels of competence for particular jobs or professional posts are detailed. The other is the use of CLIL (Content Language Integrated Learning) pedagogy. Quite detailed progression frameworks exist for modern languages learned through the CLIL approach. These take account of the interplay among Content, Cognition, Culture and Communication in learning. In CLIL, progression in both language and content must be recognised and learning must recognise the cognitive development and prior learning of the students.

To summarise the evidence from bi- and multi-lingual contexts concerning means by which progress is described, it is notable that the Friesian and Basque systems essentially use adaptations of the CEFR Modern Languages framework. There may be a potential in Wales to base a common progression framework for all languages based on adaptations of CEFR, taking account of the points about pedagogy and assessment made by Cenoz and Gorter (2016) and of the ways in which CLIL frameworks take account of students' cognitive development and cultures.

An approach to describing progression as broad as the CEFR framework would raise the issue of how teachers and learners would be able to access more detailed descriptions of learning necessary to

enable them to identify next steps and operate effective assessment for learning. It also raises the question of the extent to which frameworks such as the CEFR afford space for multi-modality, code-switching and translanguaging and the ways in which their expectations are consonant with the four purposes at the heart of *Successful Futures.* There is a suggestion relating to this issue in the comment about the possible use of the PEPELINO and FREPA teacher support systems at the end of the next section 'Lean Achievement Outcomes'.

'Lean' Achievement Outcomes

Some frameworks focus on relatively succinct key outcomes as the basis for assessment. They avoid large amounts of detail in the curriculum documentation itself, yet still aim to provide teachers with much detailed support to guide assessment for learning and next steps decisions.

The *Finnish* approach is particularly succinct. It sets out what learners are able to do at the end of two stages of basic education, the ends of Grade 2 (age 9) and Grade 5 (age 12), but does not describe progression between these points. In *Language and Interaction*, the description of good performance for interaction at the end of Grade 2 consists of three briefly worded bullet points. There is a well-established understanding among Finnish teachers that it is their professional duty to know the curriculum and pedagogical approaches well enough to enable pupils to progress without very detailed central specification of learning targets (or, at least, to find ways of doing this, e.g. through use of course books, which, in effect, do identify specific intermediate learning targets in the tasks they set for pupils).

Some frameworks, such as *Australia's*, identify as desirable outcomes key ideas, knowledge, skills, capabilities as broad standards (for every second year 2, 4, 6, 8, in Australia) and define progression through increasing complexity of purposes, contexts and tasks and through increasing complexity and range, stamina and development of skills such as critical thinking in learning experiences. The Australian progression statements are general statements illustrated with some specific examples of focused activity, e.g. *Level 1d Compose Texts* is expanded as '*Create texts with familiar structures such as speech, simple print texts, keyboard texts, illustrations, pictographs; comment on people, events and objects in the past, present and future and to ask questions; convey knowledge about learning area topics*.'

In *New Zealand* there are statements of what students will be able to do at each stage in a *Standards* document (which includes a section called *Illustrating the Standards*). These standards are linked to fairly detailed descriptions of the characteristics of Reading and Writing work in the separate *Learning Progressions* document. Both documents aim to provide description and/or exemplification of 'specific literacy knowledge, skills and attitudes' to address increasingly complex texts and tasks. They do so by describing the characteristics of texts and tasks at the various stages, linking them to specific nationally specified categories of text used to support learning and progression (e.g. 'Gold Level'). The *Learning Progressions* document also exemplifies student work that matches the Standard for a particular stage, with explanatory commentary. This framework thus creates, separately from the broad Standards statements, much detailed material showing examples of the kinds of tasks and pedagogical activities of appropriate levels of challenge relevant to achieving the standards. There is an explicit expectation that teachers will describe and judge progression towards

the standards based on curricular tasks (in a portfolio). In principle such material can form the basis of valuable professional development and discussion for teachers.

The *Centre for Literacy in Primary Education (CLPE)* Reading and Writing Scales consist of descriptions of achievement which are entirely progressive. They describe learners' journey through eight progressive stages, not at all age-related, from *Beginning Reader/Writer* to *Mature Independent Reader/Writer*. At each stage the statement of the learner's behaviour and what they can do clearly describes or implies what matters for progression. The authors claim that the descriptions are empirically validated by the range of research to which they refer and do represent real learning behaviours as pupils progress in Reading and Writing. They can thus contribute effectively to assessment for learning, as well as enabling teachers (and pupils) to record and report at particular points the stage of learning each pupil is at. The descriptions are presented in descriptive prose, not in a format which might encourage 'ticking boxes': they incorporate a large number of factors that matter in the process of reading or writing, which are presented as parts of the complexity of that process, not as separately learnable knowledge and skills. The Scales thus emphasise the idea that the important constituent elements in reading and writing should be learned, developed and assessed in the context of actual communicative tasks and activities. In addition, the documentation provides much helpful pedagogical guidance (separately from the description of the Scales). The Scales and the associated guidance are derived from and supported by large amounts of significant research about what matters in language development. Key points emerging from the research and many research references are listed in the material surrounding the learning stage descriptors.

In the context of ways of providing professional development support for teachers parallel to descriptions of achievement/progression, PEPELINO (European Portfolio For Pre-Primary Educators) - Plurilingual And Intercultural Dimension, 2015) and FREPA: A Framework of Reference for Pluralistic Approaches to Languages and Cultures (2012) both aim to facilitate and enrich teachers' professional development in relation to use of the CEFR modern languages progressive framework. The former addresses plurilingual and intercultural dimensions of pre-primary education and the latter more general issues of interculturality. These could serve as starting 'working documents' to look at Language Competence/ Knowledge Across Languages in Wales

Graded or Ungraded Descriptions of Performance

The frameworks review has thrown up a further issue on which the Languages, Literacy and Communication group will need to make a decision. Some frameworks seek to differentiate learners' performance at the same chronological or progressive stage using a grading system or mark. For example, *British Columbia* places students' performance in one of the following categories (with detailed descriptors): *Not Yet Within Expectations*, *Meets Expectations* (minimally), *Fully Meets Expectations* and *Exceeds Expectations* at every year. *Ontario* applies a mark: *1 = limited effectiveness, 2 = some effectiveness, 3 = considerable effectiveness* and *4 = a high degree of effectiveness or thorough effectiveness*. The expected State Standard is 3. The *ACTFL* framework describes standards of performance for three broad levels – *Novice*, *Intermediate* and *Advanced* – and divides each into *High*, *Mid* and *Low*.

On the other hand, frameworks such as those of *Australia* and *New Zealand* and the *CLPE* Scales offer ungraded descriptions of complex achievement and interacting skills.

This matter is related to the number of stages of development it is appropriate to describe in a progressive framework. A possible justification for the kinds of grading or marks systems shown may be that descriptions of very broadly defined frameworks do not give teachers and learners enough detail in deciding on next steps in learning. An obvious potential disadvantage is the danger of labelling learners and the associated motivational issues. Approaches like that of New Zealand and of the CLPE Scales seek to provide desirable guidance and support for pedagogy and assessment for learning through additional associated material and encouraging continuing professional development activities.

'I can' Statements

Ways of describing progression points or standards vary across the frameworks reviewed – some use 'I can' statements, some do not. *Successful Futures* proposes that the Welsh curriculum should use 'I can' statements: it will be possible to write the achievement outcomes using that formula, once decisions have been made about the crucial nature of the achievements. As noted above, Frisian schools make use of an adapted version of the CEFR in which 'I can' statements of achievement are used. Ashton (2014) also reported that '*in the Nordic-Baltic region, the Bergen can-do project used adapted CEFR descriptors to develop a set of can-do statements for on-going self-assessment for 11–12 year olds*.'

Decisions for the Languages, Literacy and Communication Group Arising from the Review

The review identified a number of issues for consideration by the Group. The main issues considered by the Group included:

- What are the broad aspects of Languages, Literacy and Communication which the group chooses to value and identify as the key components which will determine the areas for which descriptions of learning will require to be written?
- What lessons can be learned for the creation of a progression framework and steps from the models examined in this review and from the principles underpinning them?
- What are the relevance, advantages and disadvantages to development in Wales of the models reviewed?
- Is there a case for considering an adaptation of the CEFR Modern Languages framework as the basis for a common learning progression framework in Wales, with associated detailed guidance on learning development available as teacher professional learning material?
- How may descriptions of learning relate to the national Literacy Framework and existing levels descriptors?
- Might existing Literacy Framework and Welsh and English Programmes of Study be developed to meet *Successful Futures* requirements for achievement outcomes constituting progression steps at ages 8, 11, 14, 16 which are derived from empirical evidence about the real nature of progress of learning in Languages, Literacy and Communication?
- Should descriptions of learning be highly detailed or 'lean'?
- If these are detailed:
  - how can effective AfL use and manageability be ensured?
- If these are 'lean':

  - will they take the form of succinct broad statements, possibly with a small amount of expansion?
  - will they be narrative descriptions, like the CLPE ones?
  - where will detailed guidance for teachers about progression, next steps and pedagogy be located?
- Will descriptions of achievement be graded or ungraded?
- Having decided on the issues listed above (and any others arising from the research review), what are the practical steps to writing achievement outcomes and support material?

Languages, Literacy and Communication: Research Review

Purpose of the report

The review was conducted keeping in mind the intention of the Languages, Literacy and Communication AoLE Group to develop a common curricular and progression framework for all language study, i.e. Welsh and English as first languages and any language as an additional language. The researchers were aware of discussion within the AoLE Group about practical issues in ensuring that students learning Welsh but not speaking it regularly at home or in their community could develop their abilities as well as Welsh first language speakers, but did not address this particular issue in the review. The focus of the review work was specifically to find evidence relevant to ways of describing progression in Languages, Literacy and Communication in any language. However, the review did consider some factors relevant to developing Languages, Literacy and Communication in contexts similar to that in Wales, where policy and action seek to promote bi-lingualism and equality of status for more than one language.

Introduction

This review focuses firstly on a number of relatively recent key texts which deal in different ways with the idea of progression within different aspects of languages, literacy and communication and with ways of facilitating such progression. This work considers progression in the different modes of language, oral language, reading and writing. The model of progression and the model of learning are interdependent, e.g. a spiral curriculum would require different types of progression statements from those employed in a linear model. In addition the weight afforded to different areas in which progression may be evidenced (e.g. grammar) has to be considered in the context of their value as indicators of overall progression. The CAMAU LLC team will continue to review related research as the work of the project proceeds. The report proceeds to note briefly some of the issues raised relating to progression in the context of teaching and learning within multilingual societies and classrooms and then in the final section raises a fundamental issue.

Marshall *et al.* (2018), as part of a comparative international study, explore and identify characteristics of very good English teaching. The characteristics of high quality work identified there are relevant to language development in all educational contexts, including the plurilingual one in Wales.

Learning in Languages. Literacy and Communication can be seen as involving two broad kinds of development:

- ‘integrationist’ competencies: personal growth; emphasis on the essential humanness of the individual learner; language as means of responding to and giving meaning to experiences (including imaginative ones through literature), learning things, relating to people, conducting dialogue, solving problems, interpreting and achieving communicative purposes in various contexts ...
- awareness and understanding of the nature of language as a discipline: forms and structures; skills of listening, talking, reading, writing and other forms of communication as valuable for their own sake; ‘rhetoric’ in the broadest sense, becoming aware of how

> language achieves meaning and influences readers' and listeners' reactions in different ways in different contexts…

The CEFR provides potentially helpful guidance for this language awareness focus in its three main dimensions:

- language activities
  - reception (listening and reading)
  - production (speaking and writing)
  - interaction
  - mediation (translating and interpreting).
- domains of language usage, e.g. educational, occupational, social, personal, etc.
- the competencies speakers apply when they are engaged in language activities.

Put more briefly, these two types of development could be expressed as:

- development of learners' ideas and thinking, on the one hand; and
- development of awareness of the nature and potential of language, on the other.

These two broad types of development could be used to 'explain' explicitly to the readers of a progression framework that these are the main types of learning that study of Languages, Literacy and Communication develops.

Writing

Christie, F. (2010) The ontogenesis of writing in childhood and adolescence. In D. Wyse, R. Andrews, & J. Hoffman (Eds.), The Routledge international handbook of English, language and literacy teaching, London: Routledge.

Christie (2010) proposes that children and young people progress in learning to write through four developmental phases, typically at the following ages:

- 6-8 (lower to middle primary)
- 9-13 or 14 (upper primary to lower secondary)
- 14-15 or 16 (middle to upper secondary)
- 16-17 or 18 (upper secondary to 6th form)

Christie acknowledges that these phases need to be viewed as flexible, partly because of the developmental differences between individual learners, partly because of the impact of environmental factors such as social class, background and life experiences.

The first phase of learning to read or write is often considered to be the most important as this is when children establish the basic tools needed to progress. However, Christie contends that it is the second phase that is most important developmentally, as this is when children effect the transition to successful control of the grammar of written language:

> *'Successful control of the grammar of written language accompanies, and indeed facilitates, important changes in cognition, as children move into adolescence and on to adult life: capacities for critical reflection on experience, for generalization and for abstract argument, for example, are among the important capacities that adolescence requires, and control of writing has an important function in expression of all these.*

The third and fourth phases see a further expansion of linguistic demands and consolidation of knowledge and skills when the range of meanings which learners are able to construct becomes enhanced and their capacity to express value judgments and opinion grows.

When children first begin to read or write, their writing tends to resemble the way they would typically speak, but making use of a simpler vocabulary than they would do orally as a consequence of their limited experience of the tools for writing. As they mature, learners start to develop control of thematic progression. They move away from reliance on simple noun phrases and personal pronouns and begin to introduce new information, adding clauses to sentences and using adverbs to modify the verbs used. Tenses are varied and circumstantial information is often added. Gradually, learners' knowledge of the use of congruent grammar grows and they develop the ability to expand and elaborate. This is an important step towards the writing of longer texts, a requirement in secondary education.

From phase two and into phase three, learners increasingly use adverbs and adjectives to provide additional circumstantial information and nuanced meaning in their writing. Their use of clauses becomes increasingly more diverse and subtle and, through experimentation, they are able to make certain pieces of information more prominent than others. This facilitates more sophisticated attitudinal expression and learners are able to make more credible arguments and evaluations in their written work.

Another feature of the movement from phase two into phase three is learners' ability to use a non-congruent grammar in order to engage with and write about abstract ideas and to critique, interpret and evaluate the work of others. This ability is necessary for success in many aspects of study in upper secondary schooling and in adult communications of various types. Christie gives a number of examples of how non-congruent grammar or grammatical metaphor manifests in learners' writing:

- turning actions into things or phenomena ('*Removing the trees causes the soil to become loose*' rather than '*If you remove the trees, the soil becomes loose*.')
- '*Our newly extended lives are causing our population to rise like never before*.' rather than '*We now live long lives and therefore our population has grown*.'

The final developmental phase concerns learners' capacity to engage with and to represent increasingly more abstract meanings, including description of and critique of qualities and values in texts, situations or people. This ability is necessary for success in many aspects of study in upper secondary schooling and in adult communications of various types.

Christie characterises development in writing as the movement from writing about the familiar or about personal experience (the 'commonsense') using a congruent grammar system in primary school to writing about the abstract or remote (the 'uncommonsense') using non-congruent grammar during adolescence and into adulthood. The transition is facilitated by the growing recognition, interpretation and internalisation of the grammar of writing.

Christie perceives the development of writing abilities as being very much impacted upon by learners' experiences within school, including the demands of the range of subjects to which they are exposed in secondary school, and by teaching which is crucial in helping learners develop their knowledge and skills.

The four developmental phases involve familiarity with and understanding of language elements (knowledge) and skills in the use of these to express experience and thought.

Myhill, D. A. (2009) Becoming a Designer: Trajectories of Linguistic Development. In Beard, R., Myhill, D. A., Riley, J. & Nystrand, M. (Eds.) The Sage Handbook of Writing Development, London: Sage

Research by Myhill (2009) concentrates on the development of writing of secondary school learners. This recognition of the specific contribution of secondary schooling is valuable as there are very clear differences, for example in teaching grammar for writing, between what is appropriate for early years and primary pupils versus secondary pupils (D. Wyse, personal communication). Myhill attempts to define what 'good' writers do, challenging the current implicit assumption that progression in writing is based on exposure to and engagement with 'a wider repertoire of genres and purposes for writing' alongside a growing accuracy in spelling and the use of punctuation. The study builds on existing research on linguistic development and reports on a large-scale empirical study of the linguistic characteristics of writing in 13 and 15 year-olds.

Most researchers have found that in the writing of learners between the ages of 13 and 17, there is a developmental leap in:

- lexical density
- lexical diversity
- length of sentences and clauses used
- syntactic complexity.

However, Myhill argues that, although development in writing may include the above, these features do not describe progression themselves. What we value in writers is their ability to make meaning; their ability to make the right rhetorical choices and thereby convey 'different shades and nuances of meaning for different audiences and contexts'. It is arguable that some curriculum models largely fail to consider how the progression of ideas for writing might develop, i.e. the overall intentions and purposes for writing that have to be translated into specific ideas that will inform any text.

Myhill's study involved examining two pieces of writing from each of a number of learners in years 8 and 10 in six English schools. One piece of writing was a personal narrative and the other an argument. Each of the pieces was assigned a National Curriculum level by class teachers and, for research purposes, were labelled Good, Average and Weak.

Quantitative data on linguistic constructions was gathered and qualitative data on three developmental trajectories was also used:

- Speech patterns to writing patterns
- Declaration to elaboration
- Translation to transformation

The relationship between speech patterns and writing patterns was marked by certain tendencies. Examples included the following.

Longer words were more frequently present in writing samples placed in the 'good' category. Stronger writing tended to use longer Latinate words (e.g. *environment* rather than *place*, *negative* as opposed to *bad*). This is important because spoken language tends to make use of shorter words, often of Anglo-Saxon origin.

> *'Put simply, one element of linguistic development in writing is learning to make vocabulary choices in writing of words you would be less likely to use in speech.'*

Another linguistic feature, often related to speech patterns, was the use of the word '*like*. In the 'good' writing category there were no instances of '*like*' being used as a subordinator and only a few cases in the 'average' category.

> *'I could smell the sweet smell of lavender, like I was standing in a herb garden.' (Good)*
>
> *'It seemed like he had stopped trying to get him and gone away.' (Weak)*

A further linguistic pattern related to oral communication was the overuse of conjunctions in the weaker written work.

An important mark of progress in writing is the writer's ability to manage information appropriately with the reader in mind, thereby ensuring clarity – to progress *from declaration to elaboration*. This is not necessarily achieved through the lengthening of sentences. Although other researchers have noted the correlation between linguistic development and lengthened sentences, Myhill's study found that sentence length per se was not of any developmental significance. What was developmentally significant was 'the ability to manage complex ideas expressed in long sentences'.

The researchers found that the good pieces of writing used punctuation, coordination and subordination to present ideas clearly. In contrast, the writers of weaker pieces struggled to use these techniques to express ideas and control coherence. Researchers also found that the lack of explanatory or reflective detail in the work of the weaker writers explained the significantly higher frequency of finite verbs in their writing.

Another progression point considered by this research is the movement *from translation to transformation*, from 'knowledge-telling' to 'knowledge-transforming', from putting verbal ideas into linear sentences to transforming verbal ideas into sentences with complex content and rhetorical impact.

The study found that one of the distinctions between the good writing and the weak writing examined was thematic variety. Weaker writers were more likely to begin sentences with the subject as the theme and to repeat this sentence structure throughout their writing, whereas stronger writers used a wide repertoire of thematic constructions.

> *We were off to the beach called Sunny Cove. The wind was blowing in our faces. I set up the tent and looked around. I was a bit scared but it was quite fun. (Weak)*
>
> *When I was young, I was like a mouse. Not just because I was small, but because I didn't stop moving. My head was like a fairground. The big wheel was spinning in my brain. Something always told me that I had to go get up and run somewhere, and that is what I always did. (Good)*

The flatness of the first excerpt contrasts markedly with the rhythmic quality of the second. Also of note is that the first piece is made up of sentences fairly uniform in length, whereas they vary in length in the second.

Myhill sees progress as movement along the three trajectories described above. While environmental factors impact heavily on progress, she describes teachers as responsible for opening

learners' eyes to the design options available to them – linguistic, rhetorical impact and the communication of meaning – rather than teaching grammar per se.

Reading

Duke, N. K. & Pearson, P. D. (2008/2009) Effective Practices for Developing Reading Comprehension, Journal of Education, 189:1/2, 107-122

This source is based on prior educational research evidence that showed that learners' reading comprehension can be improved, thereby enabling learners to progress. The authors identify the known behaviours of good readers and ask whether it is possible to teach learners to engage in these productive behaviours. Although this report focuses on the pedagogy of moving learners on, it also describes the skills, knowledge and dispositions learners need to acquire in order to progress.

The teaching of reading comprehension must be balanced; teachers need to give explicit instruction on the strategies learners need to employ and the time to read, discuss and write about texts. This mix of teacher and learner led activity provides the correct environment for learner progression and is key to learners moving on.

Duke and Pearson describe learner progress as movement from the teacher taking the majority of the responsibility for the learning of a strategy to the learner taking responsibility and employing the strategy independently. The move from learner dependence to learner independence is described over five phases (see *Figure 10*):

- *Explicit instruction*: learner is introduced to the strategy, told what it is and what they need to do.
- *Modelling*: teacher models the strategy in action, talking about what he/she is doing, how he/she is able to do this.
- *Collaborative use of the strategy*: earners are asked to use the strategy as part of a whole class/group activity.
- *Guided practice*: instruction followed by independent group work.
- *Independent use*: use of the strategy independently.

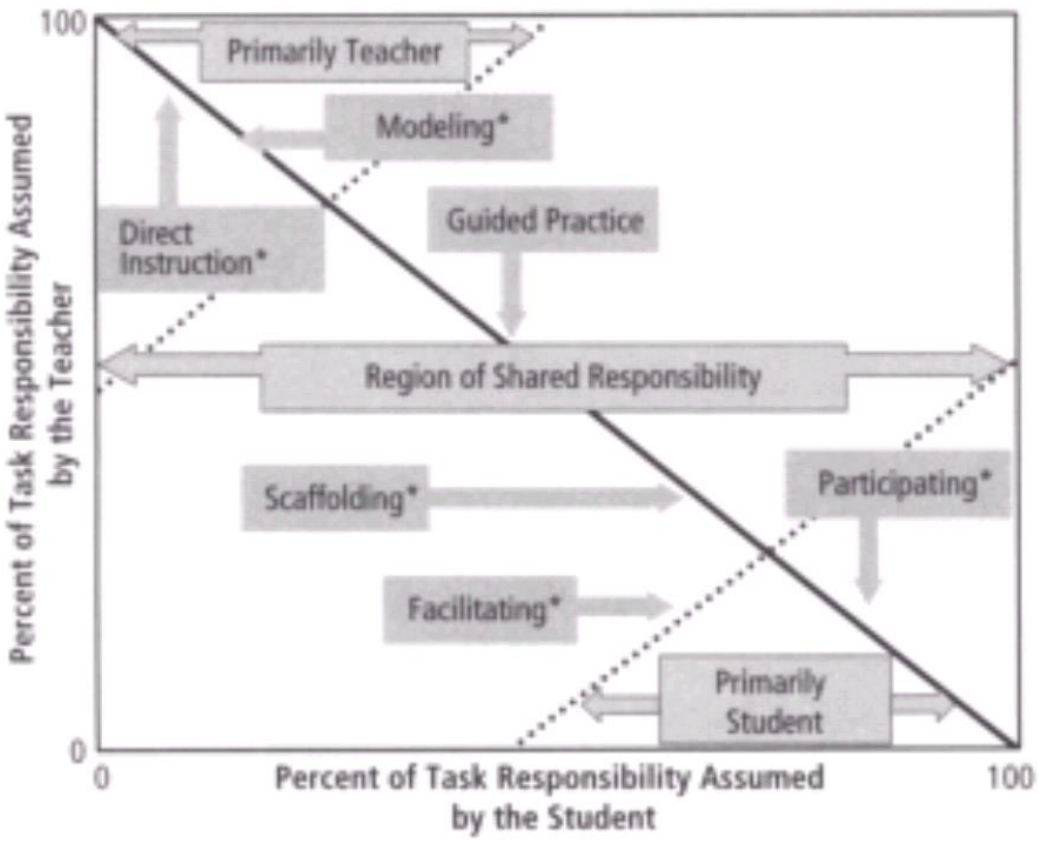
Duke and Pearson argue that creating 'a comprehension instruction environment' has a great impact on learner progress. Children develop their comprehension abilities partly through independent reading, but mainly through learning about enabling strategies and then practising them until they can use them independently. Progression is implicitly linear as learners are introduced to these strategies and at its optimum when they are able to move from deploying single strategies to using a combination of strategies, termed by the authors comprehension routines, independently.

The report is clear that progress in reading comprehension is dependent on the development of learners' skills, knowledge and behaviours. These are taught and modelled by teachers until they are acquired or become habitual in learners.

Figure 10

Figure 10.1. Gradual release of responsibility.

As one moves down the diagonal from upper left to lower right, students assume more, and teachers less, responsibility for task completion. There are three regions of responsibility: primarily teacher in the upper left corner, primarily student in the lower right, and shared responsibility in the center. (This figure is adapted with permission from Pearson and Gallagher [1983]; the asterisked terms are borrowed from Au & Raphael [1998].)



Reading and Writing

Wyse, D., Jones, R., Bradford, H. & Wolpert, M. A. (2013) Teaching English Language and Literacy. (3rd edition) London: Routledge

Wyse *et al.* present a series of milestones based on a number of sources:

- review of in-depth single child case studies
- patterns in larger groups of children (such as First Steps progression statements, from Australia
- Centre for Literacy in Primary Education (CLPE) development statements
- larger studies of particular areas e.g. the development of grammatical knowledge.

The milestones describe skills, knowledge, behaviours and dispositions exhibited by children in their reading and writing at ages four, seven and 11. They suggest ways in which teachers can build on what learners can do and how they can help move them on through support and challenge: e.g.

- at age seven, children are observed reading longer texts but also enjoy returning to favourite picture books; the advice to teachers is to provide access to books with more text and fewer pictures.
- at age seven, learners, when writing, have largely developed their use of punctuation for learning; the advice to teachers is to help them organise their writing and to continue to check for capital letters and full stops.

Children build upon skills and knowledge learned at four which become increasingly more sophisticated as learners move through primary school. For example, reading aloud:

- needs other people to help with reading aloud (age 4)
- uses expression when reading aloud (age 7)
- varies pace, pitch and expression when reading aloud and varies for performance purposes (age 11)

However, new behaviours are observed as the learner becomes more mature and new skills and knowledge is learned and deployed.

Centre for Literacy in Primary Education (CLPE) (2016) Reading and Writing Scales. Philadelphia: Consortium for Policy Research in Education (CPRE) Research Reports [retrieved from https://www.clpe.org.uk/library-and-resources/reading-and-writing-scales*]*

The Reading and Writing Scales form a comprehensive progression framework devised by a task group of staff from the CLPE, UKLA, NAAE and NATE. The scales are based on a set of key principles derived from research evidence, which is likely to assist in the development of the Languages, Literacy and Communication progression framework.

The Reading and Writing Scales are a distillation of the complex and individual journeys learners typically take towards becoming literate. They are designed for use in primary schools, but are not age specific and the upper end of the scales would be relevant to many lower and middle secondary school pupils. The authors recognise explicitly that older early stage readers and writers will undertake a different journey to their younger counterparts.

The Scales consist of descriptions of achievement which are entirely progressive. They describe learners' journey through eight progressive stages, not age-related, from Beginning Reader/Writer to Mature Independent Reader/Writer. At each stage the statement on the learner's behaviour and what they can do clearly describes or implies what matters for progression. Each of the scales describes the behaviours learners develop as they move towards becoming independent readers and writers. The authors claim that the descriptions are empirically validated by the range of research referred to and do represent real learning behaviours as pupils progress in Reading/Writing. The early stages chart learners' mastery of the tools of reading and writing (e.g. decoding, spelling and grammar). As they move closer to independence, early skills are consolidated at the same time as new skills and knowledge are being acquired. The authors are alert to the impact of the environment on progression.

The Scales can contribute effectively to assessment for learning, as well as enabling teachers (and pupils) to record and report at particular points on the stage of learning each pupil is at. The documentation also provides much helpful pedagogical guidance. The role of parents in modelling and showing that reading and writing are valued in a wide range of real life situations is recognised.

The Scales and the associated guidance are derived from and supported by large amounts of significant research about what matters in language development. Key points emerging from the research (and many research references) are listed as part of the material surrounding the learning stage descriptors.

Although the authors describe the stages of the scales as 'observed behaviours', they include description of the knowledge, skills and dispositions learners deploy and display. For example, at various stages along the Writing Scale the writer is described as:

- increasingly confident
- showing awareness
- willing to take risks
- exploring
- creating.

There are also descriptions of what learners do – descriptions of their skills and knowledge: 'use sentence punctuation more consistently', 'draw on a range of effective strategies' and 'use standard spelling consistently'.

In the descriptors there is explicit recognition that learning to read and learning to write – and indeed development of oral abilities – are interdependent and that making links across various aspects of language work helps progression. The descriptions are presented in prose, not in a format which might encourage 'ticking boxes': they incorporate a large number of factors that matter in the process of reading or writing, which are presented as parts of the complexity of that process, not as separately learnable knowledge and skills. The Scales thus emphasise the idea that the important constituent elements in reading and writing should be learned, developed and assessed in the context of actual communicative tasks/activities.

Oral Language

Mercer, N., Warwick, P. & Ahmed, A. (2014) The Cambridge Oracy Assessment Project [retrieved from https://www.educ.cam.ac.uk/research/projects/oracytoolkit/oracyskillsframework/]

The Cambridge Oracy Assessment Toolkit was developed by staff in the Faculty of Education of the University of Cambridge. The tool is designed for use with learners aged 11-12 and comprises a set of initial tasks to be undertaken at the start of the school year, Assessment for Learning tasks that are curriculum embedded and can be used throughout the year, and a series of end of year tasks.

The tool was developed in response to the recognition that education should afford learners the opportunity to use language for seeking, sharing and constructing knowledge; solve problems collaboratively; develop the skills needed to communicate clearly; and, be able to make clear presentations. It addresses the lack of systematic programmes which offer learners explicit guidance and understanding of the criteria by which their performances are evaluated.

The toolkit is underpinned by an oracy skills framework and specifies the skills that learners need to be effective communicators and speakers. These are grouped under the following categories:

- physical
- linguistic
- cognitive
- social and emotional.

Under each of these categories there are specific skills e.g. under linguistic, there are four sub-headings which, in some cases, are broken down further:

- vocabulary
- language variety
- structure
- rhetorical techniques.

Given the sparsity of research and work in this area, this toolkit and the underpinning oracy framework will be of interest to those building the Languages, Literacy and Communication progression framework.

Issues related to conceptualising progression within multilingual societies and classrooms

There have been numerous critiques of 'traditional' policies of assessment of progression in language learning, particularly within multilingual societies and classrooms, contexts which Hult (2010) argues may be illumined by the application of complexity theory. Critiques of policy have sometimes come from within the accepted paradigm of modern language learning, e.g. Hunt (2009) criticises National Curriculum policy in England for not clearly articulating progression in the following terms:

> *'Progression refers to a broadening of contexts and content; a development of each of the four skills of listening, speaking, reading and writing as well as language learning skills; a deepening acquisition of linguistic knowledge and ability; and an expansion of cultural awareness'* (p. 206)

In contrast, Mitchell (2003) is one of those authors who have noted with increasing urgency that traditional models of progression in modern languages have

> *'locked thinking about learning outcomes for languages into an outmoded 'four skills' pattern, which predates the communicative era and is in some ways in opposition to it. In performing real world tasks, skills are typically integrated for the achievement of some non-language goal, e.g. we commonly read in order to write, we listen in order to speak etc.'* (p. 16)

Such 'outmoded' approaches are seen as failing to recognise patterns of cognitive development, being applicable only to learning in highly controlled conditions, ignoring the capabilities which children bring to the classroom and, indeed, setting ceilings on achievement. Mitchell recognises specifically, that real progression in language learning will employ the model of non-linear progression developed in *Successful Futures.*

> *'Research into language development has clearly shown that L2 learning is a much more complex and recursive process, with multiple interconnections and backslidings, and complex tradeoffs between advances in accuracy, fluency and complexity.'* (Mitchell 2003 p. 16)

Lee & Benati (2007) clearly illustrate a research informed but limited model of pedagogy of the type criticised by Mitchell. The authors make use of detailed analyses of second language development presented by VanPatten (1996): they summarise (p. 3) Van Patten's model of the principles which underpin how learners identify

> *'which features of the input [they] attend to, which they ignore, and whether learners direct their attention in a principles way (VanPatten 1996 pp. 13-53)*

In brief this model recognises three fundamental principles:

- *'learners process input for meaning before they process it for form*
- *for learners to process form that is not meaningful, they must be able to process informational or communicative content at no (or little) cost to attention*
- *learners possess a default strategy that assigns the role of agent to the first noun (phrase) they encounter in a sentence'* (Lee and Benati 2007 p.3)

Each of these principles is then split into a small number of sub-principles. From this model, Lee & Benati develop a pedagogy which treats these principles and sub-principles as means of organising an inflexible form of linear progression in which each language feature is developed independently of others and which ascribes to learners a role as largely passive recipients of input planned or identified by the teacher to take them through these discrete steps sequentially.

Turnbull (2017, p. 2) describes these established approaches, in both foreign language learning and bilingual education as reflecting a 'monolingual perspective' which has influenced both pedagogy and assessment:

> *'very rarely do FL assessment measures acknowledge or take into consideration the underlying goal of FL education; that is, to develop bilingualism in some form, or to further promote the emergent bilingualism learners already possess.'*

He argues that bilingual education has made considerable advances in recognising the capabilities that children bring to the classroom and that translanguaging as introduced in Welsh research is

becoming a feature of learning in bilingual classrooms. This should now be extended to foreign language learning. Lewis *et al*. (2012) pursue a similar theme as they analyse the ways in which the concept of translanguaging has been developed both in Wales and in other contexts. Grenfell & Harris (2017) argue, from a series of research activities, that second language teaching must make use of strategies (affective, memorisation, cognitive) which empower learners, not only as a means of developing facility in the use of the language and not only as a basis of lifelong learning, but also as educational goals which themselves embody important aspects of what it means to use a second language effectively. The implications of these arguments for the assessment of progression may be considerable, requiring changes not only in practice but in underlying philosophies of language learning. Performance based assessment in real life situations using multimodal and multilingual approaches are likely to require different statements of progression than those based on traditional models of language acquisition.

Gardner & Wagner (2004) provide a range of examples of the ways in which second language learners make use of social awareness, context, topic and non-verbal cues to understand others' meaning, express their own meaning and develop their vocabulary and accuracy in the use of a target language. Jørgensen (2012) takes this theme further, arguing that 'languages' are sociocultural or, indeed, ideological constructions which do not represent the behaviour and experiences of language users, including the behaviour and experiences of young people. The examples provided of young people's language use outside of school demonstrate the extent to which they make use of a range of languages; code switching is not determined simply by genre, audience or purpose but can take place within one conversation and indeed within individual utterances within a conversation. There is evidence that features of one language have been influenced by those of another. Jørgensen provides evidence of the extent to which young people were able to articulate descriptions of their language use. It is likely that such developments are also taking place within the British Isles among speakers both of minoritised languages and of community languages (see e.g. Hult, 2010, O'Toole & Hickey, 2017). Kirsch (2017) demonstrates how translanguaging can be used effectively by young children to support their learning of languages. This is in the context of Luxembourg, an officially trilingual country which has traditionally used a monoglossic approach to language learning where languages are taught as discrete subjects and written language is privileged. In this there now live many children who employ yet another language at home or in their local community. Established practices of assessment of progression in language learning may not fully recognise the value of such language use within the classroom or community.

Datta (2000) provides a range of examples from practice (in this case of young children in English primary schools) of the ways in which children's first languages can be used effectively, often on the initiative of young children, to stimulate and support their learning and progression in the use of the language of education (in this case, English). In addition to recognising children's linguistic and cognitive abilities, Datta argues strongly that teachers must in their classrooms recognise and respect in practical ways the languages the children bring to schools and the cultures to which these languages are central. Cenoz & Gorter (2016) point out that multi-lingualism is an important point of departure for the work of many schools, where multiple languages among students are a fact of life. The authors argue that a multilingual focus has pedagogical implications, such as working across languages in learning, using different languages for input and student output, scaffolding when teaching content in L2 or L3 and analysing cognate words/expressions. It is then desirable that

assessment be changed to align with pedagogy, e.g. using a multi-lingual approach to evaluation of learners' comprehension of content, scoring taking account of different languages, or 'translanguaging' in assessment of writing.

Related to this is the development and use of Content and Language Integrated Learning (CLIL). Ruiz de Zarrobe & Cenoz (2015) in surveying the field recognise that this term (and related terms) cover a number of different approaches, but all of which share a recognition that language development, concept development and the development of thinking skills are interrelated and, indeed, inseparable. Pérez Cañado & Lancaster (2017) are among authors who report the effects of CLIL on language learning, in this case oracy: however, their assessment appears to rely on decontextualised tests which were matched to the language textbooks used by the learners: an approach which would not appear to recognise fully the affordances of this model of pedagogy. Meyer *et al.*(2015) develop an approach to assessment which aligns more clearly with this pedagogical approach: they argue that development of content (in this case science) and development of language are mutually interdependent and that assessment of progression operates along two axes, the continua of which include sub-categories, as illustrated in *Figure 11* below.

This model requires:

> *'a focus on the active construct of meaning-making rather than the rather passive notion of content knowledge as a more static-defined state… Making connections which evidence meaning instead of reaffirming prior knowledge contextualised at a surface level requires learners to use language in different ways. For example, explaining cause and effect or temporal sequence relies on appropriate use of language which can be understood by others and self according to different stages of development… The model provides both teachers and students with a way to 'visually map' out their progression in literacies: learners' texts can be mapped onto the model to trace their literacy development over time'* (p. 50)

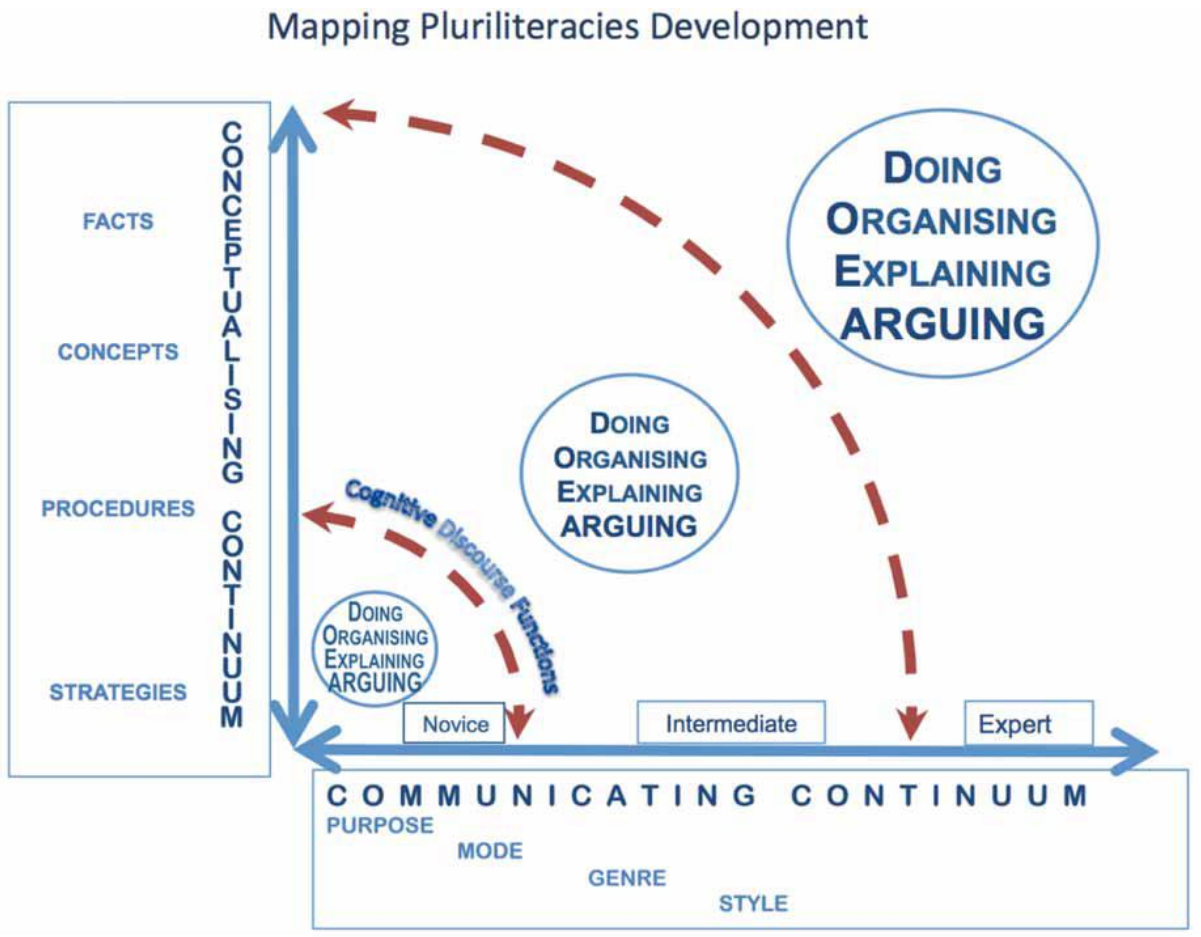


Figure 11: The Graz Group model of pluriliteracies development (reproduced from Meyer et al. (2015) p. 49

Burgoyne *et al.* (2011) and Thompson (2006) provide further evidence of the interlinked nature of progression in language and the development of content and cognitive capabilities from more narrowly focused research into detailed aspects of language development: the development of vocabulary and the use of authentic discussion. The implications of such findings for the development of learning progression frameworks may merit consideration.

Shrubshall (1997), from a different standpoint, challenges approaches to assessment of progression in language which treat development of different modes and genres as largely independent; narrative is here seen as the basis for much language development, both oral and written. The comparison of achievement of monolingual and bilingual children in this report employs linguistic analysis not in terms of accuracy of grammar and syntax or of variety of sentence structure but rather in terms of narrative and rhetorical structures, both fine grained and coarse grained. The links between language development and development of other aspects of learning is also a feature here.

Jones (2012), building on the model of the Council of Europe's European Languages Portfolio (ELP), argues for the value of portfolios in recording achievement in language: using a portfolio is both motivating and allows learners and others to recognise the interconnections *which 'clearly take place across the whole of a child's language learning across the curriculum, in English, heritage languages, [foreign languages], subject vocabularies and discourses'* (p. 412). However, Jones does not state explicitly how progression would be determined from the evidence included within a

portfolio. Ashton (2014) following a critical review of summative self-assessment approaches in language learning develops a set of 'functional frameworks' to support self-assessment: the items within these frameworks are derived from existing sets of 'can-do' statements, including the ELP, many of which are aligned to the CEFR, and thus may display both the strengths and weaknesses of these sets of statements.

The assessment of languages and development of learning progression frameworks will be carried out in a context which is significantly different from those previous contexts which adopted approaches which were based on the learning and assessment of discrete language knowledge and skills, which privileged one language at the expense of others and which did not recognise the extent or value to learning of the linguistic capabilities learners bring to the classroom.

A Fundamental Issue: Does the Research Support the Idea of a Progression Framework for Literacy and Language Development?

Mosher, F. & Heritage, M. (2017) A Hitchhiker's Guide to Thinking about Literacy, Learning Progressions, and Instruction. CPRE Research Report #RR 2017/2. Philadelphia: Consortium for Policy Research in Education [retrieved from http://repository.upenn.edu/cpre_researchreports/97*]*

Mosher and Heritage's recent article deserves more detailed analysis than it has been possible to give it here. However, it seems important to include in this report the most significant conclusion that Mosher and Heritage reach. They report that there is certainly much research evidence about the nature of language development, which involves expressing ever more complex and sophisticated meanings as one becomes more familiar with the various means and systems by which language makes such expression possible. These means include the alphabetic system, grapho-phonemic decoding, words representing things and ideas, grammar, text structure and organisation, characteristics of genres. This process of development is highly complex and certainly does not occur in a linear fashion. Mosher and Heritage (as well as the researchers whose work has been summarised earlier in this report) see it happening most effectively in contextual use of language, rather than through separate exercises on aspects of the system. However, Mosher and Heritage argue that there is no compelling research evidence about the *order* in which successful learners become familiar with the various aspects of language and therefore, at least at present, no clear basis for writing detailed descriptions of progression in a way that could be used to specify next steps in learning at any particular point. They conclude therefore that it is probably more realistic and wiser, given what we know about the complexity of language development processes, simply to aim to design the language curriculum so that key aspects are met in a sensible specified order:

> *A well-defined, ordered curriculum can function, and provide many of the same benefits, as have been claimed for the stronger hypothesis of learning progressions. The steps in the curriculum along with the activities and materials, and the associated assessments or evidence from students' work, provide a definition of how learning is expected to proceed and how to tell whether it in fact is going as expected, along with pointers to what may be the problem if it is not. If the curriculum is designed to support individualization by defining the order or orders of learning experiences but allowing the pace to vary as needed, as progressions would, it can honestly represent having the same expectations for all students, while accepting the likelihood that they may differ in how long they will take to meet them.'*

Some Key Points for Consideration

In addressing the questions proposed for the Languages, Literacy and Communication AoLE in the Review of Frameworks, several significant points from the research review should be kept in mind. These include:

- The emphasis in Marshall *et al.* (2018) on the need to ensure curricular and pedagogical balance across both development of learners' ideas and thinking and development of awareness of the nature and potential of language.
- Christie's view that the quality of writing improves across *developmental* stages and that the learner's development is impacted upon by school experiences and the demands of school work across the curriculum.
- Myhill's focus on *making meaning* and on patterns of increasing complexity in use of language to do so.
- Duke and Pearson's ideas about the role of teaching in development of comprehension abilities, as learners move from supported to independent interaction with texts.
- The argument of Wyse *et al.* about new reading behaviours emerging from more sophisticated grasp of, and practice with, skills learned earlier.
- The presentation of the CLPE Scales in a form that highlights the complexity of the language development process and avoids the danger of creating a 'tick box' assessment system.
- The recognition in the Cambridge Oracy Programme that development is a matter of both 'pursuit of meaning' to communicate and language awareness and skills to enable the communication of meaning.
- The significant question raised by Mosher and Heritage whether we are capable of creating a real progression framework for Languages, Literacy and Communication which will be relevant to the ways in which all or most learners actually develop.

Mathematics and numeracy: Review of Frameworks

Introduction

As far as documentation permits, the following reviews examine the place of progression within curricula from a range of countries. The first sections provide an overview country by country of how progression is conceptualised, how progression points are described and how they relate to broader curricular principles. Doing so also provides insight into what matters. The final section draws out similarities and differences of interest across those countries examined.

Australia

https://www.australiancurriculum.edu.au/f-10-curriculum/mathematics/

The Australian mathematics curriculum spans two broad stages: Foundation to Year 10, and then a Senior Phase in which students study more discrete courses (e.g. Mathematical Methods, Specialist Mathematics). A new national curriculum (rather than state curricula) emphasises consistency and is structured around three content strands:

- number and algebra
- measurement and geometry
- statistics and probability

and four proficiency strands:

- understanding
- fluency
- problem solving
- reasoning.

Progression is understood as the application of skills and understanding to increasingly more complex situations. It is expected that mathematical skills become increasingly sophisticated through the years of schooling.

Within the curriculum, there is year on year scope and sequence within identified standards. Comparison of level descriptions and achievement statements between years illustrates shifts in performance expectation. For example, mathematical fluency between Years 2 and 5 describes shifts from readily counting in sequence and using informal units to compare measurements to choosing appropriate units and instruments in measurement. Such shifts do capture aspects of procedural fluency but, with the exception of 'readily', do not regularly foreground adverbs in relation to notions of flow, highly developed practice and accuracy. Similar shifts are articulated in aspects including reasoning and problem solving. Within the content description, performance statements are used, e.g. 'Investigate the conditions required for a number to be odd or even and identify odd and even numbers.' These are initiated with a range of words that relate to a range of skills, attributes and capabilities (e.g. recognise, connect, investigate, apply, develop, solve, select, find, compare).

Additional documents articulate progression in other forms that support the main curriculum. The 'Sequence of Achievement' document provides successive grade-level vignettes of expected performance across standards at the end of each year. These take the form of 'Students are able

to...' statements that relate mathematical skills to aspects of curricular content. The detail included is helpful and conveys a sense of progression; however, the form that they are in does not make this readily apparent and hence may not be effective for formative discussions. The accompanying 'Sequence of Content' document is more stratified and helpful, providing overviews for high level planning.

Interesting work, however, has been undertaken by individual states, such as Victoria, which have created developmental learning continua from Foundation to Level 10 (http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/continuum/Pages/mathcontin.aspx). As with New Zealand, indicators of progress are identified with associated exemplification of student work (images and video) and linked teaching strategies. The 'illustrations' within these provide teachers with valuable insights in changes and challenges in learning, again, useful for formative assessment.

British Columbia

https://curriculum.gov.bc.ca/curriculum

This interesting concept-based and competency-driven curricular model is structured around the interaction between

- big ideas (understanding, e.g. numbers, fluency, patterns, attributes, familiar events)
- curricular competencies (doing, e.g. reasoning, analysing, understanding, solving, communicating, representing, connecting, reflecting)
- curricular content (that which students should know: e.g. number concepts to 20).

These three dimensions are differentiated by year group and collectively articulate lines of progression as students move from one year to the next. There is a strong link evident between these three dimensions within the documentation.

Notably, 'Big Ideas' are consistently centred upon core entities but evolve in emphasis from one grade to the next. The documentation cites no evidence base for why these particular shifts are conceptualised as they are; however, they appear to promote successively deeper understanding.

These are detailed further in elaborations which are also included for content and curricular competencies. Within these, sample questions are included at different stages to support students' inquiry. For example, from Kindergarten through Grade 5, 'pattern' shifts from identification, through regularity, change, representation and expression and then to linear relationships in Grade 6. One support question at this stage asks: 'How do linear expressions and line graphs represent linear relations?' (p. 43) whilst, at Grade 9, the parallel question asks 'How do [continuous] linear relationships help us to make predictions?' (p. 62). These are valuable in supporting the teaching of mathematics at a given stages and in pitching the level of expectation. Though content, competence and big ideas are detailed, there is not the hierarchical sense evident in the Singapore documentation and there is an explicit acknowledgement that these things will take place at different times.

British Columbia has also compiled performance standards for numeracy, one of three core dimensions of the curriculum, which are exemplified with student work (http://www2.gov.bc.ca/gov/content/education-training/k-12/teach/bc-performance-standards/numeracy). These relate to more formal aspects of mathematics defined within the

curricular document and are designed to apply across all curricular areas. Progression is illustrated for four aspects of numeracy

- Concepts & Applications
- Strategies & Approaches
- Accuracy
- Representation & Communication

Performance is described in terms of 'is not yet within', 'minimally meets', 'fully meets' and 'exceeds' expectations. These descriptions illustrate development in features of performance such as confidence, connection to prior knowledge, flexibility, level of support, perseverance, analysing and planning.

Table 11 illustrates a snap-shot entry for Grade 4 Strategies & Procedures.

Table 11

Not Yet Within Expectations	Meets Expectations (Minimal Level)	Fully Meets Expectations	Exceeds Expectations
• cannot break the task into stages, steps, or sections • unable to verify results or solutions	• tries to follow instructions; does not check or adjust procedures • needs help to verify results or solutions	• structures the task logically; may be inefficient • if asked, verifies results or solutions	• structures the task efficiently • may independently verify results or solutions

These are likely to be effective in making summative judgements and, in most instances, the full (rather than snapshot) illustrations, in conjunction with the examples of work, are sufficiently detailed to guide formative assessment and future learning.

Finland

http://www.oph.fi/english/curricula_and_qualifications/basic_education/curricula_2004

(Note that a newer curriculum was released in 2016; this was not accessible in English.)

The curriculum spans Primary and Secondary (Grades 1-9); progression stages are defined at the end of Grades 2 (approximately 9 years old) and 5 (approximately 12 years old); terminal expectations are listed for Grade 8. Though there are not explicit pathways of progression articulated outside of the core curricular content, the documentation does stress that there should be systematic progression facilitating the assimilation of mathematical concepts and structures (though this is framed in terms of instruction rather than learning).

There are hence three stages defined across the curriculum (Grades 1-2, Grades 3-5 and Grades 6-9). For each of these stages, there is a brief statement describing the core purpose of instruction (e.g. *'…the development of mathematical thinking; practice concentrating, listening, communicating; and acquisition of experience as a basis for the formulation of mathematical concepts and structures'*). Objectives are then listed which also give insights that would support teaching approaches (e.g. learning to justify conclusions; using pictures; concrete models; tools in writing or orally). These are followed by statements of core content for

- Numbers & Calculations

- Algebra
- Geometry
- Measurement
- Data Processing
- Statistics.

In relation to these, descriptions of good performance by learners (using the future tense) are included at for the end of Grades 2, 5 and 8, but no description of the nature of learning progression between these is given. The descriptions themselves often give quite specific indications of performance expectations and capabilities. For example: '*pupils will know simple fractions such as one half, one third and one quarter and how to present them by concrete means*.'

A section is included describing thinking and working skills in which reference is made to problem solving contexts and students' ability to remember and focus their attention in, for example, making observations. It is notable that many of the performance indicators use the word 'know' even in instances where it refers to more procedural aspects of learning (e.g. 'know how to..' rather than refer direction to the process itself).

In the absence of explicit descriptions of learning progression, it is necessary to infer this between stages. In most cases, alignment is sufficiently congruent to allow for this, but it is not necessary intuitive for use by teachers in supporting finer-grained formative assessment with cognisance of learning trajectories. Notwithstanding this, shifts can be inferred. Between Grades 2 and 5, for example, more developed learning in thinking and working skills involves more expansive and/or diverse ways of communicating understanding; in geometry learning shifts from knowing basic forms, to recognising similarity, formation of figures and judgements of sensibility. These include some references to independence and confidence.

New Zealand

http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Mathematics-and-statistics/Achievement-objectives

https://lpf.education.govt.nz/

Mathematics & Statistics are structured around three strands:

- Number and Algebra (including, e.g. number strategies, number knowledge, equations and expressions, pattern and relationships)
- Geometry and Measurement (including, e.g. shape, position and orientation, transformation)
- Statistics (including, e.g. statistical investigation, literacy and probability).

The core curricular documentation is staged through levels 1 to 8 with achievement objectives articulated with progressive complexity but in quite a general sense (e.g. use a range of counting, grouping and equal sharing strategies with whole numbers and fractions). Areas of learning within each of the three strands are fairly constant from levels 1 to 6, but the final two levels are described in two strands (Mathematics and Statistics) in which calculus is discretely included. It is noteworthy that the achievement objectives appear to constitute the curriculum itself and in the primary documentation the percentage of time to be spent on number contexts is specified.

Though lines of progression can be inferred from the achievement objectives by learning area, progression is also supported through the Mathematics Framework (part of the Progression and Consistency Tool). The can be accessed freely after creating a user account. This framework purposefully breaks down and exemplifies successive stages in learning in eight 'big ideas'

- additive thinking
- multiplicative thinking
- patterns and relationships
- using symbols and expressions to think mathematically
- geometric thinking
- measurement sense
- statistical investigation
- interpreting statistical and chance situations.

Though not structured in the same way as the achievement objectives, they complement these and mathematical learning generally. No indication is given of how or why these particular 'bigger ideas' were identified, but it is noteworthy that they are all principally procedural (rather than conceptual) in nature and are exemplified through task-based problem solving.

For each big idea, progression steps are exemplified as a series of 'sets' from one to eight. More detailed introductory descriptions articulate the ways in which performance and learning is expected to change and these are associated with exemplar activities and extracts from student work. One example for additive thinking at level 4:

- states that the student can count back across a decade
- provides a description of the problem
- provides a transcript of verbal interaction between the teacher and the student
- provides an image from the student's written work that evidences success in this.

For measurement sense at the same level, there is exemplification of a similar nature around the creation of measurement scales. Again, photographs of student work illustrate success for two scales created using matchsticks. Though the achievement objectives themselves are relatively broad, this form of exemplification around big ideas could be useful in supporting formative discussions and in cultivating a less abstract sense of learning trajectories. They give important insights to contexts that allow learners to acquire the necessary skills and strategies.

Quebec

http://www1.education.gouv.qc.ca/progressionPrimaire/mathematique/index_en.asp

http://www1.education.gouv.qc.ca/progressionSecondaire/domaine_mathematique/mathematique/index_en.asp

Approaches to conceptualising and using progression are addressed explicitly within the Elementary and Secondary curriculum. Knowledge, competence and the role of the teacher are viewed as critical in cultivating progression with articulations of progression harmonised between both stages of schooling.

For the express purpose of supporting teachers planning, progression tables (http://www1.education.gouv.qc.ca/progressionPrimaire/mathematique/index_en.asp) which accompany the main curricular document illustrate several phases of progression in each of the five

areas of mathematics (arithmetic, geometry, measurement, statistics and probability). Phases are either: (→) construction of knowledge with teacher guidance, (★) application of knowledge by the end of the school year, or (■) reinvestment of knowledge by student. When considered across several years of schooling, these form a comprehensive planning matrix.

Table 12 illustrates selected performance statements, in no particular order, from planning matrices where 1-6 represent the years of elementary schooling.

Table 12 – Selected entries from Progression Planning Matrices

	Cycle 1		**Cycle 2**		**Cycle 3**	
	1	**2**	**3**	**4**	**5**	**6**
An addition or subtraction involving natural numbers	→	★	■	■	■	■
Any of the four operations involving natural numbers			→	→	→	★
Develops various strategies that promote mastery of number facts and relates them to the properties of addition.	→	→	★	■	■	■
Builds a memory of multiplication facts (0 × 0 to 10 × 10) and the corresponding division facts, using objects, drawings, charts or tables			→	★		

Progression steps are depicted annually in alignment with school years through three cycles at elementary level and two cycles at secondary level. The points at which different performance statements are developed appear to account for the dependencies between mastering certain foundational skills and competencies within topic areas. More detailed analysis would be required to verify such dependencies between topic areas but these are assumed to hold true also.

A range of words or phrases are used at the beginning of performance statements (e.g. uses, determines, establishes, builds a repertoire, develops processes) and, interestingly, there are examples that appear to suggest ways in which these should be taught (e.g. uses his/her own processes as well as objects and drawing to determine the sum or difference of two natural numbers less than 1000). These are further supported by exemplar cognitive and meta-cognitive strategies, in the form of reflective prompts/questions, intended to support the development of mathematical competencies. There appears to be clarity between performance statements and the associated principles, although no specific evidence base is cited in relation to models of progression.

Though powerful as a means of structuring learning for progression at the level of planning, additional detail and exemplification may be necessary to support formative assessment. The main curricular documentation at both Pre-School/Elementary and Secondary levels (secondary 1 and 2), provides additional detail on content, presented in terms of concepts and associated processes. As expected, progression in complexity is evidenced between successive cycles and, in conjunction with the progression tables, provides quite a detailed curricular framework. Notably, there is significant discussion in the main curricular documents of matters such as conceptual learning, development of competencies, increasing complexity, and application and re-application of learning across cycles. Though not frameworks of progression, this description supports and significantly deepens understanding around the associated tables and description of progression elsewhere.

Singapore

https://www.moe.gov.sg/education/syllabuses/sciences/

The mathematics curriculum in Singapore spans three phases: primary, secondary and pre-university. All three stages are underpinned by a framework that groups what matters under:

- attitudes (e.g. interest, appreciation, confidence)
- skills (e.g. numerical, algebraic, spatial, data)
- concepts (e.g. numerical, algebraic, statistical)
- processes (e.g. reasoning, communication, application, modelling)
- meta-cognition (monitoring and self-regulation).

In the broadest sense, progression in mathematics is set within this framework for all stages of schooling and problem solving is explicitly stated as central to this. The curriculum acknowledges the hierarchical nature of mathematics and recognises that progression depends on developing certain foundational understandings. The documentation structures pedagogy to support learning move through three phases from 'Readiness' through 'Engagement' to 'Mastery'. Readiness takes cognisance of prior knowledge and the importance of the learning context and environment. Engagement is the phase in which a range of strategies support the learning of learning new concepts and skills with attention given to instructional approaches such as Polya's Problem Solving Heuristic. In the Mastery stage, consolidation of learning is supported through reflective review and purposeful extension. The interdependency among instructional approaches, content and assessment is emphasised in how progression is described.

Progression points in key curricular areas (e.g. Numbers & Operations, Ratio & Proportion, Algebraic Expression and Formulae) are described using both clearly specified content and associated descriptions of intended learning experiences. The specified content – which is set out in a high level of detail – implies a pathway of progression both within different content areas at given levels (e.g. for Secondary One, for Secondary Two) as well as across year groups (from Secondary One to Secondary Two). Implied progression appears to reflect increasing complexity, task demand and the hierarchical nature of the domain.

The layout and numbering system suggest quite linear and successive stages, but it is unclear whether this reflects the way teachers approach and structure content in classrooms. Progression is, in this sense, the curriculum itself. The accompanying statements of expected learning opportunities provide some insight into shaping learning experiences and could be used to support formative interactions with students.

There does not appear to be any exemplification of student performance in work at different stages in learning but assessment rubrics are referred to in the 'integrating assessment with instruction' section. The layout and level of detail give a greater sense of prescription regarding content and teaching, though it is unclear how teachers utilise this in practice.

Observations & Considerations

- Relative high degree of consistency in what matters, though variation in emphasis, structure and degree of specificity.
- Curricula generally include content relating to number/arithmetic, geometry, measurement, algebra and representation/statistics/probability. Skills and competencies relate to reasoning, problem solving/application, fluency, justification, confidence, accuracy, reflection and metacognition.
- Curricular complexity in documentation varies. Finland is simpler in conception than, for example, British Columbia that is predicated upon interaction between three dimensions.
- Descriptions of progression range from the relatively implicit and integrated (e.g. Finland and Singapore) to the quite explicit and complementary (e.g. Quebec and Victoria), though all convey a sense of increasing complexity/demand.
- Progression steps span single years (British Columbia), two-year cycles (Quebec) or longer periods (Finland).
- The wording of performance statements varies, which has implications for supporting formative assessment. More detailed descriptions are likely to be more useful.
- Exemplification of standards through learner work significantly reduces the level of abstraction (e.g. Australia, British Columbia, New Zealand). It is not always clear what performance/behaviours at a given level would look like in a classroom and this is a powerful way of addressing this.
- Though Singapore recognises 'readiness' as a phase in progression, progression does not seem to be articulated as sufficiency to move onto further learning, but is largely summative of what has happened up to the progression step.
- In most instances (Australia is an exception), it is unclear on what evidence, if any, conceptions of progression are based. As such, it is difficult to know the extent to which these reflect the way learning progresses for learners in relevant classroom contexts.

Mathematics and numeracy: Research Review

Introduction

The learning of mathematics has arguably been a central part of research and debates related to general cognitive development (e.g. Piaget and Szeminska, 1952) and a large body of literature informed by research into the learning of mathematics has developed over time. Whilst this literature can inform understanding of how mathematics may be learned, the nature of what progression in mathematics involves can be more difficult to ascertain. The aim of this review is not to outline all research related to mathematics learning. Rather, it aims to highlight some key literature that may be useful in supporting understanding of learners' progress in mathematics and numeracy and to raise considerations in relation to points that arise. The term *mathematics* is used here to encompass *mathematics and numeracy*. Numeracy is not seen as a sub-set of mathematics; rather, being numerate is considered an outcome of successful mathematics learning including, in particular, the application of mathematics learning within a range of contexts.

Any attempt to map mathematics and the progression of ideas within it necessarily invokes discussion of the very nature of mathematics itself. Many mathematicians would argue that the beauty and power of mathematics lie in its abstract nature; that a compact representation can be applied to describe and analyse a multitude of situations. This abstract nature means that learners need to learn to use and interpret a range of symbols and representations, many of which subsequently become further objects to be manipulated, and they need to learn how to model situations in a mathematical way. Being able to successfully understand and reason with a range of ideas, concepts and representations and being able to generalise, predict, justify and deduce are all key aspects of mathematics. Applying Piaget's concept of abstraction, Tall (2013) believes that there are 'three integrated worlds' of mathematics which learners may journey through:

- embodied mathematics (involving abstraction from perceptions on objects, for example shapes);
- symbolic mathematics (involving abstraction from actions and ideas into symbols);
- formal mathematics (building formal knowledge into axiomatic systems).

Tall (2013) argues that the first two worlds start with practical experience, moving into more theoretical mathematics and culminating in formal axiomatic mathematics. Whatever the belief in the nature of mathematics, a simple summary of progress through school mathematics necessarily recognises a hierarchy of increasingly complex abstraction, manipulation, interpretation and generalisation. This review explores progress in mathematics including general descriptions, conceptual frameworks and research informed learning trajectories.

General descriptions and conceptual frameworks for progress in mathematics

General descriptions

General descriptions of what it means to make progress in mathematics are very difficult to find. Watson *et al*. (2003) in their work analysing the progress of low attainers in mathematics used the term 'deep progress':

'Deep progress means that students:

- *learn more mathematics*
- *get better at learning mathematics*
- *feel better about themselves as mathematics learners'*

Watson *et al*. (2003, p. 4).

It is noteworthy that Watson *et al*.'s (2003) succinct idea of deep progress reflects aspects of metacognition and self-efficacy. Such notions seem to be present in the curricula of high performing countries (e.g. Singapore and China); they also relate to the four purposes of the Welsh curriculum. In addition, studies of international PISA assessments in mathematical literacy have suggested a link between practices that encourage metacognition and self-efficacy and high performance (e.g. OECD, 2016). However, although the work by Watson *et al*. (2003) outlines some effective approaches to supporting deep mathematics progress, it does not suggest how 'getting better at learning mathematics' and 'feeling better about themselves as mathematics learners' can be used as measures of progress and these are likely to be context dependent. If such notions are considered as part of progression in mathematics then careful consideration would need to be given to whether, and, if so, how such aspects could be interpreted.

In a United States National Research Council review synthesising research into mathematics learning from pre-school to sixteen, Kilpatrick *et al*. (2001, p.5) use the term 'mathematical proficiency' to describe the outcome of successful mathematics learning. They regard mathematical proficiency as having five strands:

- *'conceptual understanding – comprehension of mathematical concepts, operations and relations*
- *procedural fluency – skill in carrying out procedures flexibly, accurately, efficiently, and appropriately*
- *strategic competence – ability to formulate, represent, and solve mathematical problems*
- *adaptive reasoning – capacity for logical thought, reflection, explanation, and justification*
- *productive disposition – habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy'*

Kilpatrick *et al*. (2001, p. 5)

Kilpatrick *at al*. see these strands being *'interwoven and interdependent*' (p. 5) and imply that progress in mathematics would include development of all these strands. They comment (p. 217) that *'the path to proficient performance requires progress along each strand interactively'*. It is interesting that the term 'multidimensional' is used in relation to mathematical proficiency; examples discussed imply that there can be progress by moving *between* strands as well as *along* strands. For example, *developing procedural fluency* with multidigit algorithms could lead to *improved conceptual understanding* of place value and could *support strategic competence* in being able to represent and solve problems. It would be a vital role for the teacher to ensure such connections are identified and exploited. Kilpatrick *et al*. note that strands may be linked effectively in the teaching of whole numbers but less effectively in the teaching of other areas, e.g. rational numbers. The implication is that teachers must support learners in identifying, understanding and applying connections between strands of proficiency in order for them to make progress.

Indeed, highlighting relationships between skills and knowledge being learnt in mathematics has long been promoted by mathematics education experts (e.g. Skemp's (1976) writing on relational

and instrumental understanding in mathematics). Denvir and Brown (1986) noted that for low attaining learners in particular the highlighting of relationships between accruing skills and knowledge may need to be particularly explicit. Hence, progress in mathematics involves building a network of connections between what is being learned and how it is being learned at whatever 'stage'.

Development stages

Piaget and Szmeniska's (1952) work on cognitive development in mathematics contributed significantly to research into mathematics learning. However, the idea of discrete and inflexible 'stages of development' has frequently been criticised. For example, in relation to mathematics, McGarrigle and Donaldson (1974) showed that very young children could show understanding of conservation if the context was relatable. At a simple level, such research confirmed that a child's understanding may depend on how a problem is situated within a particular context and contributed to a growing body of research which suggests that global developmental stages, through which children progress in a linear way, cannot be assumed in the learning of mathematics.

Networks, hierarchies and layers

The 2011 report of England's Advisory Committee on Mathematics Education (ACME) looked at what learners need in order to become successful in mathematics. The report described mathematics as being made up of components *'which link together in networks, hierarchies and layers'* (ACME, 2011, p. 5). Furthermore, the report suggests that mathematics *'is learned not just in successive layers, but through revisiting and extending ideas'* (ACME, 2011, p. 1). This view reinforces that progress in mathematics involves building on previously learned ideas, being able to make connections between ideas and proficiencies (as discussed above) whilst also acknowledging that, within layers (or 'stages') there will be depths or levels of understanding.

The idea of depth of understanding is not new and the use of taxonomies (such as Bloom's and SOLO) to describe learning of a particular proposition and how it might develop is common in schools. Meel (2003) gives a useful overview of some theories of mathematical understanding and how they have developed. These include Skemp's (1976) seminal theory on instrumental and relational understanding and theories such as: understanding as overcoming obstacles; understanding as generating images, definitions or generalisations; and understanding as being able to operate multiple representations. These theories appear to build on and incorporate aspects of more general cognitive development theories proposed by researchers such as Piaget, Bruner and Vygotsky.

Meel (2003) also discusses the model of understanding proposed by Pirie and Kieren, developed through observation of middle and high school learners, and presented as an 'onion-layer' description of understanding. Of particular note in this model is that, as Pirie and Kieren (1994) point out, it is not a linear sequence (i.e. a learner can operate at a level without necessarily having to have operated at earlier levels) and it is not unidirectional (e.g. when faced with a difficult problem which is not immediately solvable a learner may need to 'fold back' (Pirie and Kieren, 1994, p. 173). Furthermore, Pirie and Kieren (1994) discuss how they attempted to map learners' growth of understanding in topics such as fractions and graphing of functions and found, not unsurprisingly, that learners' maps were different. They acknowledge that the reasons for the difference could be learner dependent or topic dependent or perhaps both. A key point is that the differences were not

related to age. Pirie and Kieren's model has been used in informing a model of growth of understanding used in the New Zealand mathematics framework.

A similar view of this 'layered' aspect of developing competence in mathematics is proposed by Sarama and Clements (2009) in a theoretical framework which they call 'Hierarchical Interactionalism'. This framework, developed through observation of young children's mathematics learning, attempts to synthesise contemporary views of cognitive development and mathematics specific educational research. It attempts, like Pirie and Kieren (1994), to account for the view that progress in mathematics over time and within a specific domain involves building on layers of thinking (several of which may develop at once) and that students may access these layers in varying ways over time. Students may move between these layers in particular contexts. Such views are very similar to those discussed by Pirie and Kieren (1994). An illustration and summary of this framework is provided in Daro *et al*. (2011).

Content and reasoning

The theoretical models for growth of understanding in mathematics discussed above relate primarily to particular topics or domains within mathematics, i.e. growth in understanding of mathematical content. One aspect that has not been discussed so far is progression in problem solving and/or mathematical reasoning. The notion of being able to reason with ideas and solve problems related to those ideas seems implicit in models such as those of Pirie and Kieren (1994) and Sarama and Clements (2009) discussed above; indeed, the solving of problems related to ideas is mentioned frequently when the different levels or layers are discussed and explained. This would therefore imply that a teacher would be posing problems (e.g. open-ended questions and those that invoke cognitive conflict) in order to ensure growth of understanding. Indeed, such an approach has been linked to improved problem-solving skills (Tanner and Jones, 2000). There are also numerous heuristics that have been developed to describe phases of problem solving (e.g. Polya's, which is mentioned in the curriculum for Singapore). However, although these heuristics detail necessary phases for problem solving, they do not describe how learners might progress in their competence in problem solving. Some (e.g. Carlson and Bloom, 2005) argue that problem solving is cyclical in nature (i.e. it is skill that is applied in the same way at whatever level or stage it may be met). Wismath *et al*. (2015) studied students' problem-solving skills in an attempt to identify 'threshold concepts' (i.e. fundamental concepts which may be initially difficult but once understood will not be lost and will transform future learning). Their research suggested three thresholds in relation to problem solving:

- persistence (e.g. being prepared to try something);
- process over answer (valuing processes and a variety of processes over just finding an answer);
- careful modelling (being prepared to spend more time at the start determining possible models/ approaches/ representations).

These are behaviours which arguably could be trained, relate closely to self-efficacy and attitudes and may vary depending on context.

Section summary

To summarise this section, mathematics progress over time, although there is undoubtedly hierarchy, is not a simple linear progression and involves building and using connections between

learning with layers of understanding and application which will be context and learner (rather than age) dependent. Aspects such as problem solving may be cyclical and may also relate to self-efficacy and metacognition. Reflecting such a complex view of progression in mathematics in a simple, usable format is undoubtedly a significant challenge. ACME (2011) provide examples of models of mapping for some areas which attempt to show how ideas connect and progress and suggest that an electronic map could be developed to present an idea in a number of layers and to address depths.

Progression in particular areas of mathematics

Exploring children's mathematical thinking

Much of the literature that could support an understanding of learners' progress in specific areas of mathematics has been developed from research and analysis of learners' responses to mathematics questions or tasks. This research has contributed to a body of literature considering how specific areas within mathematics may be learned and identifying typical misconceptions that may arise along the way. In some cases, such work has been used to inform the development of frameworks (or trajectories) of learning for specific areas of mathematics. Such literature is discussed within this section.

Ryan and Williams (2007) report the results of a UK cross-sectional survey of 15,000 learners aged between 4 and 15 years old which involved standardised assessments. They use the results to contribute to a body of literature highlighting typical errors and misconceptions that learners may demonstrate. They argue that awareness of such errors and misconceptions can contribute to teachers' pedagogical content knowledge; coupled with effective pedagogical strategies, understanding these errors and misconceptions should support teachers in using formative assessment effectively for mathematics. Hence such literature can be used to inform understanding of progression by highlighting typical misconceptions that, if not addressed, may inhibit progress and by signalling useful ways of eliciting and developing understanding to support progress.

Nunes *et al*. (2009) published a comprehensive and thorough synthesis of research literature on how children learn mathematics. Their aim was to identify issues that are fundamental to understanding children's mathematics learning. Their three main questions were:

- What insights must students have in order to understand basic mathematical concepts?
- What are the sources of these insights and how does informal mathematics knowledge relate to school learning of mathematics?
- What understandings must students have in order to build new mathematical ideas using basic concepts?

Nunes *et al*. (2009:3).

The resulting work is a very useful synthesis of research grouped in the following six areas:

- understanding extensive quantities and whole numbers
- understanding rational numbers and intensive quantities
- understanding relations and their graphical representation
- understanding space and its representation in mathematics
- algebraic reasoning
- modelling, problem-solving and integrating concepts.

The first four areas focus on mainly primary mathematics whilst the latter two relate more to secondary mathematics.

Each paper highlights key issues which could be useful for consideration in curriculum design and related progression. Of note, is that many of the recommendations relate to points discussed in the ACME (2011) report, particularly the need for explicit connections to be made between certain concepts and skills. Furthermore, the work signals some concepts which could be considered essential to ensure future progress. The findings also highlight specific themes which relate to longitudinal progress:

- number
- logical reasoning
- implicit models that children may use (which also relates to misconceptions)
- understanding of systems and symbols
- the learning of mathematical modes of enquiry.

These themes, which relate to all the areas considered and link to some of the aspects of progress discussed previously, are therefore key considerations for understanding progression in mathematics.

Denvir and Brown (1986) attempted to develop a framework for describing low attaining students' acquisition of number concepts (from one-to-one correspondence to being able to add or subtract pairs of two-digit numbers). They used the results of diagnostic interviews to inform the framework they developed. They found that some skills formed part of a hierarchy (e.g. a strand relating to 'place value' showed strong hierarchy); in contrast, the acquisition of other skills appeared quite independent and although some skills might appear easier than others they did not appear necessary stages for later understanding. They also found that when they used the framework as a tool to inform diagnostic teaching, the amount of progress (measured through assessment) varied for different learners and was not predictable (i.e. it did not neatly follow pathways outlined and children might 'jump' skills). Whilst this again reinforces the complexity and non-linearity of progress in mathematics, Denvir and Brown emphasised the value of developing and using such research-informed learning frameworks as support for formative and diagnostic teaching sequences. Such work could be considered the start of the development of 'learning trajectories'.

Learning trajectories

Simon (1995) introduced the term 'hypothetical learning trajectory' to describe a predicted pathway along which learning might proceed. The term also reflects such findings as Denvir and Brown's (1986): i.e. that learning can follow 'idiosyncratic, although often similar, paths' (Simon, 1995, p. 135). Over the past two decades, there has been significant research informing the development of learning trajectories within specific mathematical domains, most notably in the United States, the Netherlands, Australia and New Zealand. Stephens and Armanto (2010) suggest that learning trajectories are represented in some countries' textbooks; they analyse Japanese textbooks, concluding that these textbooks show 'carefully chosen examples and a well-developed learning and teaching trajectory' (Stephens and Armanto, 2010, p. 529). As Clements (2011) points out, the word 'curriculum' stems from the Latin word for 'racecourse' and is used to describe a path or course. Thus any curriculum framework or scheme of work could be considered a learning trajectory of

some form. However, in mathematics, learning trajectories are considered research-informed trajectories for specific domains.

Learning trajectories attempt to use research to map 'typical' progression in understanding in a specific domain and their supporters argue that they contribute to teachers' pedagogical content knowledge and can therefore be used for formative assessment and for determining instructional sequences (e.g. Kobrin and Panorkou, 2016). There can be a perceived tension between 'learning trajectories' and 'instructional sequences'. However, most learning trajectories have been designed to inform both learning and teaching; in the Netherlands, the term 'learning-teaching trajectories' is used to ensure that the two are intertwined. The perceived tension should, however, be noted when evaluating a specific trajectory as its value as a framework indicating typical progression in a specific domain and/or its value as a formative teaching tool might need to be considered.

Clements (2011) points out that most trajectories begin with a goal (a 'big' or 'central') idea within mathematics (e.g. multiplicative reasoning) and are considered in relation to research to determine whether there is a 'natural developmental progression' (Clements, 2011, p.366) informed by theoretical and empirical models of children's thinking, learning and development. In summary:

> *'researchers build a cognitive model of students' learning that is sufficiently explicit to describe the processes involved in students' progressive construction of the mathematics described by the goal across several qualitatively distinct structural levels of increasing sophistication, complexity, abstraction, power and generality'* Clements (2011, p. 366)

Hence a learning trajectory matching the description above should not just list everything that learners may need to achieve a particular goal; it should also outline levels of thinking or depth of understanding within the domain (theories related these have been indicated above). As Clements (2011) emphasises, a level of thinking applies *within* a domain and may not apply *across* domains. Clements (2011) argues that such learning trajectories are therefore different to previous attempts to develop sequences of learning which have been based on a top-down approach, reducing adult perceived standards into sub-skills.

A very comprehensive review of learning trajectories and how they could be used in the US has been produced by Daro *et al*. (2011). The review explores the notion of learning trajectories and considers means of using them within curriculum development and for assessment and instruction. It was informed by the work of US researchers, including Douglas Clements (mentioned above) and Julie Sarama, who has worked extensively with Clements to develop learning trajectories for early mathematics learning in domains such as Number Recognition, Counting, Comparing, Ordering and Estimating Numbers and Geometric Measurement. The review provides a useful overview of learning trajectories that have been developed.

Most of the learning trajectories reviewed in Daro *et al*. have been developed for the early years or for domains covered mainly within the primary years. Key gaps identified in the review include topics such as: Algebra, Geometry, Measurement, Ratio and Mathematical Reasoning. However, since the publication of the review, there appears to have been significant work on the mapping of the US Common Core Standards in Mathematics (mathematics standards applicable in all US states) to specific domain learning trajectories.

The GISMO research team in North Carolina State University (headed by Jere Confrey, who contributed to the Daro *et al*. (2011) review) has developed 18 learning trajectories and mapped the

standards up to grade 8 (equivalent to UK year 9). This work appears as an interactive hexagonal map available online and it outlines progress through the standards in specific domains in addition to attempting to show the link between those domains. Of significance is that this work spans the typical age range from 5 to 14. However, this work is also based on the US Common Core Standards in Mathematics (i.e. expected standards for grades) and it could therefore be argued that learning trajectories may have been designed to reflect the standards rather than standards being informed by available learning trajectories. Nevertheless, this is a significant body of work which illustrates how learning trajectories could be used to map progress and connection of ideas in mathematics over a longitudinal period.

As noted previously, learning-teaching trajectories have also been developed in the Netherlands, Australia and New Zealand. The available literature in English on learning-teaching trajectories in the Netherlands seems sparse although it seems these trajectories are a significant part of Dutch mathematics teaching and learning. Van den Heuvel-Panhuizen (2003) links the use of learning-teaching trajectories to the theoretical teaching approach called Realistic Mathematics Education, developed initially by Freudenthal and later in the Freudenthal Institute. This approach to teaching mathematics is underpinned by a belief that mathematics is generated and created from human activity. Of significance is the notion of 'levels of understanding'; learners can initially devise informal solutions to contextual problems, then can use specific schemes and can finally show insight into general principles behind a problem. These levels link to levels of understanding discussed earlier and also suggest that problem solving is integral and implicit within the trajectories. As Van den Heuvel-Panhuizen (2008) reinforces, Dutch learning-teaching trajectories incorporate the notion that a level of understanding is domain specific, which relates to points discussed earlier. The learning-teaching trajectory texts available in English seem to be mainly for the primary years.

In Australia, much of the development of learning trajectories seems to have evolved from analysis of numeracy teaching and learning in the middle years of education (10-13 years). Of note is that learning trajectories in Australia seem to have been developed as tools to support assessment alongside the use of rich assessment tasks. A key researcher in this work, notable because of her prominence in any writing on learning trajectories related to Australia, is Dianne Siemon. Through the development of materials to develop and scaffold numeracy in the middle years of schooling in the state of Victoria, Siemon and colleagues developed a 'learning assessment framework' for multiplicative thinking (Siemon *et al*., 2006) which is, essentially, a learning trajectory for the big idea 'multiplicative thinking'. Siemon has subsequently been involved with other colleagues in the development of trajectories in 'big ideas' in number (Siemon *et al*., 2012). Significant and unusual in this work, is the small number (six) of progressive 'big ideas' in number; this contrasts with other discussions on mathematical 'big ideas' (e.g. Charles, 2005) in which numerous big ideas might be seen as ideas that connect across mathematics in a longitudinal manner.

In Victoria, 'big ideas' for which assessment frameworks (considered as learning trajectories) have been developed are, in progressive order:

- Trusting the Count
- Place Value
- Multiplicative Thinking
- (Multiplicative) Partitioning
- Proportional Reasoning

- Generalising.

Siemon *et al*. (2012, p.24) comment that these ideas are '*very big ideas in Number without which students' progress in mathematics will be severely restricted'*. As Hurst and Hurrell (2014) point out, the work on 'big ideas' by Siemon *et al.* (2012) has a particular strength as it highlights the hierarchical and connected nature of these ideas. Hurst (2015) further argues that a model for a curriculum which uses 'big idea' thinking as a way of organising content could support teachers in planning for connecting content and ensuring development of those ideas over time, thus supporting progress and depth of learning.

Significant work on learning trajectories has also been undertaken in New Zealand. This arguably began with the development of 'The Number Framework'; a construct for promoting part-whole thinking in the early years of schooling (Higgins and Parsons, 2009). The framework reflects the belief that there are increasingly sophisticated ways of thinking mathematically in relation to early number concepts. Of note is the idea that knowledge and strategy are two interdependent components necessary for progress which echoes (although with fewer components) the competence notion of Kilpatrick *et al*. (2001). Higgins and Parsons (2009) argue that application of this number progression framework, alongside the use of a theoretical model of growth of understanding and participation in diagnostic interviews related to the framework, contributed significantly to teachers' professional development.

Since the development of this framework there has been significant work developing learning trajectories called 'Learning Progression Frameworks' from school years 1 to 10 (ages 5-14). For mathematics, the progression framework incorporates eight 'big' aspects:

- additive thinking
- multiplicative thinking
- patterns and relationships
- using symbols and expressions to think mathematically
- geometric thinking
- measurement sense
- statistical investigations
- interpreting statistical and chance situations.

Learning trajectories for each aspect provide stage (not age) illustrations of genuine learners' work and analysis of their response to tasks. These trajectories can be used to identify where a learner may be within each aspect of mathematics and what will be needed to ensure further progress. One point to note is that it is not clear from this current analysis whether any links *between* trajectories is made within the framework.

To conclude, this section has discussed the concept of learning trajectories in mathematics, how they have been developed and what they involve, and has indicated some of the learning trajectory work undertaken internationally. A common feature is the belief that learning trajectories should helpfully outline progress within a specific domain, not simply through accumulation of facts and concepts but through reflecting levels (or depths) of understanding. Developing a learning trajectory needs identification of 'big' areas whether these are related to content/process areas (as in the case of US, Netherlands and New Zealand) or whether these are related to progressive and interdependent areas (as developed in Australia). Both approaches arguably have their advantages

and disadvantages but what seems clear is that the development of learning trajectories can support teachers' understanding of progression within specific domains.

Summary and overall conclusion

- The notion of 'connectedness' and 'depth' or 'level' of understanding is strongly emphasised in literature related to progression in mathematics.
- Progression in mathematics is not a simple linear development.
- The ability to solve problems and reason with ideas and concepts related to specific content is also a key indicator of progress.
- Progress also relates to metacognition and self-efficacy. Such notions have already been identified in the Mathematics and Numeracy Strand 2 report.
- The research work that has been undertaken in relation to children's learning of mathematics could be used to inform understanding of progression and misconceptions in specific domains of mathematics.
- The work undertaken internationally to try to describe and map progression in specific domains through the development of learning trajectories could be useful, particularly as these seem to be underpinned by theoretical frameworks related to children's learning of mathematics and, perhaps more significantly, are also informed by evidence of children's learning.
- However the curriculum is ultimately organised and whatever the 'big ideas', it should be possible to map progression in a way that recognises the complex and multidimensional nature of learning mathematics.
- There is no single correct way of doing this; there is no universal 'truth' in this respect. However, it seems the countries that have developed seemingly coherent and potentially useful progression frameworks for progression have done so in a way that has been informed by research and is underpinned by theory about the way in which children learn mathematics.

Science and technology: Review of Frameworks

Introduction

In reviewing examples of progression in the specification of curricula, countries or regions were selected as meeting one or more of the following criteria:

- High performance in international comparative measures (e.g. TIMMS & PISA),
- Some evidence from research of student learning development
- Two official languages of equal status
- Similar aims to the ambition of a Curriculum for Wales

Documentation from seven jurisdictions was analysed in one or more of Science, Design and Technology and Computing.

Finland
Science
7 to 16 years old

http://oph.fi/english/curricula_and_qualifications/basic_education [retrieved April 2017]

https://www.ellibs.com/fi/books/publisher/0/opetushallitus [retrieved April 2017]

In Finland for children from ages 7 to 11, Science, along with health education, is part of Environmental Studies. From 11-13 years, pupils can then specialise in two areas (from either Physics and Chemistry or Biology and Physical Geography) with a similar time allocation; from the age of 13 onwards, pupils can study individual subjects.

Curricular content is structured around topics rather than big ideas and there are strong links between the illustrated learning experiences and curricular aims; consequently, this framework appears to promote deeper learning of fewer concepts in comparison to others considered here.

The 2004 core curriculum (basic education) is specified in terms of *broad aims* with *more detailed statements of objectives and core content* and *descriptions of good pupil performance* at ages 11, 13 and 16. Progression between these points must be inferred as it is not described in the documentation; this would require that teachers' understanding is sufficiently developed to shape formative assessment that effectively supports future learning.

In the case of *scientific practice*, objectives suggest that learning should move from developing care in observing and recording properties with a range of tools/techniques through to describing and interpreting, using more complex equipment. At this stage, learners would also be expected to carry out small scale investigations independently.

New Zealand
Technologies
4 to 18 years old

http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Technology [retrieved March 2017]

http://elearning.tki.org.nz/Teaching/Curriculum-areas/Digital-Technologies-in-the-curriculum [retrieved July 2017]

The New Zealand technologies curriculum is split into eight overlapping levels, each of which can span between 2 and 4 years. Three main strands run through these levels

- technological practice
- technological knowledge
- the nature of technology

Each of these has sub-strands with specific achievement outcomes at each level and indicators of progression. From 2018, these strands and sub-strands will be developed through five different contexts:

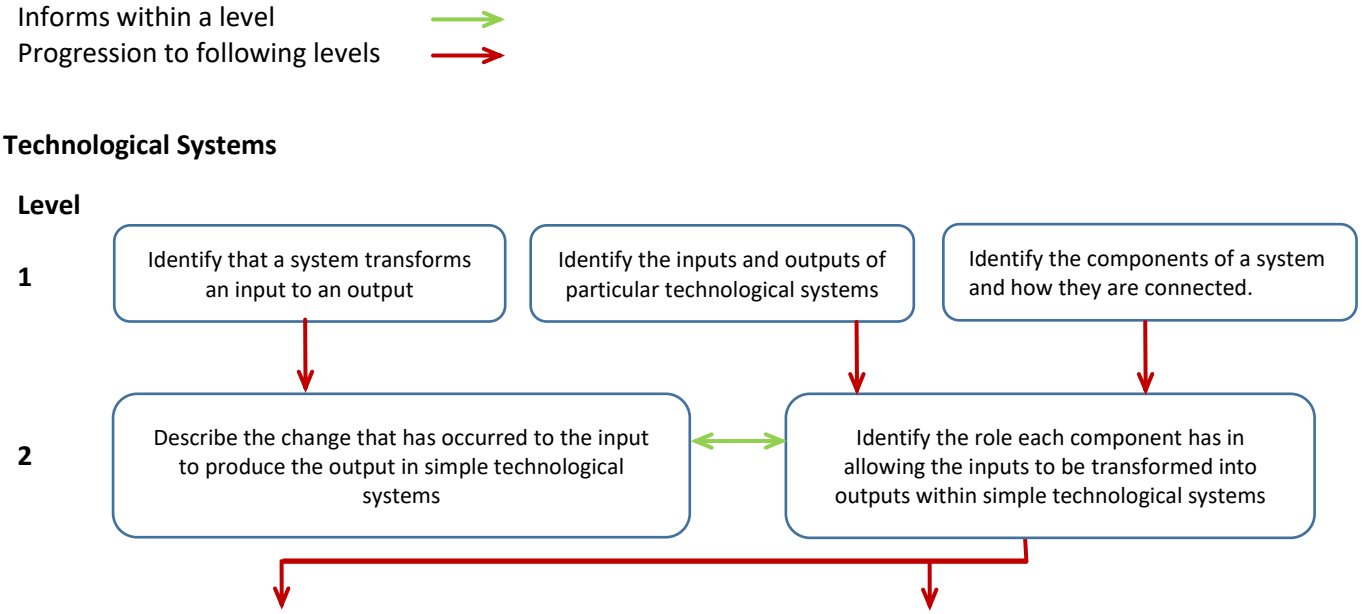
- computational thinking for digital technologies
- designing and developing digital outcomes
- designing and developing materials outcomes
- designing and developing processed outcomes
- design and visual communication.

Specific *progress points* and *annotated exemplification of pupils' work* at different stages are given for the first two of these contexts. This may suggest that already existing achievement indicators and indicators of progression were less capable of supporting learning and assessment in the creation of digital rather than in the case of physical artefacts.

Of particular interest is the inclusion of *network diagrams of progression indicators* (see *Figure 12*) to *illustrate links and interdependencies within a level and links to future learning.*

Figure 12

Components of Technological Knowledge: Indicators of Progression



These may act as useful tools to support planning for progression. However, the more generic nature of statements – without additional exemplification – assumes that teachers have the relevant domain knowledge to know what acceptable performances look like at different stages.

Ontario
Science and Technology
6 to 13 years old

http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec.html [retrieved March 2017]

From Grades 1 to 8, Design & Technology is part of the Science & Technology Strand of the curriculum. In grade 9 there is a general Technology subject; this leads into the study of specialised areas in grades 10 to 12 in school/college/university: e.g. communications, computer technology, manufacture, hairstyling, health care and transportation.

Progression is defined as the extension and deepening of learners' understanding of six fundamental concepts of Science and Technology:

- matter
- energy
- systems and interactions
- structure and function
- sustainability and stewardship
- change and continuity

As learning progresses, learners will apply their understanding with increasing sophistication. Big Ideas relating to the fundamental concepts are defined as '*the broad, important understandings that students should retain long after they have forgotten many of the details of something that they have studied*'. These feed into the overall expectations with extended detail and learning experiences which are described for each grade.

Progressive skills continua are defined both for discrete aspects of scientific inquiry and for technological problem solving; these continua are described as consisting of five stages (*beginning > exploring > emerging > competent > proficient*). Interestingly, however, development through the five phases is outlined in tables of four (not five) columns of descriptive rubrics and somewhat limited exemplification of increasingly sophisticated performance. Thus, for 'initiating and planning' within technological problem solving, progress in sophistication relates to such matters as identification, solution selection, planning and reasoning.

For knowledge and understanding and for general skills such as investigation and application, progression is articulated through four stages of increasing effectiveness (for skills) and four stages of increasing levels of knowledge or understanding. In both the skills continua and the additional curricular aspects, statements of progression are limited and largely relative (e.g. 'with limited', 'with some', 'with considerable'…) and, if considered without exemplification, would be unlikely to support formative assessment and future learning effectively.

Scotland
Computing Aspect of Technologies
4 to 15 years old

https://education.gov.scot/scottish-education-system/policy-for-scottish-education/policy-drivers/cfe-%28building-from-the-statement-appendix-incl-btc1-5%29/Experiences%20and%20outcomes [retrieved June 2017]

https://education.gov.scot/improvement/curriculum-for-excellence-benchmarks [retrieved June 2017]

Like New Zealand, Scotland has recently strengthened the area of the curriculum which deals with the digital aspects of technologies. This has involved a revision of the statements of Experiences and Outcomes, which describe curricular expectations, and the publication of benchmark statements to help teachers assess the level that a pupil is working within. There are five of these levels (early, first, second, third, fourth); during their Broad General Education (3-15), learners are entitled to learning that is specified by all of the experiences and outcomes up to third level; they may also access a number of the fourth level Experiences and Outcomes in the final years of Broad General Education (aged 14-15); the selection of these will be dependent on their achievement to date and on their intended choices of certificated courses in the Senior Phase (15+).

The two major divisions for the area of Computing are Digital Literacy and Computing Science. The three 'organisers' of Digital Literacy are:

- Using digital products and services in a variety of contexts to achieve a purposeful outcome
- Searching, processing and managing information responsibly
- Cyber resilience and internet safety

The three 'organisers' of Computing Science are:

- Understanding the world through computational thinking
- Understanding and analysing computing technology
- Designing, building and testing computing solutions

Computing Science gives equal weight to each of these three organisers. Their order in the document suggests that learning in the first two strands is important for developing fluency in the third. The focus and development through each organiser suggest learners will come to understand more complex concepts and patterns of interaction, independent of a particular language or tool, before they implement them in their own solutions.

Each organiser comprises at each level one to three statements of experiences and outcomes. Associated benchmarks can be used to indicate how securely learners have met these requirements. Benchmarks use performance orientated verbs for cognitive actions such as *recognises*, *identifies*, *describes* and for physical actions such as *creates*, *collects* and *simplifies*.

USA
Science & Engineering
Ages 3 to 18
https://www.nextgenscience.org/framework-k-12-science-education [retrieved March 2017]

https://www.nextgenscience.org/resources/evidence-statements [retrieved March 2017]

The Next Generation Science Standards (NGSS) in the USA use *performance expectations*, linked by cross-cutting ideas:

- patterns
- cause and effect: mechanism and explanation
- scale, proportion and quantity
- systems and system models
- energy and matter: flows, cycles and conservation
- structure and function
- stability and change

across four core domain areas:

- physical sciences
- life sciences
- earth and space sciences
- engineering, technology and applications of science

These four areas contain thirteen *disciplinary core ideas* (e.g. Matter and its interactions, Heredity, Earth's place in the universe, Engineering design). These performance expectations are to be understood in terms of increasing depth. Learners demonstrate performance through scientific and engineering practices. For each of these aspects, there is a *description of possible progression* over time, informed by *evidence of how learners progress*.

Each disciplinary core idea has four *grade band end-points* (summarised in *Table 13*) which sometimes have boundary conditions describing what will and will not be considered. Grade bands provide a scaled system for assessing learners' progress in the exploration of phenomena, from understanding individual features through to using and reasoning with accepted scientific models.

Table 13

> 7yrs	Macroscopic items that can be experienced and observed with naked eye.
7 > 10yrs	Invisible macroscopic items that can't be directly experienced and invisible microscopic items without considering their size.
11 > 13yrs	Cellular/atomic level without details of their inner structures.
14 > 17yrs	Subcellular and subatomic items.

These descriptions form the basis of *integrated statements of learner performance expectations*. These appear to include *tasks*, *criteria* and the *relevant core ideas, practices* and *cross-cutting concepts*.

The standards themselves are aimed at curriculum designers in individual states and have been criticised as containing too much content. There is some evidence in documents discussing assessment that the designers recognise a need to create rubrics or progress maps that detail intermediate and partially correct performances leading up to an end point usually based on the sophistication of understanding and ability to reason scientifically at the expected level. Descriptions of observable features of student performance have also been produced for each grade level which include indications of whether the pupil has been supported by the teacher or peers.

USA
Computer Science
Ages 3 to 18

https://k12cs.org/ [retrieved July 2017]

The Kindergarten to Grade 12 Computer Science framework superficially appears similar to the Next Generation Science Standards in terms of being organised using three aspects called *core practices*, *concepts* and *cross-cutting concepts*; but there are several important differences. The emphasis, in terms of detail, is focused mostly around the core practices rather than the concepts; the cross-cutting concepts are not described separately in detail but are instead embedded in the concept descriptions where appropriate. This reflects both the creation orientated nature of most Computer Science courses and the lack of research into how learning develops within Computing in general and Computer Science in particular. Core practices have a definite end point but the description of development is vague and it is unclear when learners are expected to develop more sophisticated forms of practice.

Like the Next Generation Science Standards, the concepts are organised within four end points: up to age 7, between 7 and 10 years old, between 11 and 13 years old and at age 18. Within Computing Systems and Networks and the Internet, one of the main patterns visible within these descriptions is a move from directly observable behaviour and hardware through to gradually more detailed models of the hidden layers underneath. In the descriptions for Data and Analysis another pattern is visible: the move from understanding high level behaviour through to more functional descriptions and finally to the underlying structures on the computer system itself.

For each of the concepts there is an overview of why, and the ways in which, the concept is important, followed by similar overviews for the sub-components and then the end points. These are each composed of a *concept statement*, *elaboration* and *examples* with optional boundary statements about what is not expected and a note of crosscutting concepts and other concepts within the framework to which this concept relates.

Observations & Considerations

- Almost all frameworks include statements that relate to learners' demonstration of understanding and application of big ideas.
- NGSS is the only framework that appears to be shaped by systemic use of research on learning progressions, though there insufficient research on learning progression in computing to draw definitive conclusions.
- In New Zealand, there is some evidence to suggest that using separate strands to describe the practices of Science and Technology in documentation can lead to these being treated separately in classrooms.
- Most frameworks provide snapshots of expected learner performance at different stages but few detail progression in learning between these, which would be of use where a learner is unable able to meet some of the end point requirements.
- Very few frameworks articulate stage expectations in terms of sufficiency for future learning (e.g. The learner is ready to…).

Science

- Patterns of progression specific to the Science domain:
  - Phenomena to be investigated at different ages and stages appear to be organised by scale, moving from Macro- through Micro- to Nano-scale
  - Similarly, phenomena to be investigated at different ages and stages appear to be organised by the extent to which they can be directly observed and experienced by learners or not
  - Scientific reasoning generally follows the pattern of moving from
    - > irrelevant/no idea to
    - > logical reasoning from everyday life to
    - > incorrect reasoning using scientific terms and concepts to
    - > partially correct reasoning without much justification to
    - > correct with incorrect justification to
    - > correct reasoning with suitable scientific justification.
- Big ideas most often relate to matter, energy, systems and interactions, structure and function and cause and effect.
- Common practices including scientific reasoning and/or argumentation and experimental investigation and/or inquiry skills.

Technologies

- Patterns of progression specific to the Technologies domain:
  - Understanding how digital systems operate generally moves through
    - > identifying and describing observable behaviour to
    - > learning and relating the behaviour to specific functions to
    - > understanding the underlying structure or mechanism in more detail.
  - As learners create physical or digital products the complexity, techniques and number of the steps involved increases with experience; the level of teacher support tends to reduce as learning develops.

- In computing, big ideas generally include algorithms and their basic building blocks, understanding data and data structures, and developing a more detailed model of the functions of individual and networked computers.
- Network maps (e.g. New Zealand) identify interdependence more explicitly, which, if augmented with more cross-strand linkage and detailed exemplification, would likely benefit formative assessment.
- Common practices include modelling and designing computational solutions, creating computational artefacts and being able to test, evaluate and refine these to meet better a range of user and performance requirements.
- Increasing effectiveness features as a discriminator of progression for problem solving in design and technology (Ontario).
- Additional guidance for the Scottish framework in computing recommends that building understanding of particular computational concepts and of how aspects of the systems or languages work should happen slightly before, or alongside, the ability to develop effective computing solutions, using those concepts independently.

Integration between Science and Technology

- The extent of integration of Science and Technology varies:
  - Science and Technology are treated as one area in the early years in Ontario
  - Science and some aspects of Technology blended together at all levels for the NGSS in the USA
  - they are defined separately in New Zealand, Scotland and Finland.
- Science and the Technologies have very different overall aims: balanced progression would avoid either focusing on Technology experiences with some scientific concepts or focusing on Science with some technology applications.

Science and technology: Research Review

Introduction

This report reviews some of the key research available in helping to understanding learning progression in areas of science and technology. As far as possible, it has been structured around the key areas of learning in the Science and Technology AoLE and gives insight into how progression is conceptualised and what is known about shifts in pupil learning.

Science

Nature of Science Education

Science Education plays a powerful role in allowing pupils to explore and understand the workings of the natural world. Its most widely accepted aim is to develop pupils' *scientific literacy* (Roberts, 2007). However, DeBoer (2000) notes the considerable disagreement over exactly what this should mean for science education: he describes the development of scientific literacy, in response to changing societal circumstances, from the importance of understanding science and the work of scientists following World War 2, through addressing a 'poverty' of scientific knowledge, to understanding science and scientific enterprise within its societal context. These more recent ideas of scientific literacy are noted by Erduran and Dagher (2014) as promoting the development of pupils' scientific reasoning in addition to conceptual understanding. Whilst Hand *et al.* (1999) argue that scientific literacy involves learners developing a range of wider habits of mind and ethical and civic dispositions, scientific understanding and knowledge and reasoning appear to play a central role. Holbrook & Rannikmae (2009) argue that science education can be expected to allow pupils to develop a range of skills and values and to solve problems of a scientific nature and is hence more than understanding the nature of science.

Most recently, OECD (2017) argues for the importance of scientific literacy for all as humanity faces such challenges as global warming, endemic poor health, malnutrition and sustainable development; the impact of these is felt in daily lives as well as globally. In the context of the PISA assessment programme, 'scientific literacy' is defined as:

> *knowledge of both science and science-based technology, even though science and technology do differ in their purposes, processes and products. Technology seeks the optimal solution to a human problem, and there may be more than one optimal solution. In contrast, science seeks the answer to a specific question about the natural, material world. Nevertheless, the two are closely related.* (p. 20)

OECD (2017) proceeds to argue that scientific literacy includes three areas of competence:

- explain phenomena scientifically (content knowledge)
- evaluate and design scientific enquiry (procedural knowledge)
- interpret data and evidence scientifically (epistemic knowledge).

Our understanding of learning across these aspects, as well of scientific reasoning and knowledge, benefits from extensive research interest. Kuhn (2010) describes 'scientific reasoning' as 'the intention to seek knowledge that transforms implicit theory revision into scientific thinking' (p. 499);

Erduran and Dagher (2014) consider that scientific reasoning features in particular cognitive practices that result in modelling, explaining and predicting. Many of these, such as modelling, can be quite demanding for pupils (e.g. Lehrer & Schauble, 2000) and require abilities such as pattern recognition, reflection (Bullock *et al*., 2009), understanding how hypotheses and evidence are related (Zimmerman, 2007) and curiosity in asking questions about things not yet known (Kuhn, 2005; Nayfeld *et al*., 2011; Jirout & Clahr, 2009; Jirout & Clahr, 2012). For primary pupils, there is evidence that proficiency in reasoning is linked to depth of conceptual understanding (Pollmeier *et al.*, 2017). Koerber *et al*. (2017) suggests that children's scientific reasoning moves through three hierarchical levels from naïve through intermediate to advanced. Such findings may be helpful when thinking about learning progression.

Learners develop knowledge of content which is structured and defined in a number of ways. Erduran and Dagher (2014) present a 'theories, laws and models' (TLM) framework that describes content that pupils can interrelate to generate scientific explanations and build knowledge. In chemistry, for example, atomic theory, periodic law and the atomic model allow the structure of matter to be explained; in many ways, these relate to 'Big Ideas' in science. Bernholt *et al*. (2012), argue that a big idea must possess explanatory power and/or scale that help in explaining a range of phenomena as well as being accessible by pupils and allowing them to think in powerful ways. Additionally, big ideas should provide a foundation for learning at a later stage. Several studies identify big ideas and unitary concepts either across science as a whole (e.g. Harlen & Bell, 2010) or in sub-areas such as astronomy (e.g. Lelliott & Rollnick, 2009). These include the model of matter, gravity, energy, and natural selection. Whilst these do specify what should be in a curriculum, they are concepts through which pupils can develop a deep and integrated scientific understanding rather than discrete knowledge of ideas in science.

The following sections identify some key findings and insights about learning progressions. These are often developed around 'big ideas' or unifying concepts and can incorporate practices such as scientific reasoning.

Progression of Learning within Specific Aspects of Science

Work on the development and validation of learning progression in science is widespread (Duncan *et al.*, 2016, Todd & Kenyon, 2016, Todd *et al.,* 2017). Krajcik *et al.* (2014) argue that learning progressions must include:

- big ideas
- levels of understanding
- validated assessments
- instructional components
- boundaries, rationale and connections.

This interim report recognises that there has been extensive work over a period of years into the development of children's understanding of scientific concepts and practices. Thus, the Children's Learning in Science Project (1984) (CLIS), based on a constructivist model of learning, explored children's own ideas around the science topics they cover in school science lessons, mainly in early secondary education, and used this to help improve the way teachers develop students' scientific understanding. One of the aims of CLIS was to provide a longer term perspective on changes taking

place in students' understanding over the compulsory school years. The Primary Science Processes and Concepts Exploration Project (1990) (Primary SPACE) investigated learners' ideas about science concepts. The results were used to provide teachers with descriptions of what they were likely to find if they explored the ideas of their pupils and to develop trial materials to help teachers to plan activities to take learners; ideas as a starting point in classroom work.

This interim report seeks to draw some key provisional insights from examples such as the atomic/molecular model of matter (e.g. Archer & Arcà, 2014), genetics (e.g. Todd *et al,* 2017; Elmesky, 2013; Roseman *et al*., 2006), ecological systems (Gunckel *et al*., 2012a), natural selection (Furtak, 2012) and energy (Duit, 2014). Learning progressions are considered 'hypothetical' until validated, and often refined, with pupils (see Duschl *et al.*, 2011). In the following sections, validated studies are drawn upon as far possible to inform upon how learning may progress in life, physical, earth and space sciences and scientific practices.

The PISA programme (OECD, 2017), designed to assess learners at one point in their learning, describes progression in terms of a scale of competence, founded on Webb's depth of knowledge taxonomy. The seven levels of the scale are intended to describe terms of the extent to which students use content, procedural and epistemic knowledge to provide explanations, design and evaluate scientific enquiries and interpret data in various situations. The planned opportunities which would move learners from lower levels of achievement to reach higher levels are not explored as is to be expected given that programme focus is on assessment.

Life Science

Many of the progression frameworks in this area tend to describe learning by moving from concrete thinking to abstract thinking and/or changing scale of phenomena. In the Next Generation Science Standards, for example, novice stages involve macro-level concepts (e.g. organisms) and advance with growing expertise to micro-level concepts (e.g. cells). These scales also reflect the shift from concrete to abstract that is both familiar and, in some ways, intuitive. However, Elmesky (2013) presents a hypothetical Kindergarten to Grade 12 learning progression for genetics that introduces some simple cellular and inheritance concepts at an earlier stage to encourage greater links between the macro and micro-scales. This is based on evidence from, among others, Toyoma (2000) and Inagaki & Hatano (2004) that learners are capable of more sophisticated reasoning at earlier stages than frameworks typically suggest. This progression consists of three main phases:

1. Early primary: gradually developing the ability to classify things as living/non-living, animal/plant, and finally unicellular/multicellular; understanding the basic relationship between structure and function and inherited traits of offspring.
2. Late primary to lower secondary: understanding cell-splitting and genetic inheritance as trait expression.
3. Middle to upper secondary: exploring the concept of genetic inheritance as protein expression.

Ergazaki *et al*. (2015) show that pre-school children are capable of quite sophisticated scientific reasoning about inheritance, something often considered to be too abstract for them. These studies suggest there may be implications for how scale is used and the development of understanding by moving from concrete to abstract thinking. Simons and Keil (1995) highlight that the foundations and precursors of abstract ideas can indeed be developed at earlier stages; Duschl *et al*. (2007) find

further evidence that children's abstract thought processes are often precursors to more concrete ideas. Relying on the use of simplified models at early stages can feed misconceptions at later stages of learning.

Drawing on four key existing frameworks, Todd *et al*. (2017) tested a learning progression for genetics comprised of 12 constructs including 'proteins do the work of the cell', 'cells express different genes', and 'DNA varies between and within species'. Significant learning was observed along each of these constructs as pupils' knowledge developed; learners progressed least in their understanding of meiosis, allele arrangements, chromosomes and chromosome combinations. Rather than simply building knowledge of different concepts, the study shows that more developed expertise requires that pupils understand the interrelationships between the genetic, meiotic and molecular models (see Stewart, Cartier & Passmore, 2005).

Recent studies creating learning progressions related to water, carbon and bio-diversity noted that the big ideas had an aspect of ethical decision-making as well as subject understanding (Gunckel *et al.,* 2012b; Jin & Anderson, 2012; Mayes *et al.*, 2014, Spencer, 2016). Moreover, learners' ethical perspectives were culturally influenced, which suggests that learning progressions should focus socio-culturally as well as the cognitively. McGinnis & McDonald (2011) review work on learning progression in more socially-orientated dimensions of science such as climate change.

Physical Science

While some studies explore smaller ideas, the particle nature of matter and energy form two of the key ideas in this area. The former facilitates the understanding of a range of other processes and phenomena such chemical bonding and phase change (e.g. Chui & Wu, 2013), whilst the latter constitutes a unifying concept across science (Duit, 2014).

Merritt *et al*. (2008) present a 6-stage progression framework for the particle model of matter based upon existing research and empirically tested learning gains with 6th grade pupils. As shown in *Table 14*, developing complexity moves from descriptive and mixed models (1-3) through to partial and then complete models (4-6).

Table 14

Level [of Complexity]	Category	Particle Model
6	Complete Particle	All relevant substances are made up of particles. Particles are identified as atoms/molecules. The particles are in motion relevant to a particular state, for example, in the gaseous state, there is empty space between the particles and the particles move randomly.
5	Basic Particle	All relevant substances are made up of particles. There is empty space between the particles. The particles are in motion.
4	Incomplete Particle	A substance is made up of particles. There is empty space between the particles.
3	Mixed	Combines both particle and continuous ideas. The substance is made up of particles within a continuous medium.
2	Continuous	No notion of particles
1	Descriptive	Describes what is happening in words and/or draws an exact replica of phenomena
0	No response	No response or nonsense response.

Useful insight can also be gleamed from Black & Wilson (2010) who use the particle model of matter to develop 'roadmaps' to learning. Though not progression frameworks per se, they attempt to map conceptual dependency useful to planning learning for progressive understanding. Several other studies also examine how conceptual understanding develops.

Liu & Lesniak (2006) show that learners' descriptions of understandings generally progress from characteristics they can perceive, uses and benefits, through physical properties and change, to chemical properties and, ultimately, the particulate model. Similarly, a recent study by Hadenfeldt *et al.* (2016) shows that more sophisticated and complete understandings of matter required an understanding of: (i) structure and composition, (ii) physical properties and change, (iii) chemical reaction, and (iv) conservation.

At a finer conceptual level, Johnson (2013) shows that learners find understanding gases, liquids and solids progressively difficult and speculates that misconceptions and relative difficulty might be mitigated by a substance based approach to teaching (rather than structuring learning around solids, liquids and gases). Additional insight into phase changes by Chiu & Wu (2013) identified early, middle and late development trends using seven models of phase change, whilst Morell and Wilson (2016) found evidence of three levels of explanation of chemical change.

As a unifying concept, there is evidence that pupils hold misconceptions about energy (e.g. only things in motion have energy), but also that there is a degree of consensus about how learning progresses. Herrmann-Abell & DeBoer (2014) evidence a spread of misconceptions helpful in ordering understanding for a range of ideas (e.g. knowing that motion energy depends on speed

comes before knowing motion energy depends on mass). They also recognise that novice learners tend towards more human-centric understandings.

Notably, relatable and human-centric understandings appear elsewhere in the early stages of understanding. Duit (2014) reviews key learning progressions (Liu & McKeough, 2005; Driver *et al*., 1994; Neumann *et al*, 2013; Liu & Park, 2014), which collectively evidence understanding shifting from forms and sources of energy to which learners can relate to transformation, degradation and, finally, to conservation. Such evidence is important to shaping progression frameworks.

Earth and Space Science

A number of useful studies have explored learning progressions for celestial motion and the formation of the solar system. Plummer & Krajcik (2010), for example, present four learning trajectories (sun's path of motion, motion of moon, pattern/visibility of stars with seasons, appearance of the moon), each of which has its own explanatory model that they argue should collectively allow pupils to progress towards a more sophisticated understanding of 'celestial motion'.

Importantly, such progression does not represent how learners' understanding naturally develops (Plummer, 2012). Arguably, the sophistication of explanation that can be achieved depends also upon pedagogical sequences and approaches that address earlier barriers to later understanding. There is, for example, evidence of order-of-presentation effects where learners move more easily from naïve to more scientific understanding of daily celestial motion (earth, sun, moon, stars) when they know about the relative scales of entities and cosmological distances first (Plummer, 2012). In a review of studies, Mills *et al.* (2016) highlight related difficulties with explaining phenomena such as seasonal variations. These studies raise questions about whether simplifications of particular models used at earlier stages of teaching might inhibit future understanding. Moreover, Plummer *et al*. (2015) found that children's tendency to omit the role of gravity in planet formation inhibited more sophisticated understanding and that instruction should include this from an earlier stage. Such evidence suggests that, where possible, consideration should be given to the relationship between learning progressions and associated pedagogy.

Computing

Nature of Computing Education

Progression frameworks in science (Corcoran *et al*., 2009; Duschl *et al*., 2011; Heritage, 2008; Merritt *et al.,* 2008) and learning trajectories in mathematics (Clements and Sarama, 2004; Ellis *et al.*, 2016; Land and Drake, 2014; Stephens *et al.*, 2016) contain a wealth of information regarding possible models of progression. However, this type of understanding is at a much early stage for computing generally and, in particular, computing science (Webb *et al*., 2017). As many different countries around the world (Hubwieser *et al*., 2012) move towards a model of providing some computing science for all learners, it has become increasingly important to identify suitable learning goals (Rich, Strickland and Franklin, 2017).

Much of the existing work on how learners' understanding develops is focused either within the domain of computational thinking (Wing 2006) or programming (Lister, 2016). Wing (2011) defines

computational thinking as 'the thought processes involved in formulating problems and their solutions so that the solutions are represented in a form that can be effectively carried out by an information processing agent'. She also argues that the abstractions formed in computing are different to those formed in mathematics or physics because they deal with more complex situations which often have many interacting parts and generate a wide range of possible outcomes. Wing (2008) goes on to explain that 'In working with rich abstractions, defining the 'right' abstraction is critical'. Colburn and Shute (2007) also argue that the use of abstraction in computer science is fundamentally different from mathematics as it is concerned with understanding and creating patterns and levels of interaction both within and between computers and humans. There is also debate (Stein, 1999) about whether the current dominant, calculation based, model of computing defined by the simple input-process-storage-output view of Von Neuman and Turing adequately captures the interactional nature of modern computing. This, and the failure to acknowledge and build on learners' cultural knowledge as users of technology (Kolikant, 2011), may explain why learners often fail to connect with traditionally defined computing science curricula.

Guzdial (2016) argues that understanding computing requires developing a consistent mental model of the computer – what it can and cannot do. Ben-Ari (2001) also claims that a model of a computer must be explicitly taught; otherwise students will inevitably develop their own haphazard and non-viable mental model. Given the large number of layers of abstraction that typical computer systems are built upon (Gobbo and Benini, 2014) this would initially seem an almost impossible task within the context of school education. However, this model, often referred to as the notional machine (Du Boulay 1986), only needs to be sufficient to support the understanding of the structure and actions of an application, system or programming language, rather than reflecting the lowest levels of computer operation (e.g. logic gates manipulating bits). The need to develop learners' ability to trace code (Griffin 2016; Kumar 2013; Lopez *et al*., 2008; Nelson *et al*., 2017; Venables *et al*., 2009) to improve code writing skills, even in early programming environments like Kodu (Touretzky *et al.*, 2017), lends further weight to the idea of the importance of explicitly sharing and developing notional machine understanding in computing.

A big challenge is that the model of computation learners experience determines the type of notional machine understanding they need to develop at any particular point in time. For example, the underlying model of computation for Kodu (Touretzky *et al.*, 2017), Scratch (Resnick *et al*., 2009), Snap (Harvey & Mönig, 2010) or an environment specifically for building scientific simulations like Star Logo TNG (Begel & Klopfer, 2007) work in very different ways to many text-based programming languages (Kelleher and Pausch, 2005). Early programming environments tend to be event-driven and object-based with many sets of instructions attached to the objects executing in parallel as a set of interacting influences. This contrasts with the mostly sequential and explicitly coordinated nature of procedural or object-orientated text-based programming languages (Armoni *et al.*, 2015). Fortunately, there are a number of shared concepts between most block-based and textual languages. Several studies (Armoni *et al*., 2015; Grover *et al.*, 2014; Weintrop and Wilensky, 2016) have shown that starting with block-based programming in primary and early secondary has a positive effect when transitioning to text-based languages when teachers consider how to effectively bridge between them.

Progression of Learning within Specific Aspects

Abstraction is often identified as being central to computer science (Hazzan, 2008; Rich, 2017; Wing, 2008) but has a multitude of different meanings (Colburn, 2007). It can refer to aspects of a particular piece of software or different processes people undertake when creating computational solutions. To achieve more sophisticated thinking, there are three distinct skills in abstraction (Hill *et al.*, 2008) that learners benefit from gradually developing:

1. Conceptual abstraction: the ability to move back and forward between the big picture and smaller details.
2. Formal abstraction: how to remove or simplify details in the problem domain in order to create a workable computational solution.
3. Descriptive abstraction: how to identify the most important characteristics in order to generalise a solution so that it can solve a greater range of problems.

The development of programming ability is still an active area of research; several attempts to adapt generic frameworks of cognitive development, such as Bloom's or SOLO taxonomies, to the field of computer science have had varying levels of success. There is also a growing body of empirical work, summarised in Teague (2015), which examines the behaviours of novices at different stages of their development of programming knowledge:

1. In the beginning, the computer has powers of interpretation and the learner cannot identify and distinguish between different parts of the programming language – built-ins, variables, literals, function and procedure calls, etc. Later on, they start to understand the sequential nature of code and the relationship between a variable and its value.
2. They focus on specific parts of the code and can only trace code line by line, using concrete values to understand its behaviour. They struggle to write code to undo an effect or reverse an action and cannot refactor the code while retaining the same behaviour. Explaining in plain English what a piece of code does is difficult as is seeing how different parts work together to create a more complex action.
3. They can trace code abstractly without having to substitute in concrete values and can explain code in plain English. They can write code to undo an effect or reverse an action and reason about loops without just focusing on the beginning and end states.

These stages were found to be sequential but with overlapping waves that related to whether the programming constructs and techniques needed were familiar or just newly introduced. Linked to this is wider evidence of links between decoding, tracing, explaining and code writing skills (Lopez *et al.*, 2008; Venables *et al.*, 2007; Tan and Lister, 2009). Although not a strict hierarchy, basic identification of concepts within code is linked to tracing ability and this, along with explaining code, makes a large contribution to being able to independently write code (Lopez *et al.*, 2008; Venables, *et al.*, 2007).

Within the context of primary and secondary education, a number of studies assess the relative difficulty of particular programming concepts (Seiter & Foreman, 2013). Young learners can create programs, using coarse grained movement within a 2D grid (Franklin *et al*., 2017), events, sequences of costume changes and movements, unconditional and fixed repetition, and simple conditional statements that do not use Boolean operators. More difficult concepts, even for late primary stage children and early secondary stage, are the initialisation of multiple sprite properties, complex

conditionals with Boolean operators, simple variables, lists and procedures (Aivaloglou *et al.*, 2017; Franklin *et al*., 2017; Rivers *et al*., 2016; Seiter & Foreman, 2013). As contexts for learning, stories, animations, games and simulations reflect increasing complexity of programming concepts and appeal to the broadest range of learners. Curricular approaches based on teaching behavioural patterns, rather than constructs, such as Scalable Game design (Repenning *et al*., 2015) provide one possible way to motivate and scaffold the gradual development of the understanding of computational concepts.

Design and Technology

Nature of Design and Technology Education

Research in Design and Technology (D&T) remains limited when compared with educational fields such as science and mathematics and, with relatively few studies that explicitly consider the nature of learning progression, this continues to be debated and is not yet well-understood (Barlex, 2007; Keirl, 2015; Mawson, 2007). Furthermore, tensions are evident. As the literature is limited, a range of sources and older studies are purposefully included as well as key contributions by Jones, Kimbell, and Compton & Harwood.

In contrast to science education, in which pupils seek to develop an understanding of the existing natural world and universe around them, D&T is concerned with the designed or human-made world and with the creation of that which does not yet exist (De Vries, 2005). According to Barlex and Rutland (2003), D&T 'engages pupils with thinking about the made world and how they might intervene to change it' (p. 171). This generative dimension of D&T means that it is insufficient for a pupil to build up knowledge and understanding about or related to technology; it further requires them to use their understanding in ways that shape effective technological solutions. It requires pupils to understand and re-conceptualise (Stevenson, 2004), rather than simply apply, a wide range of knowledge and understanding from diverse fields, including psychology, economics, markets, ethics, aesthetics, engineering, mathematics and science. Importantly, this 'bringing to bear' of factors by pupils towards a successful end is referred to as 'operationalisation' and may play an important role in progression for this subject area. De Vries (2005) argues that while truth is the ultimate condition for science, effectiveness is the ultimate condition for technology.

Barlex (2017) states that D&T allows pupils the unique opportunity to develop a technological perspective on the consequences of technological outcomes and activity as well as the capability to design and make. These evaluative and creative dimensions are extensively reflected elsewhere (e.g. Solomon & Hall, 1996; McCade, 1990; Williams, 2000). In addition, others promote the socio-cultural dimension of technology education; shifting its locus from its historical vocational roots (e.g. Petrina, 2000, Williams *et al*., 2015). Pupils' engagement with this spread of learning in D&T requires that they develop and use knowledge, skills and dispositions in an often heavily situated and contextualised way (Hennessy & Murphy, 1999). Doing so contributes greatly to the four purposes articulated in *Successful Futures* (Donaldson, 2015). McCormick (1997) recognises the place of conceptual (knowing that) and procedural knowledge (knowing how) in D&T; although what constitutes 'technological knowledge' is not fully understood, it is thought to have a large procedural dimension that becomes more implicit and 'hidden' as proficiency increases (Herschbach, 1995). In classrooms, this is commonly evident in practical work. Hill & Wicklein (1999) validate and extend a

range of intellectual and cognitive processes identified by Halfin (1973) from the analysis of expert and pupil technological activity. These include analysing, predicting, designing, measuring, managing and visualising and are used cyclically by pupils in problem solving and design activity (Mioduser & Kipperman, 2002). In examining these, it is necessary to recognise that conceptual understanding and processes cannot be readily separated in learning.

Progression of Learning within Specific Aspects

Problem solving, particularly Design, has come to feature prominently within technology as it facilitates generative and evaluative dimensions of the subject. It provides a means by which pupils can develop and use knowledge, understanding and skills towards realising a technological solution (Middleton, 2005). It is also closely linked to creativity. Despite creativity being widely explored in D&T research, progression in associated learning is not yet well understood. It may be, for example, that shifts can occur in novelty of idea, materials and complexity (Denson *et al.*, 2015) or aesthetic, technical or constructional creativity (Rutland & Barlex, 2008). Arguably, forms of diversity, novelty and synthesis play a role in all of these. A significant study by McLellan & Nicholl (2011) demonstrates that fixation effects (the natural tendency to adhere to a limited set of ideas or notions) limit pupils' diversity during design activity (for fixation, also see Jansson & Smith, 1991; Purcell & Gero, 1996). One implication of this might be that progression involves pupils overcoming cognitive fixation in a way that allows them to engage in a more varied range of considerations. The study by McLellan & Nicholl suggest pedagogy plays a significant role in this and others have argued that overly sequential or linear approaches to design stifle creativity (e.g. Liddament, 1996; De Vries and Tamir, 1997; Roberts and Norman, 1999; Compton & Harwood, 2003). Some useful insight into progression and assessment of creativity are explored for education generally by Spencer *et al*. (2012).

From a capability perspective, Kimbell (1994), considers progression in design quite broadly as increasing sophistication and complexity. This is in part because he believes that viewing progression in more holistic terms, with additional description, is more reliable and valid when summatively assessing and judging pupil work (see Kimbell, 2012). Similarly, Moreland & Jones (2000) urge teachers to focus on processes, concepts and products *integratively* to develop a holistic and comprehensive picture of student progress. Cross (2004, p. 431) recognises 'integrated design strategies' as a feature of successful expert-level design.

While holistic approaches to painting a picture of progression may be useful for summative assessment, there is evidence that holistic learning outcomes are less effective in supporting formative interactions between pupils and teachers (Compton & Harwood, 2003). These findings arise from extensive exploration of progression in D&T in New Zealand. A key contribution from this body of work is a set of empirically validated and exemplified 'components of practice' as a means of articulating progression (Compton & Harwood, 2005). These include 'brief development', 'planning for practice', and 'outcome development and evaluation' and attempt to capture the interrelation of achievement outcomes as a function of pupil performance. More recently, Compton & Compton (2011) refined indicators of progression for the 'Philosophy of Technology' strand of D&T in the NZ curriculum using pupil/teacher interviews.

Design and make tasks can be both extended and complex. Additional insights are given by studies that compare pupil performance, either at different educational stages or within a given task, typically involving a conceptual and practical phase. As with Kimbell (1994) and Compton & Harwood (2005), these suggest that rather than progression being reflected in the development of discrete packets of knowledge and understanding, it is better reflected in the depth, complexity and interrelatedness of factors in pupil thinking when *operationalising* knowledge and understanding. In fact, Compton & Harwood (2005) argue that viewing progression in terms of knowledge and understanding is not particularly useful in technology education as, in the absence of a clear understanding of what constitutes 'technological knowledge', much of this is native to other fields. Importantly, however, this stance on indicating progression does not mean that knowledge and understanding should not be defined within the curriculum. As a subject, D&T is often criticised as conceptually under-developed and overly procedural; careful consideration is required in determining the role of, and relationship between, different types of knowledge. Valuable insights into this are found in studies by McCormick (1997), Ropohl (1997) and Banks & Plant (2013).

Jones (2009) posits that progression must move beyond binary judgements of 'can' and 'cannot', and that it does not constitute doing something extra and different. He presents four categories of progression (Jones & Moreland, 2003) tested with 8 and 12 year olds:

(i) the nature of technology
(ii) student technological practice
(iii) generic
(iv) specific conceptual, procedural, societal and technical aspects.

Interestingly, it was shown that more developed learning involved:

- consideration of a greater number of functional alternatives, conflicts in demand and relationships between variables
- more developed use of technical language and an ability to operationalise more task variables
- active consideration of several variables (rather than just a single variable) in relation to suitability of materials and functional effectiveness
- a greater ability to predict material suitability for given functional requirements
- greater use of compare and contrast processes in material choices
- encapsulating greater level of consideration in drawings, with a greater likelihood of integrating these with written content and visual representation from more than one aspect in 3D rather than 2D
- an ability to identify more positive and negative societal impact beyond those affected most immediately.

These shifts reveal the types of detail and complexity to which Kimbell (1994) refers. Two further studies, McLaren & Stables (2008) and Morrison-Love (2015), augment this and suggest that reflection and metacognition are associated with more developed learning. The former, undertaken with pupils transitioning from primary to secondary school (10-13 years old), demonstrated that higher performers engaged in a deeper level of reflection of their own work and of that of others. Data revealed higher performers gave more consideration to aspects such as idea feasibility and considered a greater variety of factors when doing this than lower performing pupils did. Though the number of factors is highlighted in all three studies, Compton & Harwood (2005) caution that

variable count alone does not indicate the depth or quality of pupil interaction and is, by itself, insufficient as a measure of progression. McLaren & Stables report more generally that lower performing pupils appeared to be less aware of their own learning, again suggesting that, in this context, metacognition may be significant.

Morrison-Love (2015) compared higher and lower performing pupil groups at age 12-14 years who completed the same design and make task. This study examined the real-time in-task interaction and task outcomes for pupils and reported similar findings to both Jones (2009) and McLaren & Stables (2008). Here, higher performing pupils made more extensive use of what Morrison-Love terms 'declarative reflection' and, more notably, 'analytical reflection'. The former of these refers to general judgements (e.g. 'that's good' or ' that'll work'), whilst the latter reveals knowledge of relationships between variables associated with the developing solution or task context (e.g. 'moving that part will make this part more rigid'). Critically, the use of analytical reflection requires a deeper qualitative knowledge of the developing solution and indicates more developed learning and understanding. Additionally, more successful groups:

- spent longer in the conceptual development of ideas prior to construction
- had a more secure grasp of objective knowledge about structures
- translated more prior conceptual understanding into their physical solutions (a form of modelling), with greater practical efficacy.

During solution development, the process was managed more pro-actively with fewer negative managerial and social traits. Mawson (2007) identified that a positive disposition towards risk taking was associated with a higher level of achievement for pupils in their first 3 years of school. Risk taking (also discussed by Keirl, 2004), and thirteen other possible lines of progression including autonomy (from teacher as source to autonomous decision-making), creativity (constrained to generative) and problem-solving (simple to complex) are theorised by Martin (2003), though no evidence is present of validation in practice. These are, however, useful as they conceptualise less and more developed learning in characteristic aspects of D&T. In the case of problem-solving in D&T, ill-defined problems (see Frensch & Funke, 1995) generally require deeper and wider engagement by pupils as the understanding of the problem and the solution co-evolve; this is recognised by Cross (2004) as characteristic of expert-level design.

As well as elements of design thinking, these forms of technological activity encapsulate aspects of graphics and practical skills, knowledge and processes (see Baynes, 1992). Evidence on progression in sketching is limited though, as noted by Danos & Norman (2011) – drawing on Kellogg, Gaitskell, Lowenfeld – it does appear to develop through a number of fairly consistent stages from scribbling (circa 1-2+ years) through symbolic/schematic/pictorial stages (circa 5-8 years) to realist and natural stages (circa 12-16 years). Within and across these stages fine motor skills develop with various media and, in the latter stage, children begin to use light, shadow, 3-dimensionality and visual exploration. However, insightful exploration of this within Design & Technology classrooms is also limited. In this context, sketching requires interaction between the imagined and something that could exist in the physical world (Baynes, 1992). Welch *et al.* (2000) show that sketching is not something pupils naturally engage with to explore design ideas (favouring, for example, 3-dimensional modelling); they recognise that pupils find visualising (or imaging) and then sketching (or modelling in 2D) ideas on paper demanding. In a primary school study of technological capability, Anning (1993) notes that children struggle to master scale, spatial orientation and overlap and that

there is some evidence they can represent forms more easily after they have constructed or physically interacted with them.

Key Considerations

Learning progressions can be thought of as frameworks of achievement – statements that support learners in reaching more sophisticated levels of understanding. Collectively, the studies reviewed demonstrate that this does not happen by chance. Learning progressions in science and technology involve considering dependencies between different ideas, concepts, contexts for learning, reasoning, misconceptions and pedagogy. Doing so will help to more reliably shape the form, structure and order of the achievement outcomes that help pupils to build deeper understanding in effective ways. Possible considerations about this include:

- How might existing learning progressions (e.g. genetics, energy) be used to shape possible learning progressions for science and technology?
- How might learning progressions be designed to avoid known misconceptions (e.g. introducing true scale/complexity before simplified models)?
- How can achievement outcomes reflect what is understood about the nature of more sophisticated learning in science and technology and how, if at all, do they capture links with pedagogy?
- In Design and Technology and Computing, how might learning progressions capture deeper understanding of key concepts and avoid being overly procedural?
- What is the role of modelling and what should the balance be between pupils using models to develop understanding and creating models of their own?
- Should systematic thinking and spatial abilities be integrated to assist with the understanding of scientific and technological ideas?
- Which programming paradigm or paradigms and concepts provide a firm foundation for future study in Computing and also allow learners to transfer their learning to other areas of Science and Technology?

Section 3: Exploring teachers' understandings of progression

Introduction

As described in the section on methodology, the CAMAU project is built on principles of partnership and collaboration which include recognising teachers and other practitioners as co-researchers. Between April and July 2017, much of the collaboration with the teachers who participated in the six AoLE groups focused on the articulation of the teachers' understanding and conceptualisation of learning progression. This represented, for many teachers, a new approach to thinking about learning; previous articulations of the curriculum in Wales had tended to place greater emphasis on curriculum specification and/or statements of standards tied to specific ages than on progression in learning. The thinking emerging from this work was used to inform activities in the CAMAU project from August – December 2017, including the evidence base for the decision tree workshops.

Information relating to teacher perceptions of progression in learning was generated through using a range of methodologies which acted as prompts to support the articulation of their thinking about progression. The teacher's role was that of co-researcher, contributing consciously to the process of developing empirically well-founded descriptions of learners' progression journeys. The aim of this phase was to draw on teachers' practical experience to obtain description of pupils' actual progression in school work, which would contribute to the learning progression frameworks.

The information discussed in this section was gathered in the early stages of the research project and thus illuminates early stages of thinking in the CAMAU project on progression in learning. The close relationship of the CAMAU work on progression to the identification of what matters – indeed its dependency on it – meant that, over the period of interaction with the AoLE Group in Phase 1 of the project where ideas about what matters were in the process of development, the CAMAU team adapted tasks to take account of the broad direction of thinking within an AoLE about what matters.

Information on teachers' developing ideas of progression was obtained from:

- Materials prepared for the teacher workshops
- Completed 'feedback proformas' from a range of activities e.g.
    - Time 1-Time 2: teachers were supported to articulate their views of learner progress across a period of time
    - critical examination of aspects of progression frameworks from other countries
    - CoRE (Core Representation) (Eames *et al.,* 2011; Loughran *et al.,* 2004): this approach involves identifying areas of knowledge or skill that seem central to learning in an AoLE.
- Shared notebooks (using OneNote) in which groups recorded their discussion as they sought to develop statements of progression
- Teacher feedback cards on the processes in which they were participating
- Reflective notes from CAMAU staff.

Four research questions were developed by the CAMAU team and used to analyse the data: firstly to explore evidence of teachers' understanding of progression in learning emerging from the data and secondly to consider the efficacy of different approaches to the collection of evidence of teachers' understandings of progression:

- What evidence on progression emerges from teachers' articulations of progression in learning in their classrooms?
- What are the characteristics of learning identified?
- What types of activities led to teachers articulating their understanding of progression most effectively?
- What sorts of group structures and size supported such activities?

Information related to the first two of these questions is considered in this section.

While there were aspects common to several or to all AoLEs, there were also considerable differences between the views articulated in different AoLE groups. The next section summarises the findings AoLE by AoLE while a final section notes common features and conclusions.

How did teachers conceptualise learning progression?

Expressive Arts

When teachers were asked to describe *actual pupil progression in learning* for an aspect of learning in Expressive Arts they first debated whether to consider progression generically in the arts, bringing together under common headings progression in Film and Digital Media, Music, Drama and Art, or whether to recognise that, in addition to any generic skills that apply across these aspects, there are also specific skills for each subject area. At this stage, a generic approach was of concern to many secondary teachers, who were unsure of their own skills in teaching outside their own area of expertise. Discussion tended to explore pedagogical or organisational matters (e.g. collaborative interdisciplinary planning and teaching) rather than progression. The primary teachers generally favoured a generic structure without content description or assessment in the separate areas of the arts.

During this discussion about generic versus specific skills, the group identified some generic elements of 'what matters' as the basis for progression descriptors within three parameters:

- Exploring and Experiencing
- Creating and Expressing
- Responding and Reflecting.

Within these parameters progression in the arts was conceptualised as increasing sophistication or complexity.

Alongside the discussion around the adoption of a generic approach to progression using these three parameters, discussion in the second workshop focused on how assessment might be supportive of progression in *competence in Expressive Arts* and *confidence in engaging with Expressive Arts*. There was also at this stage recognition and discussion of how progression might be designed to be consistent with wider aspects of Successful Futures, for example, to be supportive of assessment for learning, to provide opportunities for occasional summaries of achievement and to include broader, cross-curricular and wider developmental outcomes of the Expressive Arts.

Teachers expressed interest in the model of the British Columbia Arts Curriculum as the basis for developing a progression framework in this AoLE. The British Columbia curriculum specifies generic Achievement Outcomes at each stage of learning (i.e. year groups), and includes descriptions of

increasing sophistication and complexity for each outcome in each of the Expressive Arts areas. One group was attracted to an approach taken by a school in Wales that defined progression as: *beginning to make progress; making progress; achieving potential; exceeding potential*. This group believed that a combination of this and the British Columbia model would be a good basis for defining progression.

After further discussion primary teachers proposed a wholly generic structure to Expressive Arts, without either description of content or assessment in the separate arts areas. This proposal led to discussion about how generic or detailed the descriptions of key progression steps should be. The majority of secondary teachers came to agree that key progression descriptors should be generic rather than related to specific content or skills, though concern was raised that this could lead to a lowering of standards.

There was recognition across primary and secondary teachers of the need to describe both 'processes' and 'outcomes'. Some participants, particularly those with expertise in Additional Learning Needs, were keen to identify key skills relevant to generic Expressive Arts, across the three areas and proposed a similar approach to that adopted in *Routes for Learning (RfL),* which outlines descriptions of progression which may be used to support learners with additional needs:

> *RfL … is a method of recording and celebrating individual progress in very small steps, in particular to recognise the 'lateral' progress made by learners with PMLD [profound and multiple learning disabilities] through the identification of small step milestones.* (Pittaway, 2017, p. 2)

The next meeting afforded teachers an opportunity to consider in depth issues related to 'interdisciplinarity' in Expressive Arts, as against 'subject' approaches. The intensity of debate about generic versus specific (subject) factors and about the value of Expressive Arts to young people's education and development as people meant that the Group as a whole found it difficult to focus sharply on the business of describing learning in terms of *progression* (though teachers at different stages of education and in different arts areas spoke with enthusiasm and passion about particular kinds of success that their pupils had demonstrated at particular stages). As yet, no clear, coherent, agreed set of ideas was emerging about how the Group would address the business of writing descriptions of learning or progression – it had, however, identified a broad set of 'what matters' ideas which could form a solid basis for eventual description of learning.

Activities during this workshop provided evidence that many teachers in the Group articulated good ideas about desirable provision and pedagogy in the Expressive Arts and about practical issues in ensuring that pupils' will enjoy beneficial experiences in this area of learning. Some also showed awareness of key aspects of learning in the area. However, there was less illumination of their thinking about *learning progression.*

Health and Well-Being (H&WB)

Analysis of teachers' responses indicates that overall (although there were exceptions), there was an inclination towards describing progression in terms of a body of content: teachers often listed words such as 'making health choices', 'somato types', 'strength' or 'flexibility' that indicated content rather than progression. The THRIVE approach (www.thriveapproach.com) was noted as a basis for structuring the 'what matters' progression statements for emotional development, indicating again

that teachers in some groups were more focused on content rather than progression. This focus on content was perhaps a consequence of teachers working in the AoLE to determine what content or themes should be included in H&WB, which, unlike the other AoLEs, could be described as a new discrete area of learning without a history of development over decades.

However, some discussion groups began to consider the importance of linking content and progression. Many teachers made cross-curricular links, with Science, for example, demonstrating a broader conceptualisation of progression which extended beyond the specifics of this area of learning.

Teachers also conceptualised progression in terms of increasing sophistication of understanding and skills from novice to expert (Heritage, 2008), a model which was able to capture progression over time. However, there was an emphasis on describing progression in terms similar to those used in Bloom's Taxonomy. On occasion, teachers used terminology from the developmental literature to document progression (e.g. of play for young children).

The group responded favourably to the idea of focusing on key concepts, or 'anchors' for developing progression statements: some examples of such statements that are broad yet can incorporate ideas of progression included:

- **Body**
- Being physically literate has lifelong benefits.
- Physical activity has lifelong benefits.
- Our choices and behaviours impact on the quality of our lives (broader definition).

- **Relationships**
- Healthy relationships are built on safety, trust and respect.

- **Social**
- Inclusive, equitable & creative societies and cultures are the foundations of health & well-being.

- **Emotion**
- Social & emotional factors influence our health & well-being.
- Learning about ourselves and others helps us develop a positive attitude and caring behaviour.

The majority felt that progression statements should be learner-focused (first person) and that this would support detailed or fine-grained descriptions of progression; there was some concern about using first person language from the learners' perspective because, for example, this may impact negatively on self-esteem, particularly for those who might not be able to state 'I can …' At this stage there seemed to be no consensus on whether progression statements should be generic or specific; whether progression in some topics in H&WB should be content-based; and whether there need be more than the five progressions steps proposed by Donaldson (2015).

Staff from Special Schools expressed concern about whether final progression statements would refer to current *Routes for Learning* statements and argued that the statements need to be sufficiently broad and inclusive for all.

Overall, teachers conceptualised progression as non-linear, allowing for each child's individual paths; progression statements needed to be broad and flexible enough to be inclusive for all needs and

abilities; many characterised multiple concepts of progression, which were closely aligned with research findings and existing frameworks in other countries.

Humanities

In Humanities, teachers started out by identifying certain overarching 'big ideas' to inform their discussion of progression. For example, in Geography, one of the big ideas identified was decision making and teachers described how students first needed to understand opinions, facts, and bias before they could make informed decisions. Building on the 'big ideas' approach and recognising some difficulties or limitations, they began more formally to identify prerequisite skills or knowledge that would be needed for progression. Teachers outlined a relatively complex progression in depth of knowledge that described how understandings occurred at different points in time and were interdependent, building on each other. This type of activity may be useful when considering and developing some of the bigger progression steps that students take through larger conceptual ideas relevant to the AoLE. Consideration of common misconceptions or difficulties might also help teachers to uncover progression paths that they had not previously considered.

When considering more closely progression across a time interval, the teachers tended to rely on descriptors from Bloom's Taxonomy to describe progression in terms of a linear sequence of competencies, implying that learners, as they progress from novice to expert, move from basic understanding to evaluating. The group also conceptualised progression in terms of increasing sophistication in understanding and skills (Heritage, 2008), for example, from relying on teacher guidance or support through to completing a task independently.

Progression was also described as occurring in multiple dimensions at any given point. For example, a learner could travel along one axis of progression in terms of becoming an independent learner and, simultaneously, along another axis in gaining greater sophistication in their knowledge and understanding and critical awareness. There was discussion around the tension between descriptions of progression in a linear fashion and teachers' experience of the actuality of learner progress.

The teachers preferred to conceptualise a model of progression that is enquiry-based and skills-focused, rather than one which is prescriptive, linear and focused on content; the model could thus provide space for each child's individual path and include him/her in the process. The level of specificity and prescription in progression statements and the extent to which they should be seamless (describing progression in terms of increasing complexity or sophistication) or incorporate large, qualitative jumps required further consideration. Questions of whether statements should be written from the perspective of learners and whether statements should reflect or incorporate current *Routes for Learning* statements were also regarded as needing further consideration.

Languages, Literacy, and Communication (LLC)

In order to ensure that there was time available for detailed discussion on each of the three key elements of LLC, the AoLE elected to use each of the three workshops to address respectively oracy, reading and writing.

The first workshop focused on oracy and was designed on the assumption that, if given 'scaffolding' suggestions, the teachers would find it relatively easy to draw from their experience to develop descriptions of learning actually achieved by their pupils. At this initial workshop it was agreed that developing a common framework for *all* languages was the favoured strategy.

Focusing on oracy, the group agreed that for much of 'what matters' in LLC, progression was characterised by increasing sophistication and/or increasing complexity and/or increasing challenge afforded by the contexts and tasks in which language is used. This articulation of progression reflected a recognition that progression is a multidimensional concept. More particularly, sub-groups produced very different statements:

- 'I can' statements, mainly very general, but with some specification of language/skills, for Years 2 and 6.
- An account of progression in the Foundation stage consisting of descriptions of what children can do at ages 3 and 8 in relation to 4 aspects of what matters: Physical Aspects; Linguistic Aspects; Cognitive Aspects; Social and Emotional Aspects.
- Identification of What Matters for Speaking in early secondary years (covering Language Knowledge, Fluency, Purpose of Talk) and an initial draft of a progression framework using the terms *I know; I know and understand; I know, understand and use; I know, understand and use in more complex/varied contexts; I know, understand and use in more complex/varied contexts across languages*.
- A set of generic listening skills for Years 4-13, to be applied in increasingly complex or sophisticated contexts across the years.

At the second workshop (reading), recognising that a great deal of very positive work already existed in the National Literacy Framework, the AoLE Group decided to focus on identifying the extent to which the National Literacy Framework could contribute to the development of descriptions of progression in LLC. From this starting point, sub-groups identified different approaches to progression in reading.

One sub-group explored progression in reading at Foundation Phase and considered that an existing framework, that underpinning *Reading Rockets* (http://www.readingrockets.org/article/stages-reading-development), provided good, detailed descriptions of the characteristic behaviours of three 'levels' of reading achievement from 'emergent readers', through 'transitional readers', to 'fluent readers'. It was felt that this framework described the interactive relationship between skills and behaviours, avoiding a list of skills at age or stage.

A sub-group of colleagues from a secondary and primary schools cluster described their experience of looking closely at the CLPE Reading Scale (Centre for Literacy in Primary Education, 2016) in order to establish the behaviours that underpin successful development of reading and writing. This had been used within the cluster as an audit tool to assess the opportunities that existed in classrooms to allow successful progression of desirable reading behaviours. They noted that there were marked

differences in the descriptions of reading behaviours described within the learning journey in the scale and statements of outcomes specified in the National Literacy Framework.

A sub-group of secondary teachers considered the New Zealand statements on reading strategies, comprehension and response and analysis, concluding that these statements generally reflect broad areas of what matters in reading and describe progression in these broad areas and in more detailed aspects constituting each. They noted that some statements were dependent on complexity of text, type and depth of questioning, whether responses were expected at word or sentence levels.

The third workshop focused on writing and produced a detailed list of factors that seem likely to contribute to a final description of learning or progression in writing. However, some of the factors referred to pedagogy rather than focusing on progression from the point of view of the learner.

In general, it was agreed that 'I can …' statements should not be specific to year groups, nor should they function as a set of standards against which learners are judged. Instead, they should exist as progression statements that enable formative assessment. There was general consensus that existing frameworks (e.g. Australia and New Zealand) would be useful in developing the progression framework, as would selected, purposeful examples of pupil work.

Mathematics and Numeracy

In the early stages there was a tendency for teachers to consider shifts in activity expectations rather than shifts in underlying learning. Teachers also reported difficulties in distinguishing between progression and assessment. It was clear that tensions existed between conceptualising progression holistically and teachers' previous experiences of the expectations of national assessment.

Nevertheless, all groups were able to articulate understandings of progression in a range of areas, and attempted to describe a shift in learning at a given 'stage', and a stage beyond. This may have been supported by the existence of the Welsh Literacy and Numeracy Framework which contains progression points with which the group were familiar.

Illustrations of progression reflected a range of models of progression. In some instances, progression was conceptualised as successive, whereas others perceived it as multidimensional. However, when specific areas of the curriculum were explored in the workshops, teachers all conceptualised the underlying learning as multi-dimensional and not dependent on any single factor. Progression was commonly described as cyclical and its dependence on content and context meant that it was not necessarily age-related.

The workshops generated some detailed examples of progression in specific aspects of learning. These varied to some extent in terms of how learning was conceptualised but there were similarities across the descriptions. For example, a group working on number operation conceptualised progression along three dimensions of 'skills', 'fluency in the mathematics' and 'reasoning/ numeracy/ application' and summarised their understanding of progression as 'movement from understanding basic concepts, to fluency and understanding of connections, to use of skills in the reasoning'. Another group's description of progression in fractions for reception and Year 1 mapped performance expectations in using skills and competencies along three dimensions: 'practical', 'language acquisition' and 'visualisation'. It was recognised that at this stage of learning, language and motor skills were likely to be significant in impacting on progression than at later stages. This

suggests that learning progression for identified mathematical abilities may depend on different factors at different stages, rather than a linear movement from 'novice' through to 'expert'. The fractions group identified further factors that would impact on progression such as level of support, previous learning and learning opportunities.

Overall, all groups expressed progression as multi-dimensional and recognised that development was dependent on learning in a range of skills, capacities and knowledge and understanding. However, possible difficulties were noted in defining and implementing assessment for particular learner groups, for example, learners with Additional Learning Needs, and how progression could be evaluated in terms of 'real' progress rather than learners demonstrating desired learned behaviours.

Science and Technology

In common with other AoLEs, during workshops some of the groups rather than focusing on learning and progression tended to consider specific skills or course content.

The focus of discussion and resultant descriptions ranged from macro to micro, according to the depth of focus of the learner work under consideration. For example, at one extreme, the Physics group considered a whole qualification level. They were then encouraged also to look at more specific areas before developing descriptions of progression. Another group, looking at creating solutions to programming problems, focused on examples of learner work derived from a task with a fairly narrow focus. This resulted in detailed discussion around specific aspects of the task itself with a focus on activity rather than progression. By also looking at a different set of learner work that covered a wider range of skills the group were able to produce a description of progression.

Where the examples of learner work were produced from tasks that had been strongly teacher-led, with a high degree of scaffolding, there was little to differentiate between the examples, and therefore practical illustrations of progression were limited. This resulted in difficulties for the participants in identifying underlying learning and progression.

Many of the groups generated fairly detailed learning progression in which the learning statements tended to be in the form of descriptions of learner behaviour from the teacher's perspective, rather than from the learner's in the form of 'I can …' statements.

Examples of the groups' learning progression statements generated through the workshops demonstrate that progression was conceptualised by the participants in this AoLE as multi-dimensional, incorporating a range of skills and content knowledge. However, the presentation of these statements appears linear and makes use of a similar structure and language to those of Bloom's Taxonomy.

Conclusions and Next Steps

Teachers across all the AoLEs demonstrated a commitment to exploring progression and to articulating their understanding of this; few appeared to have had previous experience of so doing. It was clear that within and across AoLEs there was little consensus at this stage on how progression in learning should be described and articulated. This was not a situation unique to Wales as there is considerable evidence that when teachers are first asked to describe progression they tend to refer to some combination of the following: prescribed curriculum content, programmes of work,

prescribed standards and expectations, and/or classroom activities. At times it was challenging to encourage movement from discussion of content or activities to learning and progression. There seems little doubt that in many cases this situation arises from the prominence previously afforded in Wales to statutory (or similar) statements of curricula and standards.

In analysing discussions of progression, a number of common themes emerged.

- Many AoLE members recognised that progression was not linear and should rather be conceptualised as multidimensional; a learner might progress along different dimensions or axes at different rates.
- In some areas of learning, at least in the earlier stages, aspects of progression in learning might be related to developmental progression.
- Many expressed a preference for using skills rather than content as the key aspect of learning which should be used to define progression; there was acknowledgement of the interdependence of progression in cross-curricular skills and progression in domain specific skills.
- There were recognised differences between generic high level descriptions of progression in learning and more detailed or specific descriptions of progression as the teachers related their discussions to productive work around 'what matters'.
- Teachers recognised that frameworks existed which could inform the development of the curriculum for Wales but combined this recognition with a desire to move away from the principles underpinning the current National Curriculum and the prescriptive approaches associated with recent policy and practice.

Next steps

Building on this preliminary work and in line with the shared principle of subsidiarity, the CAMAU team took action in several areas.

- Recognising the commitment of teachers to developing their understanding and articulation of matters related to progression, the CAMAU team built emerging thinking from teachers into the decision tree methodology used at the December 2017 meetings of the AoLE groups.
- Planning for the period January to May 2018 included providing opportunities for further gathering of evidence of teachers' developing understandings of progression emerging from their own experiences. It was anticipated that this would be less challenging since there would be far greater clarity about what matters in the Welsh Curriculum.
- Learning from the work reported in this section was used to inform design of future activities in gathering evidence with teachers, both for working within existing AoLEs and with new pioneers coming into the process; findings would be shared with professional learning pioneers.
- Future activity would involve an increased role for teacher researchers, e.g. as leaders of small group activity and through their gathering of evidence, rather than, as often in the earlier work, relying on leadership of activities by CAMAU team members.
- At future AoLE meetings, CAMAU would seek teacher reflections on the processes of change and would extend universities' ethics approval to enable this.

Section 4: Conclusions and Framework for Decision Making

Introduction

This section of the report is in four parts.

- Part 1 draws together major themes emerging from evidence analysed in Sections 1 and 2 of the report.
- Part 2 relates key messages to *Successful Futures*.
- Part 3 states fundamental principles which will underpin decisions within each AoLE Group.
- Part 4 provides evidence derived from the review relevant to key questions each AoLE will consider as they take decisions about the development of progression frameworks.

This **research** report is intended to support thinking across and within the AoLE groups as ideas of progression are developed and shared across Wales.

Part 1: Major themes

Progression matters for learning

The crucial function of the curriculum is to identify for each AoLE what matters in order to achieve the overall purposes of the Welsh curriculum, viz., to enable each young person to be

- an ambitious, capable learner, ready to learn throughout life;
- an enterprising, creative contributor, ready to play a full part in life and work;
- an ethical, informed citizen of Wales and the world;
- a healthy, confident individual, ready to lead a fulfilling life as a valued member of society.

Within the curriculum for each AoLE description of progression is important:

- for teachers to have an overview of the curriculum
- for learners to see a bigger picture and relate what they do on a day to day basis to a broader understanding of what matters
- as the basis of decisions about next steps in learning and pedagogy.

The research review suggests that, to achieve these three purposes effectively, descriptions of progression should be structured in terms of learning development such as beginning learner to expert in a domain, rather than in terms of predetermined statements of standards related to age or stage of education.

Descriptions of progression serve two main purposes

The research and national framework reviews suggest that descriptions of progression can usefully be of two broad kinds, interrelated but with the following separate purposes:

- **Broad statements providing an overview of the journey from beginning learner to expert in a domain**.
  - These descriptions summarise succinctly what matters over time within the domain.
  - They can guide teachers' large-scale planning over an extended period of students' education.

  - They can show students and teachers how current work relates to longer term aims and so avoid students seeing their learning as fragmented and with little sense of clear purpose.

- **Detailed description of progression in learning within topics in a given domain**
  - Specifying the knowledge, skills and capacities which students acquire and practise in the process of working towards the learning described in the broad statements.
  - These detailed descriptions should enable the teacher and the learners to identify in assessment for learning dialogue what has been achieved and the next immediate steps to ensure further successful learning.

Evidence emerging from the research and frameworks reviews suggests that different countries have taken different approaches to the presentation of national curricula and assessment arrangements. In Wales, it will be important to consider how best to address both the above purposes in a way that would promote clarity, eg, allowing teachers and learners to have a sense of the overall learning journey using broad descriptors whilst more detailed information on learning related to the overall descriptors is contextualised within professional learning. Such an approach should create clear links between the national framework and local practice, providing an effective basis for

- developing teachers' discussion and deep understanding of learning
- exploring means of responding to the voices of learners and promoting their ownership of learning
- exploring the potential of assessment for learning and pedagogical action to ensure success
- demonstrating ways in which day to day work builds towards achievement of what matters in the AoLE, as defined in succinct broad curriculum descriptors.

Successful curriculum and assessment development is only possible if contextualised in professional learning.

Successful development and enactment of learning progression frameworks developed for Wales will depend on an inextricable relationship between development of curriculum and assessment and professional learning.

Part 2: Relating AoLE Review Findings to *Successful Futures*

The ideas presented in *Successful Futures* form the principles from which curriculum, pedagogy, models of progression and assessment in Wales are to be developed and offer a touchstone against which emerging proposals can continue to be evaluated. These principles serve as touchstones for the CAMAU project processes.

Progression is characterised in *Successful Futures* in terms of increasing achievement in a range of aspects of learning such as: breadth, depth, complexity, level of abstraction, mastery of techniques, sophistication, accomplishment and skill, application, challenge and independence and confidence: this increasing achievement will be evident for both disciplinary knowledge and wider competencies. *Successful Futures* recognises the diverse needs of learners and is clear that the curriculum purposes can be met in a wide variety of ways and allow for wide variations in the experiences of individual children and young people. Each child's learning continuum functions as a journey

through the curriculum; while the road map will be common to all learners, this journey should allow for variety of pace, diversion, repetition, and reflection, as appropriate for each individual to make progress in learning. These aspects of progression are all identified in the six reviews in section 2 as being visible to some extent and at some points in both the findings of research and national policy statements, but the review found no existing national system where all these issues had been fully addressed.

Similarly, learning is defined in *Successful Futures* through the concept of progression, represented as a coherent continuum without separation or interruption. The continuity that the new curriculum places at the centre of learning describes a holistic approach to the development of the individual, including experiential learning that is valuable in and of itself. The characterisation of progression embedded within Successful Futures as the vision for education in Wales is not fully evident in any one country's policy or one theoretical model.

The Curriculum for Wales, therefore, is breaking new ground and will need to bring together multiple forms of evidence, for example, research where it exists as documented in the research reviews, teacher and pupil understandings of progression, samples of pupil work that show progression, and insights from other national frameworks, in order to create bespoke progression frameworks for each AoLE tailored to the needs of young people in Wales.

By revisiting the elements of the *Successful Futures* vision for progression outlined in section 1 of this report we can summarise relevant findings of the six reports in section 2 (see *Table 15*). Each of the 12 points summarised in this table may help inform decision-making within each AoLE group as well as across the system.

Table 15

	Element of the vision for progression embedded within *Successful Futures*	Summary comment from section 2 reviews
1.	Phases and key stages should be removed in order that progression can be continuous, increasing the potential for higher attainment by minimising transitions.	Evidence from research considered in some reviews supports this principle: if progression steps represent significant aspects of learning, then reference to specific ages/stages/phases is at least difficult, and maybe inappropriate. There exist some frameworks which do not prescribe attainment by age or grade.

	Element of the vision for progression embedded within *Successful Futures*	Summary comment from section 2 reviews
2.	Progression in each Area of Learning and Experience should be based on a well-grounded, nationally described continuum of learning that flows from when a child enters education through to the end of statutory schooling at 16 and beyond.	Reviews report that some progression frameworks run through the whole of a child's learning while others are specific to particular stages (e.g. primary, early secondary). The latter may be marked by discontinuity. Some research reviewed considered the whole continuum; other research reviewed investigated progression in the shorter term. The latter may inform the former.
3.	Learning should be an expedition, with stops, detours and spurts rather than a straight line. Progression is a 'road map' for each and every child/young person's progress in learning though some children and young people will progress further and/or faster than others.	Although some countries do outline tightly prescribed linear progression, there is considerable evidence from research that non-linear progression (sometimes 'spiral') is either to be expected or is necessary. This is recognised in some policies. The question of moving forwards and backwards in learning is raised in some reviews, as is the notion that there may be multiple paths of progression that different children may take.
4.	Progression Steps will be described at five points in the learning continuum, relating broadly to expectations at ages 5, 8, 11, 14 and 16 (staging points for reference rather than universal expectations – but expectations should be high for all learners).	Research considered in some reviews questions the value of progression steps which represent significant aspects of learning referring to specific ages/stages/phases as at least difficult, and perhaps inappropriate.
5.	Progression Steps are made up of a number of achievement outcomes linked to what matters in the curriculum and linked to the four purposes ('I can' statements). Literacy, numeracy, digital competence and wider skills should be embedded as well as elements of the Cwricwlwm Cymreig.	The reviews provide evidence on the nature of 'achievement outcomes'. Some progression frameworks contain many statements of achievement, an approach which presents both practical and educational difficulties: difficult to manage and detailed prescription is unlikely to be consistent with flexibility in individuals' learning. Very broadly stated outcomes may be open to a breadth of interpretation and be perceived by teachers as unsupportive. First person learner statements are uncommon.

	Element of the vision for progression embedded within *Successful Futures*	Summary comment from section 2 reviews
6.	Achievement Outcomes should not be a checklist of knowledge or skills and should incorporate effective pedagogy.	The reviews provide accounts of research evidence which points up the potential disadvantages of this 'checklist' approach. While some countries do adopt this 'checklist' approach there exist in at least some curricular areas in some countries models of progression which avoid this approach.
7.	Achievement outcomes should inform next steps and be framed as broad expectations achievable over a period of time (approximately 3 years).	While a number of countries monitored progression across periods of time longer than a year, there was less clarity about how achievement outcomes might explicitly inform next stages in learning.
8.	Achievement Outcomes should use 'I can', 'I have' (and 'I am ready to') statements to describe progression (not over specified or overly vague – this may vary across AoLEs).	The reviews found that use of first person statements is rare in the countries examined. Typically, third person statements referred to the past 'The learner will have developed…' or present 'The learner is able to…'. There seem few statements that could be equated with 'I am ready to…'
9.	Assessment (relevant and proportionate) should be focused on learning intentions and progression in relation to the four curriculum purposes and based upon the intentions set out in the Achievement Outcomes at each Progression Step within each Area of Learning and Experience.	There was some evidence that tensions could arise from seeking to incorporate within achievement outcomes both learning directly related to the discipline and evidence related to broader statements of learning such as the four purposes.
10.	In each AoLE the Achievement Outcomes at each Progression Step will need to encapsulate the most important aspects of learning, take account of the ways in which children progress in different kinds of learning and recognise what they need to be able to know and do to move securely to the next stage.	This issue is noted in some of the reviews: some progression frameworks reviewed would seem to be inconsistent with aspects of this aim, those which have many statements of achievement for example. In many countries statements of standards (or similar) focused on attainment to date and made little reference to next stages of learning.

	Element of the vision for progression embedded within *Successful Futures*	Summary comment from section 2 reviews
11.	Professional judgement is central to assessment (formative assessment with relevant summative information collected and used formatively within classrooms and schools).	The research and policy reviews undertaken here found less evidence for the use of assessment to inform school evaluation than for its use to inform learning.
12.	Schools should use teacher assessment of progression systematically, together with other sources of evidence, to inform their self-evaluation for school improvement purposes.	The reviews found less evidence for the use of assessment to inform school evaluation than the use of assessment to inform learning. This applies both to research and policy reviews.

Part 3: Principles

Building from the evidence emerging from the review of national frameworks and the research literature, a number of principles emerged that might be used to take forward the progression aspirations of Successful Futures.

Principle 1

The four purposes should inform and be evident in learning progression frameworks and achievement outcomes.

The six reviews in Section Two recognise that each AoLE has specific characteristics, reflected in both research and existing national frameworks. It will be important that learning progression frameworks in Wales recognise these characteristics. In some of the frameworks reviewed, the 'main aims' of the curriculum are articulated at the start and then elaborated in detail in a description of the curriculum or in a description of learners' expected achievement (e.g. learning or achievement outcomes, standards, descriptions of progression) or in descriptions of both. A learning progression framework, the progression steps within it and associated achievement outcomes must reflect or encapsulate what the designers of the curriculum most value in the process of educating young people**.**

Principle 2

Progression frameworks must relate to what matters

Each progression framework should focus on the knowledge, skills and attributes which have been identified within each AoLE as the heart of successful learning in each domain and must encompass the four purposes of the curriculum.

Principle 3

Learning progression frameworks will place the development of learning at their heart rather than focusing on content or activities.

In the past insufficient attention has been paid to progression in learning with negative consequences for learners and teachers who perceive learning as fragmented and with little sense of

clear purpose. This leads to problems with practice in Assessment for Learning where understandings of where a learner is and where a learner might next progress to are commonly not linked into a bigger picture of what matters. Reviews emphasised the interdependency among pedagogic approaches, content and assessment in how progression is described.

Achievement outcomes at each progression step should encapsulate the most important aspects of learning, take account of the ways in which children progress in different kinds of learning and recognise what they need to be able to know and do to move securely to the next phase of learning in that framework.

Principle 4

Progression frameworks should serve two main purposes: broad statements and detailed descriptions

Each AoLE will develop broad statements to provide an overview of the learning journey over time and more detailed statements related to individual topics, themes or other aspects of learning. A little like Russian nesting dolls, the more detailed progression statements should be linked clearly to the broad progression statements and the broad statements should be derived from what AoLEs have identified as what matters.

Principle 5

National progression frameworks should enable and support schools to develop curriculum and assessment practices to suit local circumstances

It is important that broad progression statements are written in a way that allow schools to have the flexibility to ensure that they can relate the curriculum to local circumstances as they maintain high levels of challenge for all learners.

Principle 6

Successful curriculum and progression development requires professional learning

It is important that professional learning builds on available evidence: this involves bringing together research understandings with practice insights in the emerging policy context of Successful Futures. Professional learning will stimulate and support teachers to recognise, build on and develop their pedagogical insights and practice. There are opportunities for professional learning to be built around the development of the national programme rather than simply learning about the national programme. For example, the evidence base to build more detailed progression statements does not exist in all areas. One function of the professional learning programme should involve groups of teachers working together to help build a better evidence base whilst learning about the new curriculum and assessment arrangements.

Principle 7

Where possible progression frameworks should be informed by research evidence

Consistent with the policy aspiration of Successful Futures achievement outcomes should describe significant progression steps within a learning progression framework. Achievement outcomes should not be a checklist of knowledge or skills and should incorporate effective pedagogy; they should inform next steps and be framed as broad expectations achievable over a period of time (approximately 3 years).

Part 4: Evidence derived from the review which may help to inform decisions to be taken within each AoLE Group

Here, questions arising from the review related to the principles identified above were identified. These were offered as a stimulus for thinking within and across AoLEs as they made proposals to the Coherence Group on how progression frameworks might best be developed.

1. What are key features of research-informed progression?

Each of the AoLE reports refers to and supports Heritage's (2008) argument noted in section 1 that

> *'By its very nature, learning involves progression. To assist in its emergence, teachers need to understand the pathways along which students are expected to progress. These pathways or progressions ground both instruction and assessment. Yet, despite a plethora of standards and curricula, many teachers are unclear about how learning progresses in specific domains. This is an undesirable situation for teaching and learning, and one that particularly affects teachers' ability to engage in formative assessment.'* (p.2)

Common conceptual features of progression frameworks were summarised in Section 1. Heritage (2008) argues that all models of progression conceptualise progression as a continuum of increasing sophistication of understanding and skills as young people move from 'novice to expert'. This concept is explicit in some of the national frameworks and may underpin others; however, there is a range of understandings of the nature of development from novice to expert. Some learning progression frameworks adopt a developmental view, inviting teachers to conceptualise learning as a process of increasing sophistication rather than as new bodies of content to be covered within specific grade levels; others detail content or very specific skills to be developed at each stage. It seems that approaches may vary from AoLE to AoLE: whether this is the result of different epistemological models or of tradition is unclear. No definition of learning progression contains references to grade or age level expectations, in contrast to many standards and curriculum models as learning is conceived as a sequence or continuum of increasing expertise.

Implicit in progression is the notion of continuity and coherence. Learning is not seen as a series of discrete events, but rather as a trajectory of development that connects knowledge, concepts and skills within a domain. Issues related to interconnection of knowledge, concepts and skills across a domain – or domains – are considered in the individual AoLE reviews; these demonstrate differences between AoLEs, some associated with the range and fit of the domains within each AoLE, some associated with differing balances among knowledge, skills and dispositions. Learning progressions are accommodating. They recognise that, commonly, learners do not move forward at the same rate or with the same degree of depth and progression. This issue was consistently acknowledged in each of the AoLE reviews. A number of existing frameworks do not appear to allow learners to move forward at different rates.

Learning progressions enable teachers to focus on important learning goals, paying attention to what a learner would learn rather than what a learner would do (the learning activity). The learning goal is identified first and teaching, pedagogy and assessment are directed towards that goal. 'Consequently, the all too common practice of learning being activity driven rather than driven by the learning goal is avoided.' (Heritage 2008 p.5). Clear connections between what comes before and after a point in the progression offer teachers a better opportunity to use assessment to

calibrate their teaching, to address misunderstandings or to develop skills, and to determine what would be important next steps to move the student forward from that point.

2. Who might key audience(s) be for Learning Progressions?

Learning progression frameworks provide teachers with an overview of the curriculum and provide learners with a bigger picture which allows them to relate what they do on a day-to-day basis to a broader understanding of what matters. The AoLE reviews set out the intentions for the articulation of progression and achievement that can be summarised as follows:

> Achievement Outcomes and any associated description of learning progression should enable teachers to know what kinds of knowledge, skills and aptitudes they should aim to develop with learners at all stages of their learning journey. Achievement Outcomes should enable both teachers and learners to see the next steps to be taken.

The purpose, scope and structure of the progression frameworks within and across AoLEs will need to be clear to those who will use them prior to developing their content.

As noted in Section 1, Black *et al* (2011) make a strong case for the centrality of teacher assessment. This is well supported in the reviewed literature and international models where the potential for rich evidence of progression and better standards of validity and reliability than national or state tests are noted. However, each AoLE review highlights that, as Black *et al* (20011:106) suggest, attaining a position where teacher assessment fulfils this promise may require significant professional development. Lambert (2011) also raises the issue that the actual understanding (and perhaps even the actual relevance) of level descriptors is often questionable. Lambert cites the difficulties that teachers have in identifying work to exemplify certain levels, implying an uncertainty about what constitutes a level (and therefore arguably progression).

Heritage (2008) reminds us that many learning progressions are written primarily for teachers and tensions can arise if a single learning progression attempts to serve too many purposes. For example, problems can arise if it is assumed that the same degree of granularity (level of detail) will serve both long term planning and assessment to support immediate next steps. The degree of granularity in a learning progression designed to ensure that teachers have an overview of progress from novice to expert is very different from the degree of granularity necessary to enable teachers to support learning formatively: the latter would require a far more detailed analysis of progress in learning.

Learning progressions can also be written in ways which provide a framework for learners to understand their own learning journeys. Such models were not explicitly noted in the AoLE review reports. Heritage (2008) argues for the importance of learners being aware of longer term goals and the relationship between those and their day to day progress. Increased involvement in learning occurs when teachers share with the students what their longer-term goals are and enable them to participate in evaluating the degree to which they have met the goals.

3. How detailed should the descriptions be? (described in research literature as 'granularity')

There are different understandings about what is meant by progression in learning. It is important to make a clear distinction between learning progression as providing an overview of the long journey from emerging to expert in a domain and as detailed insight into the expectations of immediate progression in learning within a topic in a given domain. Both are necessary and inter-related but

different in their purpose, scope and level of detail. Both should help teachers and learners to see, and indeed to develop habitual awareness of, the appropriate next steps, as dialogue and assessment for learning take place during the learning process. Heritage (2008:2) suggests that greater attention should be paid to the different levels of specificity used to articulate the curriculum. Some curricula specify detailed objectives to be mastered at each grade in sequence. When the curriculum is described in this level of detail, 'grain size', it may be difficult to see how these many discrete objectives connect to bigger, organising concepts; learning can become little more than a checklist of things to be learned. Curricula organised around core concepts or 'big ideas' and sub-concepts offer better opportunities for a stronger relationship between formative assessment and learning goals. However, Heritage (ibid) argues that care also needs to be taken with this approach for too often 'big ideas' are not brought together as a coherent vision for the progressive acquisition of concepts and skills. Without a coherent vision the potential for teachers to have a broad overview of learning in a specific domain is restricted.

The AoLE reviews include some detail about specific models for progression which teachers may employ; these may be domain-specific or applicable more generally.

All of this implies the need for consideration not only of the determination of the central aspects of achievement in the AoLE but also of the appropriate (that is, helpful and manageable) levels of specification of description of achievement. If the central aspects are described in 'lean' statements, then it will be necessary to consider the most appropriate format: e.g. succinct broad statements, possibly with a small amount of expansion; or narrative descriptions. It will also be necessary consider where more detailed guidance and support for teachers about progression, next steps and pedagogy should be located and how this could be used? If descriptions of achievement are detailed, it will be necessary to consider how these can be used effectively to support assessment for learning and progression, given the issues about manageability which have been raised.

There is evidence from several countries reviewed that exemplification of standards through learner work significantly reduces the level of abstraction. Descriptive statements alone do not always make clear what performance/behaviours at a given level would look like in a classroom and this is a potentially powerful way of addressing this issue. The use of such material to inform professional learning requires consideration. Several of the reviews raise the issue of the most appropriate location of detailed guidance for teachers about progression, next steps and pedagogy: within the curricular/progression framework itself or in associated material available to teachers as part of their continuing professional development? Related to this is the question of how such material can be most effectively used to support professional learning.

4. Steps in a learning journey?

The issue of relating learning progression frameworks to ages, stages or even phases has already been referred to. Research argues that this should not be the case on both fundamental and instrumental grounds. As the groups develop an empirically well-founded learning progression framework where achievement outcomes describe learning necessary to make further progression, how will they address the issue of descriptions of achievement which are related to phases?

The reviews of international frameworks demonstrate how some frameworks seek to differentiate the performance of learners' who are at the same chronological or grade stage by using a grading system or mark. This may take the form of such phrases as *Not Yet Within Expectations*, *Meets*

Expectations (minimally), *Fully Meets Expectations* and *Exceeds Expectations* or a mark such as: *1 = limited effectiveness, 2 = some effectiveness, 3 = considerable effectiveness* and *4 = a high degree of effectiveness or thorough effectiveness*. This matter may be related to the level of specification or the number of stages of development employed in a framework. A possible justification for the kinds of grading or marks systems shown may be that very broadly defined frameworks do not give teachers and learners enough detail in deciding on next steps in learning. An obvious potential disadvantage is the danger of labelling learners and the associated motivational issues. Such grading approaches are usually linked to statements of standards which themselves may be linked to age and stage; there is powerful evidence that such approaches divert teacher and learner attention away from learning to simplistic models of attainment.

The reviews demonstrate that existing frameworks can provide ungraded descriptions of complex achievement and interacting skills. These may be supported by desirable guidance and support for pedagogy and assessment for learning through additional associated material and by encouraging continuing professional development activities.

5. How might the progression frameworks relate to previous frameworks?

During the process of review it was noted that the former National Curriculum in Wales and the Literacy and Numeracy Frameworks used progression frameworks which took some account of pupils' varying pace of progress. This raises the prospect that there may be some value in looking at earlier local models of curriculum and learning progression in the writing of new achievement outcomes. However, it was also noted that practice must align with the new intentions for the curriculum in Wales: in particular, the requirements to address the four purposes; the fundamental importance to learning of ensuring that curriculum, pedagogy and assessment are coherent and aligned; and the need to move from backward focused statements of standards to forward focused statements of achievement. This has implications for the development of learning progression frameworks which support effective learning.

While considering descriptions of performance it is worth noting the Review of the National Curriculum in England (2010-2014) was highly critical of the previous levels-based system. In this context, best-fit judgement failed to recognise major gaps in children's knowledge and contributed to superficial coverage of the curriculum because the levels-based system encouraged learners to move on to new content without secure grasp of key areas.

6. Relationship with literacy, numeracy and digital competence frameworks?

The Languages, Literacy and Communication review notes that *Successful Futures* explicitly states that the achievement outcomes and progression framework for Languages, Literacy and Communication should take appropriate account of the national Literacy Framework. There are therefore important decisions to take about how the development of the Languages, Literacy and Communication learning progression framework may relate to the Literacy Framework. Parallel issues will apply in the articulation of progression for numeracy with Mathematics and Numeracy and for digital competency and the computing aspect of Science and Technology. All AoLE groups will wish to consider how achievement in these three frameworks and in other cross-curricular aspects may be reflected in their learning progression frameworks.

7. What view do we have of the developing child and young person?

The place of child development within the domain and associated expectation for progression in learning is raised in several reviews. Pellegrino (2017) suggests that although learning progressions are not developmentally inevitable, they may be developmentally constrained. This issue was noted in some AoLE reviews and was of particular importance for the H&WB AoLE review. It may be that this issue is more broadly applicable, especially in the earliest years of learning. When considering progression (e.g. in H&WB), links have been made to research in child development. While child development differs from progression in learning within a domain, developmental stages are closely tied to achievement within H&WB: a young child typically cannot run, regulate emotions, navigate social situations or demonstrate self-control as well as an older child. Teachers may draw on knowledge of child development to understand what typical development looks like within the physical, mental, and social domains, identify when pupils seem to be developing atypically and provide support to maintain the progress of all learners. Progress in domain-related learning relates to developing metacognition and self-efficacy; this observation underlines that there is a complex relationship between children's progress in the H&WB and their progression in other AoLEs.

While it is argued that research undertaken on cognition and learning has led to the emergence of highly developed descriptions of progression in particular curricular areas, specifically science, reading and mathematics (Pellegrino 2017), the evidence from several of the AoLE reviews is that this is often at a micro or detailed level (e.g. one topic) rather than over a longer time scale. Learning progressions can be developed through tracking the actual development of thinking/learning during a sequence of learning or topic. The premise of these 'learning progressions' is that they allow the teacher to understand the ways in which learners progress in their thinking or skill development in order to track progress. This approach would seem to have the potential to produce evidence based learning progressions which would act as a usable version of level descriptors and would support a genuinely formative process of checking current attainment against a known progression and the setting of targets for improvement. However, it should be noted that such progressions are extremely complex (taking 2-3 years to produce) and that a large number of these may be needed in order to cover 'big ideas' within any curriculum area.

Children and young people are beings not becomings. The four purposes describe what all children and young people should become and achieve through statutory education as well as how they are perceived and positioned to experience the curriculum. *Successful Futures* (p.22) argues that:

> *'statements of curriculum purpose need to be formulated carefully so that they have integrity, are clear and direct and become central to subsequent engagement and development; in that way they can* ***shape the curriculum and suffuse practice*** [authors' emphasis]*. Common understanding of why we are doing what we are doing is a powerful starting point from which to determine what it is we need to do and how we are going to do it'.*

Recommendation 2 (p.23) states:

> *'The school curriculum should be designed to help all children and young people to develop in relation to clear and agreed purposes. The purposes should be constructed so that they can directly influence decisions about curriculum, pedagogy and assessment'.*

The purposes therefore tell us about how children should experience their curriculum day to day. Each child's learning continuum functions as a journey through the curriculum; while the road map will be common to all learners, this journey should allow for variety of pace, diversion, repetition, and reflection, as appropriate for each individual to make progress in learning. There is therefore a greater responsibility for schools and teachers to ensure that learning is child-centred, since the details and pace of each journey are set according to the requirements of the learner, always in order to ensure challenging, sustainable and effective learning takes place.

As children and young people move through the education system in Wales they must not be viewed as *aiming towards* the four purposes, but rather must be seen *as living the four purposes* during their time at school – the purposes, then, are not simply goals to be reached at the age of 16, but are also descriptions that inform how we 'position' children throughout their education in schools in Wales.

8. What view do we have of pedagogy?

The notion of 'child-centred' learning and children 'working at their own pace' can imply a pedagogic role that is facilitatory; that is, the role of the teacher is to facilitate the child or young person to lead their own learning or set the pace and/or direction of this learning; the teacher does not take a pro-active role in progressing this learning. It is suggested here that such a view of pedagogy in the new curriculum will be unhelpful. Wales has experience of significant curricular innovation in the shape of the Foundation Phase, introduced in 2008. Recent evaluations (Siraj 2014; Welsh Government 2015) have indicated that poorly understood models of appropriate pedagogy hampered the success of the innovation that, where effectively implemented, has had positive impact on learner outcomes.

Successful Futures provides clear guidance on what is meant by appropriate pedagogy:

> *Pedagogy is about more than 'teaching' in the narrow sense of methods used in the classroom. It represents the considered selection of those methods in light of the purposes of the curriculum and the needs and developmental stage of the children and young people.*

Teachers will draw on a wide repertoire of teaching and learning approaches in order to ensure that the four purposes are being fully addressed and that all learners are engaged and the needs of individual learners are recognised. Teachers will avoid labelling teaching approaches; rather they will consider their appropriateness in terms of purpose. Approaches will encourage collaboration, independence, responsibility, creativity and problem solving in authentic contexts which will draw on firm foundations of knowledge. Approaches will employ assessment for learning principles and make use of scaffolding, modelling and rehearsal.

In order to enact the vision set out in Successful Futures it may be helpful to signal *intentional pedagogic approaches* throughout. That is, the teacher, with the support of appropriately articulated progression frameworks, undertakes to work intentionally with each learner in the direction of progress and to maintain a focus on pace and ambition throughout this process. AoLE groups will wish to consider how this approach may be facilitated by the learning progression frameworks which they develop.

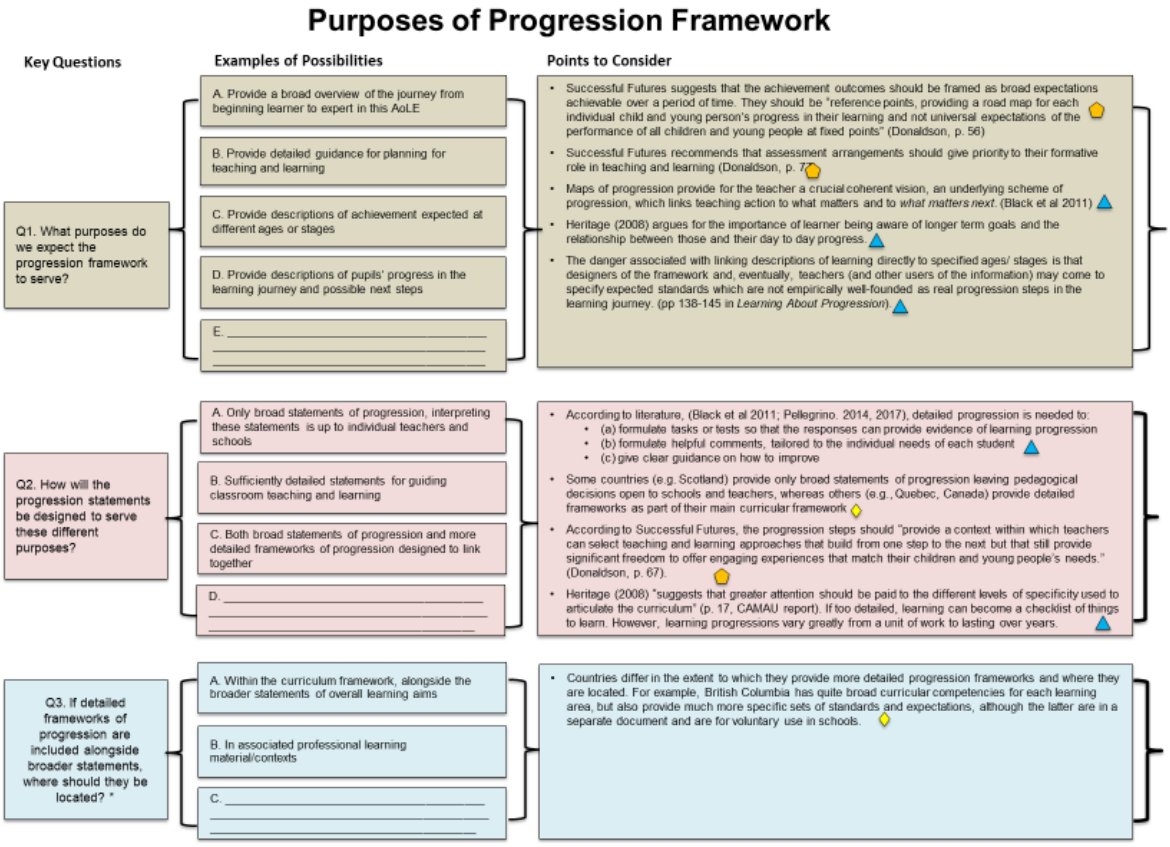
In conclusion

This research report, following the first seven months of work of the CAMAU project, is offered to the education community of Wales and, specifically, to the Pioneer Networks in the spirit of subsidiarity as set out in Successful Futures. The report reviewed evidence from a range of national curriculum and assessment frameworks and evidence from research on progression both as it relates to curriculum and assessment and in the context of the six Areas of Learning Experience. In this final section key ideas emerging from the various evidence sources were used to develop principles. These principles may be used in a number of ways, eg, as a touchstone to check that as ideas develop they remain consistent with original aspirations. Analysis of the evidence pointed to a number of possible alternatives approaches to the design and development of progression frameworks. To remain consistent with the concept of subsidiarity, these alternatives were offered as decisions to be taken. Each decision was structured around questions to be addressed, each supported by available evidence to promote better informed decision making. Each AoLE considered carefully the evidence available and made proposals to the Coherence Group. In the majority of cases it was possible for groups to agree a single proposal, however, in a small number of cases, two alternative proposals as to how a particular issue should be addressed were submitted from the same group. An example of a decision tree can be found in *Figure* 13 below. Further examples of decision trees from different AoLEs are provided in Appendix 3.

The decision tree approach was very well received by AoLE members and the proposals submitted to the Coherence Group provided them with a strong evidence base from across AoLEs to allow collective, well informed decisions to be taken.

The next and final CAMAU research report will begin by examining the agreed progression framework and will consider the development and enactment of its principles as they begin to emerge in practice.

Figure 13: Decision Tree



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Appendix 1

CAMAU Project

International Policy Review Guidelines

STEP 1: Notes on progression for the country

Name of Country:

Year the curriculum was written/published/updated:

Website(s) where materials were found:

How is the curriculum structured? E.g., Is there a curriculum document as well as achievement outcomes or are these combined? Are there supporting materials for teachers? Is there one curriculum across all ages or is it split into primary and secondary?

How many stages/levels/benchmarks are included? Are they aligned with specific years?

What components/subjects/themes related to the AoLE are covered in this country's curriculum? What seems to be missing?

How does the documentation define 'what matters' in this AoLE? Does this include content knowledge, competencies, skills, etc? What is the balance between knowledge and understanding, skills, attributes, and capabilities?

How is progression defined? Is it defined explicitly or implicitly? You may need to look outwith the statements themselves at the supporting documentation and introductions to the curriculum. Give some specific quotes or examples.

Are key progression points identified as expected standards for specified ages? Or as descriptions of knowledge, skills, capabilities needed for further progression in learning? Or is it some combination?

What form do statements of progression take? Are they detailed or broad? Are they in pupil-first language or written for the teacher? Provide some examples.

To what extent does the curriculum for this AoLE seem to align with what is written in Successful Futures? Does it seem to align with Donaldson's vision for progression? Give some examples.

Is there anything else worth noting? E.g., Is there anything particularly unique, innovative, or useful about this curriculum? Are there any aspects of the AoLE that are included in cross-curricular aims? Was there anything within this portion of the curriculum that seems to have connections with any other AoLE?

STEP 2: Summary Statement

Please write a summary of how this country has tried to describe or incorporate progression into their curriculum for the AoLE. Please include your own evaluation in terms of its potential advantages and disadvantages as an example of incorporating progression for this AoLE. This summary should be less than a page (less than 500 words) but can of course be shorter or longer as needed, and should complement the notes you have taken above.

STEP 3: Collating Across Countries

We will combine the information you have provided for each country into one document and write an overall summary statement comparing across the countries. We will then send this final document out for your feedback to make sure your country is represented appropriately and to seek your insight on

Appendix 2

Guidelines for H&WB Literature Review

Aim:

To describe what published evidence exists that might inform our understanding of how pupils progress within the domain of health & wellbeing

Scope:

Successful Futures defines the scope of this AoLE as: "This Area of Learning and Experience draws on subjects and themes from PE, mental, physical and emotional well-being, sex and relationships, parenting, healthy eating and cooking, substance misuse, work-related learning and experience, and learning for life. It is also concerned with how the school environment supports children and young people's social, emotional, spiritual and physical health and well-being through, for example, its climate and relationships, the food it provides, its joint working with other relevant services such as health and social work, and the access it provides to physical activity."(Successful Futures, p. 45). Our review, in line with Successful Futures, will aim to cover these core areas of the field. In accordance with the health and wellbeing report that the AoLE presented in June 2017, we will also include a brief overview of character education, which is somewhat aligned with the competencies that the teachers deem important: readiness, reflectiveness, resilience, respectfulness, resourcefulness and responsibility.

Thus our review will examine what evidence exists on progression in pupils' learning related to the following themes:

- physical education, physical literacy, physical wellbeing (Nanna)
- mental wellbeing and mental health (Sarah Stewart)
- healthy relationships, peer relations, sex, and parenting (George Wardle)
- nutrition, including healthy eating and cooking (Kara)
- substance misuse, abuse, and personal safety (Sue James)
- work-related learning and learning for life (Rachel Bendall)
- character education (Kara)

Stage 1: Finding Literature:

It is important to by systematic in the steps that we take so that we can communicate to others how we conducted our review so that it can be evaluated by others, be replicated if desired, and also to allow for consistency across the members of the group. In order to do this, we should follow the following guidelines:

1) Independent search with keywords: It is recommended that we use Ebscohost or a similar academic database and keep track of the keywords that we have used to search for literature. Certainly we should search for "progression" but be aware that it may not be a word that is commonly used so additionally we may look for similar keywords such as "child development" or "developing" + various keywords for the topic we are exploring. When looking through results, we can scan the title and abstracts to decide what may be relevant, and we should keep a running list of the sources that we plan to review. If a source sounds particularly relevant but one of our Universities do not have access we can use interlibrary loan to try to obtain the relevant source.
2) Expanded search: The next set of searches will involve exploring the work and authors that are cited within the original sources we have found. For example, one paper (such as the article by Margaret

Heritage) may cite very useful literature that we can then follow up with, or we may start to recognize some names of authors who are experts in our area and can do an author search within Ebscohost to explore their work. Again, we should keep track of the process we have used and keep a running list of the sources we plan to review.

3) Advice from Professors: We will ask our professorial consultants to also recommend papers or authors that would be relevant for our purposes.
4) Collegiate advice: If we come across something that may be relevant, share with one another. If we have a colleague who studies this topic, ask them. Keep track of which sources were recommended in this manner.

During this phase it is important to consider screening and excluding any papers that seem less useful. We may want to keep a list of all the papers we have considered and the ones we end up using for the review. Given our short time frame, the important thing is that we read enough core pieces in the area in order to begin describing with some confidence what is known in this area of progression.

Stage 2: Analysis for the Review:

Our literature review should be a synthesizing statement about the broader literature within a particular area that answers some critical questions related to progression (rather than just a summary of individual articles). It should be clear that this is an informed perspective and evaluation of the field, citing relevant sources for each point that we are making. When it is helpful we can use quotes and specific examples from the literature, or to create tables to help make points of comparisons or contrasts.

Next, using the papers that are relevant, we will want to report/describe substantial elements from the papers, consider the extent to which they inform our work of progression, note similarities/differences across the papers, and at the highest level, consider the sources themselves and their relevancy.

When reviewing the articles, we may wish to consider the following questions:

- What evidence exists that informs our understanding of progression in this domain?
- In what ways have researchers described how children develop their knowledge/skills/capacities in this area? In other words, how do they model progression? For example:
    - According to the literature, are the changes that children make qualitative jumps (with big steps at key moments) or more gradual sophistication (children seen to gradually add more of the same skills over time)?
    - Is progression linear or could children move backwards and forwards?
    - Do the researchers see children's progression as something that can be impacted on by the environment and open to change, or is it fixed?
    - Is there one path that children seem to take in this area, or are there multiple paths? Do the researchers acknowledge that children may have different paths based on the context in which they grow up/learn?
    - Are there different models of progression for the same topic and to what extent do they overlap, complement, or conflict?
- To what extent does the literature focus on how children develop in terms of their knowledge/understandings vs. behaviours/skills?
- To what extent is the progression that is described at a micro-level (for one lesson/unit) or at a macro-level (across multiple years)?
- What ages are covered when describing how pupils learn in this area? Which ages seem to be missing or receive less adequate attention?
- What is the theoretical background of the relevant literature (e.g., education, public health, psychology, etc.)? We may get some insight by looking at the journal it is published in as well.

- Importantly, what seems to be missing in this area? What do we still not know? Is there not a lot of research on this topic?
- To what extent could the research in this area help to inform models of progression that could be useful for teachers and for learners?
- What can we use from this literature for our purposes of writing a framework of how children progress in this area?

This literature review will serve two purposes. 1) to inform teachers about what is known in the literature that may inform their understanding of progression in this area, 2) to be a systematic review that would be appropriate for journal publication.

Stage 3: Writing the Review:

What will the overall review look like? Proposed outline for the literature review:

A. Introduction with description of H&WB for Wales based on Successful Futures
B. Literature reviews for each of the sub-areas we propose to examine
C. Overall summary comparing and contrasting literature across areas as well, as well as evaluation of the scope and depth of literature on progression in the H&WB area, and unanswered questions
D. Implications and issues, based on the literature, for creating assessment frameworks of progression in H&WB

How long should the review be? The overall review for our AoLE will likely be approximately 6-10 pages but could be up to twice as long if we happen to find a lot of relevant literature. That means approximately 1-2 full page per sub-area (about 500-1000 words if using Arial 12pt single spaced), with an understanding that some will be longer and others will be shorter depending upon what is or is not available.

Most of the work is done before writing, through coming up with a list of relevant sources, reading the literature, taking notes, and reflection and synthesis. Our point is not to be comprehensive but to read enough core pieces in each area in order to begin describing with some level of confidence what is known in this area. What we end up writing is a concise critique and summary of the literature in this area. Readers can refer to our cited sources if they want to learn more.

How many sources should I read? Again this depends strongly on each of our topics and what is available in the literature. We may be making several points that need to be justified by sources but the sources are only peripherally related to the main topic in which case we could have dozens that we are drawing upon for each part of the review. Or we may find just 3 or 4 highly relevant sources that cover the topic in great depth that we are focusing on and deem this to be sufficient for the sub-area.

Appendix 3

Mathematics & Numeracy: Points in the Journey

Points in the Journey

Possibilities | ***Points to Think About***

Q1. How do you identify beginning and end points in the journey?

- A. Beginning point - The skills/ understandings/ dispositions/ experiences young pupils bring to the classroom
- B. End point - What a Welsh citizen should know/be able to do within the AoLE
- C. End point – Requirements for transition into different phases of the education system, e.g., higher education, vocational education
- D. Beginning point Pupils assessed for their starting point using formative assessment and taken forward from the point they are at.

Points to consider for identifying the journey starting point
- According to Successful Future (p. 53), 'Initial Progression Steps should take full account of guidance on Routes for Learning'
- Black et al. (2011) suggests that you "start from a learner's existing understanding'
- Not all young pupils enter the classroom with the same experiences, meaning some flexibility may be required
- _____

Points to consider for identifying the journey end point
- Elective/non-core subjects in some countries mean pupils leave the system with different types of specialised knowledge
- Identifying an end point as a minimal competency/skill/understanding may not allow all students to see the next step for reaching for their full potential, especially if they reach the highest progression at a young age
- According to Successful Futures (p. 54), the curriculum should enable most children and young people to reach, or go beyond, each Progression Step
- _____

Q2. Do different parts of the journey start at different points?

- A. No, all skills, understandings, and/or competencies are represented at every step in the progression framework
- B. Yes, some skills, understandings, and/or competencies may begin at later points in the journey or end at earlier points in the journey
- C. _____

- Students can increase in knowledge/skills at any point in their learning experience and even young children can develop skills or have experiences that set the basis for future learning.
- Similar to Option B, some country's curricular frameworks (e.g., Quebec) that were reviewed do not introduce certain skills/understandings until later points in the journey and/or do not continue them through the full progression framework
- Other countries that were reviewed repeat the same skill/understanding at multiple steps in order to represent that learning is happening over a longer period of time
- _____
- _____

Q3. How do you break up the journey in ways that make the best sense for learning, e.g., number of progression points?

- A. Five points in the learning continuum, relating broadly to expectations at ages 5, 8, 11, 14 and 16 (staging points for reference rather than universal expectations)
- B. The number of points may differ across learning depending upon the number of conceptual shifts that mark sophistication/development in the learning journey
- C. Descriptions of learning linked to each grade level, similar to standards
- D. Descriptions of learning needed to move into different phases of education, e.g., primary, secondary, subject choice
- E. _____

- Successful Future recommends Option A (see p. 53). There are also five progression points in the learning continuum in Scotland
- Research on progression appears to align more closely with Option B, in the sense that many of the progression frameworks that were reviewed across AoLEs have no indication of age and range widely in the number of steps they have. On a continuum of learning you may need more, or fewer, points depending upon the skill/understanding.
- Having the same number of points across each skill/understanding may be easier practically in terms of coherence across teachers and schools, but may require a compromise in terms of representing meaningful shifts in each skill/understanding, the latter of which is ideal for assessment for learning
- Many countries tend to follow Option C (e.g., Australia, British Columbia), with some exceptions (e.g., New Zealand has 8 steps/points in the learning journey). However, Option C is critiqued in the literature as it links to grade level expectations (Heritage, 2008).
- _____
- _____

Choice and Rationale

Rationale for Choice of Possibilities for Q1
Beginning Point - The teacher needs to use formative assessment to acknowledge what the learner has already achieved/ experienced / dispositions so they can assess the 'readiness' of the learner to continue their journey. (Singapore).
End point – Step achieved / reached towards the Four Core Purposes and the signal for where the next step will be.

Rationale for Choice of Possibilities for Q2
No, all skills, understanding, and/or competencies are represented at every step in the progression framework due to the way maths builds on the previous step. Each step is appropriate to the child's stage of development and introduced through play etc as appropriate. This is true for all 'What Matters" within the Maths and Numeracy AoLE.

Rationale for Choice of Possibilities for Q3
Choose B – Discussion – evidence from practitioners during CAMAU research. We agree.
Point A – Discussion - Why are the ages chosen? 5 allows a child to settle into primary at the end of Reception. 8 acknowledges the infant / junior school situation and allows children to settle in a new school but than 11 when children move from primary to secondary is separating the two stages again. Dislike the clear distinction and not a journey more of a reaching different end points.

Point C – Discussion – Teachers needs guidance children do not need to be labelled and Welsh government label schools.

Point D – Discussion – Different phases of education seperating us too much still. 'Not our problem' idea.

AoLE proposal

Example: The aspect of the learning journey should be structured as… because…
Question 1 How do you identify beginning and end points in the journey?
The group proposes…
The teacher needs to use formative assessment to acknowledge where the learner is at , at the beginning of the journey. This will need to identify what the learner has already achieved/ experienced and the dispositions they have so they can assess the 'readiness' of the learner to continue their journey. (Singapore).
Step achieved / reached at the end of the journey should be measured against what steps the learner has taken towards the Four Core Purposes and the signal for where the next step will be.

Question 2 Do different parts of the journey start at different points?
The group proposes..
All skills, understanding, and/or competencies are represented at every step in the progression framework due to the way maths builds on the previous step. Each step is appropriate to the child's stage of development eg introduced through play etc as appropriate. This is true for all 'What Matters" within the Maths and Numeracy AoLE.

Question 3 How do you break up the journey in ways that make the best sense for learning eg number of progression points?
The group proposes….
The number of points may differ across learning depending upon the number of conceptual shifts that mark sophistication/development in the learning journey. This is evidenced from practitioners during CAMAU research. This is continous formative and summative assessment rather than just a point at a certain age for each child.

We dislike the clear distinction by age as not a journey more of a reaching different end points.
Teachers needs guidance for stages of development. Children do not need to be labelled and Welsh government then measure or label schools at artificial points of time. Support should be given to learners and schools without publicly shaming.

If we only assess different phases of education it is still separating primary and secondary schools too much and becomes the 'Not our problem' idea.

Implications for other decisions to be made about progression:

Expressive Arts: Progression as Interdisciplinary or Disciplinary

Progression as Interdisciplinary or Disciplinary as the Journey Develops

Key Questions

Q1. To what extent should progression be mapped in interdisciplinary terms (e.g., for the AoLE) or subject specific within the AoLE?

Possibilities

A. Fully interdisciplinary within the AoLE

B. Subject-specific progression frameworks, e.g. learning progressions described for each subject in the AoLE

C. Changing from interdisciplinary within the AoLE to more subject-specific as students transition to later phases of schooling

D. Changing from subject-specific to more interdisciplinary within the AoLE as students transition to later phases of schooling

E. Progressions are described simultaneously for the area and for the specific subjects, i.e., AoLE-wide progression steps alongside disciplinary progression steps

- Fully interdisciplinary within the AOLE whilst providing opportunities to develop greater disciplinary knowledge and skills (post 14)

Points to Consider

- Some countries reviewed (e.g. Scotland Humanities) have learning area that remains throughout schooling
- Other countries (e.g. Australia, Alberta, and Northern Ireland Humanities) have separate elementary and secondary curriculum
- SF says that there is a trend towards emphasising the ability to apply learning across subjects and a disposition to do so effectively (p23).
- SF recommends that the curriculum 3-16 should be organised into Areas of Learning and Experience and have an identifiable core of disciplinary or instrumental knowledge (p.38). Progression in each AoLE should be based on a continuum of learning that flows from when a child enters education through to the end of statutory schooling at 16 and beyond (p.53).
- Having separate curricula and/or assessment guidelines for different stages of schooling may have implications for learners' transition into secondary school and for the extent to which the separate curricula complement one another.
- Reviews report that some progression frameworks run through the whole of a child's learning while others are specific to particular stages (e.g. primary, early secondary). The latter may be marked by discontinuity.

Progression as Interdisciplinary or Disciplinary as the Journey Develops

Choice and Rationale

Rationale for choice of possibility

- A core progression that stays all the way through however there needs to be a modular system post 14 in order to allow students to choose according to their particular interest and/or talent.
- Could there be complimentary vocational pathways – EA and specialist modules?
- All children will be studying EA beyond 14 – but only some will specialize in particular disciplines?
- Schools will need examples i.e lead creative school case studies
- The creative processes identified in the three pillars are interdisciplinary
- The curriculum 3-16 should be organized into Areas of Learning and Experience and have an identifiable core of disciplinary or instrumental knowledge (SF p.38).
- Progression in each AoLE should be based on a continuum of learning that flows from when a child enters education through to the end of statutory schooling at 16 and beyond (SF p.53).

AoLE Proposal

AoLE proposal

Example: The aspect of the learning journey should be structured as… because..

The learning journey should be fully interdisciplinary within the EA whilst providing opportunities to develop greater disciplinary knowledge and skills (post 14) in order to provide opportunity to apply learning across disciplines. This will be based on a continuum of learning that flows from when the child enters education to the end of statutory schooling at 16. Post 14 there should be opportunities for pupils to develop more disciplinary knowledge, skills and understanding through a modular approach.

Progression comes from gradual use and re-use of known skills and could also involve a qualitative jump. It is not a linear process, different learners will progress in markedly different ways as they experience EA activities. The learning environment and the quality of teaching are important factors in facilitiating progression. Qualitative and contextualised descriptive approaches to assesing acheivments and progression are key factors in this AOLE.

Implications for other decisions to be made about progression:

Science and Technology: Purposes of Progression Framework

Purposes of Progression Framework

Key Questions | **Examples of Possibilities** | **Points to Consider**

Q1. What purposes do we expect the progression framework to serve?

- A. Provide a broad overview of the journey from beginning learner to expert in this AoLE
- B. Provide detailed guidance for planning for teaching and learning
- C. Provide descriptions of achievement expected at different ages or stages
- D. Provide descriptions of pupils' progress in the learning journey and possible next steps
- E. _____

- Successful Futures suggests that the achievement outcomes should be framed as broad expectations achievable over a period of time. They should be "reference points, providing a road map for each individual child and young person's progress in their learning and not universal expectations of the performance of all children and young people at fixed points" (Donaldson, p. 56)
- Successful Futures recommends that assessment arrangements should give priority to their formative role in teaching and learning (Donaldson, p. 77)
- Maps of progression provide for the teacher a crucial coherent vision, an underlying scheme of progression, which links teaching action to what matters and to *what matters next*. (Black et al 2011)
- Heritage (2008) argues for the importance of learner being aware of longer term goals and the relationship between those and their day to day progress.
- The danger associated with linking descriptions of learning directly to specified ages/ stages is that designers of the framework and, eventually, teachers (and other users of the information) may come to specify expected standards which are not empirically well-founded as real progression steps in the learning journey. (pp 138-145 in *Learning About Progression*).

Views of AoLE Group?

Q2. How will the progression statements be designed to serve these different purposes?

- A. Only broad statements of progression, interpreting these statements is up to individual teachers and schools
- B. Sufficiently detailed statements for guiding classroom teaching and learning
- C. Both broad statements of progression and more detailed frameworks of progression designed to link together
- D. _____

- According to literature, (Black et al 2011; Pellegrino. 2014, 2017), detailed progression is needed to:
  - (a) formulate tasks or tests so that the responses can provide evidence of learning progression
  - (b) formulate helpful comments, tailored to the individual needs of each student
  - (c) give clear guidance on how to improve
- Some countries (e.g. Scotland) provide only broad statements of progression leaving pedagogical decisions open to schools and teachers, whereas others (e.g., Quebec, Canada) provide detailed frameworks as part of their main curricular framework
- According to Successful Futures, the progression steps should "provide a context within which teachers can select teaching and learning approaches that build from one step to the next but that still provide significant freedom to offer engaging experiences that match their children and young people's needs." (Donaldson, p. 67).
- Heritage (2008) "suggests that greater attention should be paid to the different levels of specificity used to articulate the curriculum" (p. 17, CAMAU report). If too detailed, learning can become a checklist of things to learn. However, learning progressions vary greatly from a unit of work to lasting over years.

Views of AoLE Group?

Q3. If detailed frameworks of progression are included alongside broader statements, where should they be located? *

- A. Within the curriculum framework, alongside the broader statements of overall learning aims
- B. In associated professional learning material and/or contexts
- C. _____

- Countries differ in the extent to which they provide more detailed progression frameworks and where they are located. For example, British Columbia has quite broad curricular competencies for each learning area, but also provide much more specific sets of standards and expectations, although the latter are in a separate document and are for voluntary use in schools.
- Some frameworks (eg, in New Zealand and, in UK, the CLPE Scales for Reading and Writing) exemplify how detailed description of progression, exemplification of it through student work and pedagogical guidance on appropriate next steps can be built into professional learning material/activities.

Views of AoLE Group?

* Q3 follows from Q2 and is only relevant if the preferred possibility for Q2 is B or C

Purposes of Progression Framework

Rationale | **AoLE Proposal**

Rationale for choice of possibility for Q1

A – too vague, will lead to inconsistencies between / within schools; however "aspirational" for the profession; only realisable if assessment / accountability doesn't mandate set progress; just marker points for the end of the journey; requires "milestones"

B -- too restrictive / prescriptive; doesn't allow customisation, prevents localised SOWs, doesn't encourage flexibility; does not support 4 purposes; would remove creativity

C – links to age / stage potentially hold back most able and/or be unattainable for least able / ALN; too similar to what we have now; doesn't reflect the learners journey; markers are a good thing (not age though)

D – Allows individualised progress regardless of ability; most relevant to the aims of the new curriculum; any "next steps" need to be carefully crafted; markers needed for end of "stage" points

Other – Combination of CD (age or stage) with key "milestones" particularly at Primary to secondary transition
-- Pen portraits of "most" learners should be… created for each stage

Rationale for choice of possibility for Q2

A – Desirable (is the system mature enough for this?); time would be an issue here; required professional development and time; too broad; practically, will lead to inconsistency; broad statements + more detail about short term, medium and long term;

B – Useful for ensuring consistency across the system; too prescriptive; narrows experiences; "sufficient" is difficult to define (NQT, non-specialists, struggling teachers)
C – Broad statements open to interpretation; potential inconsistencies;
D – Australian model;

Other – Needs to be in one document; long term aims, plus medium term detail
-- Need to ensure does not become "tick box"
-- Big Ideas + Progression framework combined

Rationale for choice of possibility for Q3

one document for teachers
Both A and B are needed. Single curriculum AoLE document should be used as part of professional learning

Other

-- Needs additional (external) exemplification
-- Needs to be one document
-- Leadership documents needs to be consistent (specification of time)
-- Need paper and flexible electronic versions

Example: The aspect of the learning journey should be structured as… because…

"The aspects of a learning journey should be structured as a single, integrated document in support of an AOLE. Each "What matters" statement should be combined with broad expressions of pupil progress and reference to key achievements at set points along that journey."

The AOLE feels it is vital to avoid under specification of progress details and guidance as this will not provide the structure necessary to ensure that all teaching and learning is suitably aspirational and rigorous. Whilst the AOLE is conscious of key pedagogies it feels that providing detailed guidance for teaching and planning will too intimately link the "curriculum" with methods of delivery, and as such reduce the flexibility in the classroom. The groups feels that in addition to the progression journey and in line with Successful Futures, "reference points" are essential (suggest Primary > Secondary Transition) to ensure suitable progress for all learners, regardless of their place within the education system.

The AOLE feels the statements of progression need to be broad enough, yet sufficiently detailed (Black et al) to meet the needs of teacher subsidiarity and the "4 purposes", whilst maintaining consistency and rigour thorough the system – without reducing progression to a "checklist"

The AOLE feels it is unnecessary to produce an additional, detailed framework and that all statements of progression are embedded within each What Matters statement.

List of additional documents available online

1. References to 'progression' in *Successful Futures*
2. Health and well-being: links to national curricula
3. Health and well-being: examples of progression statements
4. Humanities: links to national curricula
5. Examples of Religious Education Progression Statements in Scotland

These documents are available at
https://www.dropbox.com/sh/tgtjidlcuze9zt7/AABP34QNYEPceIJsjwlklBrGa?dl=0

Note also that analyses of individual country frameworks in the various curricular areas are available from the CAMAU project team.