

Draft Regulatory Impact Assessment for proposed Curriculum and Assessment legislation

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Introduction

The National Assembly has a role, along with its stakeholders and members of the public, to scrutinise the proposed costs and benefits of changes to legislation. To do this they will need to understand the potential impacts, both positive and negative, on all key stakeholders and organisations that the proposals will affect. This will allow them to weigh the pros and cons of the different options proposed on all groups, including the option to maintain the status quo.

The vehicle through which they can do this is through the Regulatory Impact Assessment (RIA). The Regulatory Impact Assessment forms part of the Explanatory Memorandum for the proposed legislation and needs to set out:

- the best estimates of
 - i. The gross administrative, compliance and other costs to which the provisions of the legislation would give rise;
 - ii. The administrative savings arising from the legislation;
 - iii. Net administrative costs of the legislation's provisions;
 - iv. The timescales over which all costs and savings would be expected to arise; and
 - v. On whom the costs would fall;
- Any environmental and social benefits and dis-benefits arising from the legislation that cannot be quantified financially.

Purpose of the document: The purpose of this draft of the RIA is to set out the scope; assumptions; evidence; evidence gaps, and to open a dialogue on the approaches to setting out the costs, savings, benefits and dis-benefits of the proposed changes.

Background

The White Paper highlights the proposals for primary and secondary legislation to enable the new curriculum and assessment arrangements in Wales. The legislation marks one element in a landscape of reforms to support the new arrangements which mark a step change in the education system in Wales: such as Professional Learning; Leadership; Initial Teacher Education; and new evaluation arrangements.

The Regulatory Impact Assessment is concerned with the legislative provisions set out in the proposed legislation. Therefore the RIA does not represent the costs and impacts of all the work

being undertaken to support the new curriculum and assessment arrangements but only those which have accompanying legislative requirements¹.

This draft RIA broadly considers two options for the proposals set out in the White Paper:

- 1) Business as Usual- this means retaining the existing provisions relating to curriculum and assessment.
- 2) Introduce new legislation (including amending existing legislative provisions) relating to the curriculum and assessment arrangements set out in Successful Futures.

The principle of a National Curriculum has been enshrined in legislation since 1988. The proposed legislation aims to reaffirm the principle of a national curriculum framework for Wales. Therefore, the basis of the legislative requirements set upon elements of the education system are similar to those requirements that currently exist but seek to enable changes to the focus of teaching and learning in line with the recommendations set out in Successful Futures. The legislative provisions will enable cultural and behavioural changes required from the system. This document will set out the range of cultural and behavioural changes we may see as a result of the legislative proposals.

Sunk Costs

In the Welsh Government, sunk costs in relation to legislation are those costs incurred prior to the financial year in which proposed legislation becomes law². In the case of legislation relating to curriculum and assessment, we are working on the assumption that the RIA will mainly appraise costs and impacts from the financial year when the assembly is dissolved for the next elections: April 2021. Examples of sunk costs in relation to curriculum and assessment arrangements are:

- Revisions to the Literacy and Numeracy Framework and the Digital Competence Framework to bring it into line with the new curriculum;
- Development and introduction of Online Adaptive Tests;
- Development of E-portfolios;
- Pioneer School funding for AoLE development;
- Development of curriculum statutory guidance;
- Development of guidance for Religious Education;
- Development of guidance for Relationships and Sexuality Education (RSE);

¹ <https://beta.gov.wales/sites/default/files/publications/2018-03/education-in-wales-our-national-mission.pdf>

² HM Treasury (2018) Green Book: Central Government Guidance on Appraisal and Evaluation.

- Professional Learning Funding (pre-2021) to support the launch of the National Approach to Professional Learning; and
- Changes to Initial Teacher Education (ITE) provision to reflect new arrangements.

While sunk costs will not be included in the forward looking assessment of costs, they will be outlined in the Explanatory Memorandum. These costs have been incurred as they are necessary to support the policy development process (e.g. the Pioneer School funding for AoLE development), or they are structural elements, which require a 'lead in time' that need to be in place for the proposed statutory implementation of the new arrangements in 2022 (e.g. changes to ITE provision).

Analytical approach

A robust and thorough approach to estimated costs and benefits is important for Welsh legislation. However, this also needs to be proportionate and ensure that public resources are used effectively.

Our broad analytical approach to the RIA is as follows:

1. Where financial information is available and relevant the costs and benefits will be monetised. This may include the use of proxy cost information to show anticipated spending, savings or costs.
2. If this is not appropriate, where possible the benefits and impact will be quantified.
3. However, given the nature of the legislative changes proposed it is envisaged that many of the impacts will be presented using qualitative, literature or proxy evidence.

It is important to note that the nature of the changes to legislation look to enable cultural and behavioural changes to teaching and learning so it is likely much of the RIA will focus on point three: *the impacts will be presented using qualitative, literature or proxy evidence*. Where decisions and assumptions are made in this process, these will be decided in conjunction with our stakeholders and experts in line with the co-production of the reforms which underpin these proposals, through the RIA Steering Group.

The proposed provisions and their impact have been categorised into three broad categories:

Category 1 – Legislative change with a significant change to practice

These are legislative provisions which we believe have minimal change in a point of law but will require or result in significant changes to practice.

Category 2 – Legislative changes to align with practice

These are legislative changes that we believe will have minimal impact on practice. For example, an element of current legislation that we don't enforce and is not delivered is not retained in the proposed Curriculum and Assessment legislation.

Category 3 – Technical amendments

These are legislative provisions which currently exist in legislation and are being replicated in the same way in the proposed Curriculum and Assessment legislation. These provisions may have technical amendments to ensure that the words and phrases are applicable to the new arrangements. This also includes provisions which are re-enacted in the proposed Curriculum and Assessment legislation.

Scope of the RIA

Who?

The provisions will have different impacts on different groups. The Regulatory Impact Assessment needs to ensure that those impacted are accurately represented whilst ensuring the process of assessing impact is proportionate.

The scope of those impacted to be included in the RIA has been structured into the following groups:

- 1) **Learner and parents** – key recipients of the reforms. Improved experiences and outcomes for learners are the primary purpose of the reforms set out in Successful Futures.
- 2) **Delivery partners** – these include maintained schools and nurseries; non-maintained nursery funded education; and Pupil Referral Units (PRUs). These settings will have direct legislative requirements as a result of the proposed provisions. Other settings may wish to adopt a curriculum that is in line with the Curriculum for Wales, but this is out of choice rather than as a result of the legislation.

These settings are within scope of the RIA as the proposed provisions require them by law to deliver the curriculum.

- 3) **Strategic Delivery Partners** –Welsh Government; Local Authorities; Regional Education Consortia; Estyn; Qualifications; Standing Advisory Councils for Religious Education (SACRES) and Wales Association of SACREs (WASACRE). These groups will be required to deliver or support the implementation of the new curriculum and assessment arrangements.

Local Authorities have duties in relation to the provision of compulsory school education in their area, which includes delivery of curriculum and assessment arrangements.

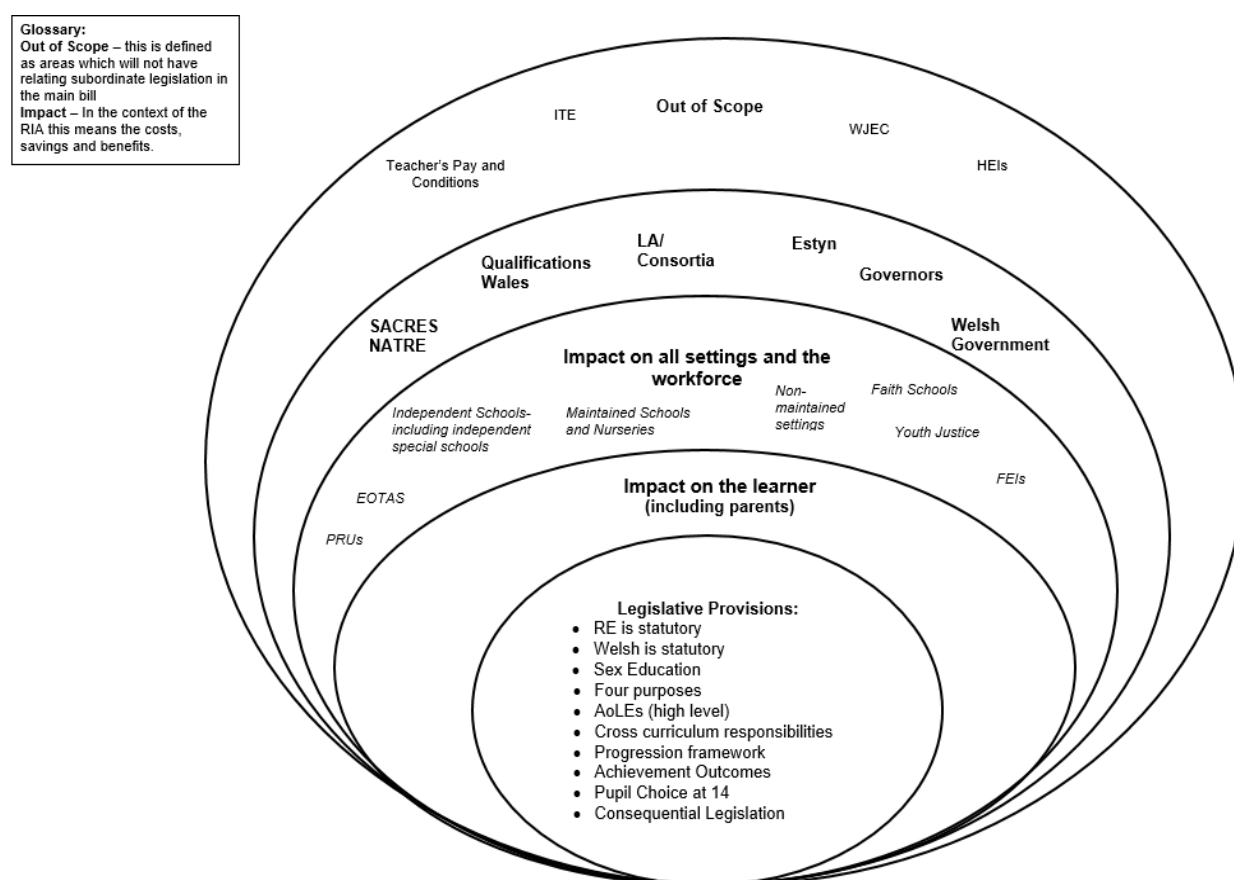
Regional Consortia will have a key role in supporting schools and practitioners to deliver these provisions and this will have a cost and an impact on them. This will be through curriculum support, Professional Learning support and school improvement activity. Some of this will be a continuation of their existing roles and activities but the RIA will look to highlight where there are elements that are directly related to the proposed changes to legislation.

Estyn's primary role is to inspect the quality and standards of education and training in Wales, whilst using the evidence they gather to build capacity in the delivery of education and training. It is therefore an inherent requirement of their role to adapt to changes in the education system to ensure their inspection and remit activity is fit for purposes.

Qualifications Wales have a role to ensure the qualifications system in Wales reflects the curriculum as set out by Welsh Ministers. The impact of these changes on Qualifications Wales will be addressed further once the curriculum is made available in April 2019.

SACREs (Standing Advisory Councils for Religious Education) are set out in legislation and have a role in advising a local authority on the religious education to be given in accordance with the agreed syllabus, including methods of teaching, advice on materials and the provision of training for teachers. Therefore, they will be involved with the proposed changes to the provision of religious education in nursery.

Figure 1: Scope of the RIA for the proposed Curriculum and Assessment legislation



Deemed to be out of scope are: Teachers Pay and Conditions; Initial Teacher Education; and Higher Education institutions. This is because the legislation or their primary purpose will not be required to change to reflect the proposed provisions, or will change in anticipation of changes to curriculum and assessment prior to 2021 (and are therefore a sunk cost). For example: the plans for new course programmes for Initial Teacher Education to align with the new curriculum arrangements will be that Newly Qualified Teachers (NQTs) will be ready for the statutory enactment of the legislative provisions in September 2022. Therefore the development costs associated with adapting ITE provision to reflect the new curriculum and assessment arrangements are defined as sunk costs.

What costs?

The nature of the legislative changes proposed act as an enabler to changes to teaching and learning in schools and settings in Wales. The legislation looks to **reaffirm** a national curriculum for Wales in legislation. Therefore, it is unlikely that many of the proposed changes will have clear monetised costs associated with changes to teaching and learning. Instead, we suggest that monetised costs can be provided for the support for practitioners to change their practice in schools (i.e. Professional Learning) and this area will be the biggest cost associated with the legislative changes. Professional

Learning is critical to enabling schools to make changes to teaching and learning. By this we mean, support in the form of release time, Professional Learning provision, promoting collaboration between practitioners and other stakeholders to deliver the behavioural and cultural changes enabled. This will be further explored in the next sections of this draft of the RIA.

A phased national approach to professional learning from November 2018 will ensure all practitioners are equipped to respond to emerging development needs. It is intended that funding will support and facilitate the following activities:

- a) National professional learning day(s)
- b) Availability of a blend of traditional, school-based and e-learning for teachers;
- c) Flexibility in funding so schools can work together collaboratively.

It is proposed that information on expenditure incurred up to 2021 is used as a proxy for the information used to calculate the full costs required for the support for practitioners and delivery partners in the RIA. This will be discussed for the relevant provisions below.

Timescales

Education in Wales: Our National Mission sets out the plans for phased implementation of the new curriculum and assessment arrangements: starting in September 2022 and ending in 2026/27 academic year³.

The RIA needs to accurately reflect the costs, savings and benefits of the proposed legislation. This involves both transition to a new system but also the new Business As Usual (BAU) or where the new arrangements are embedded into the system. The standard timescales for an RIA in Welsh Government has tended to be five years. However, due to the phased implementation introducing the new arrangements five years will only cover the transition period and not time for the new arrangements to become business as usual. As a result, we propose a 10 year appraisal period for the RIA for the proposed curriculum and assessment legislation.

Caveats

This document sets out the initial thinking around the proposed provisions as set out in the White Paper. However, the nature of the provisions means that as they change and develop as a result of the feedback to the White Paper, the RIA will continue to develop to reflect these changes.

³ Nursery to Year 7 roll out September 2022; Year 8 roll out September 2023; Year 9 roll out September 2024; Year 10 roll out September 2025; and Year 11 roll out September 2026.

This document contains financial costs based on expenditure incurred in 2017-18 and budgeted expenditure for 2018-19. These costs are included to as proxies to the types of information which will be included in the final RIA and as the development process is ongoing, are not commitments to future spend.

The detail around the content of the new curriculum will be made available for feedback in April 2019 following extensive engagement and collaboration with Pioneer Schools and expert practitioners. This document therefore presents the early stages of gathering evidence to support the assessment of costs, impacts, benefits and dis-benefits associated with the proposed changes.

Further development of this document will take place as the curriculum is made available for feedback in April 2019 and in preparation for the introduction of legislation.

Transformational Curriculum arrangements

A National Curriculum in Wales has been enshrined in law since 1988. This principle is maintained in the recommendations set out in Successful Futures but with changes to make it flexible and suitable for a 21st Century.

This section will set out the following:

- Which provisions and how have they been categorised in terms of impact;
- Who is impacted by the proposals;
- What sources of information/ evidence we propose using; and
- Which evidence gaps we are proposing to fill.

Categorising provisions

The proposed areas of legislative provisions set out below require changes to practice to deliver different curriculum arrangements. These will be appraised as part of the RIA:

- 1) A duty on Welsh Ministers, Local Authorities, Governing Bodies and Head Teachers, to deliver a broad and balanced curriculum that is designed to meet the four purposes to replace the existing duty to deliver a broad and balanced curriculum.
- 2) A duty on Welsh Ministers, Local Authorities, Governing Bodies and Head Teachers to deliver a curriculum that contains the named Areas of Learning and Experience (AoLEs) to replace the existing subject listings, including a power to develop statutory guidance relating to the content of AoLEs. It is proposed this is accompanied by a power to enable Welsh Ministers to issue statutory guidance for each AoLE.

- 3) Duty on schools to deliver cross-curriculum responsibilities of Literacy, Numeracy and Digital Competence across the curriculum.
- 4) Removal of the distinction between core and foundation subjects.
- 5) Removal of Foundation Phase and Key Stage terminology to create a continuum of learning.
- 6) Regulation making powers to set Progression Reference Points at ages 5, 8, 11, 14 and 16.
- 7) Relationships and Sexuality Education as a statutory part of the curriculum up to 16.
- 8) Religious Education as a statutory part of the curriculum up to 16.
- 9) Welsh as a statutory part of the curriculum but with removal of the distinction between first and second language Welsh.

The second categories of provisions are being amended to align them with practice in schools and settings, therefore there will be impacts but these are more specifically focused:

- 1) **Requirement for schools to develop specified cross-curriculum responsibilities across the curriculum** – literacy and numeracy will remain statutory parts of the curriculum. Digital competence is currently supported as a cross-curricular element. It is proposed that digital competence becomes statutory: for some schools this will be bringing legislation into line with their current practice.
- 2) **Removing the requirement for Religious Education to be delivered in schools post-compulsory school age** – This is currently not enforced throughout the education system and is not delivered.
- 3) **Non-maintained nurseries to deliver religious education** – The National Exemplar Framework for Religious Education currently supports delivery of this subject in the Foundation Phase through the following areas of learning: Knowledge and Understanding of the World, Personal and Social Development, Well-being and Cultural Diversity; and Creative Development. However, the existing legislation doesn't require it to be taught in nursery classes.

The following curriculum provisions are to be retained in legislation but require technical amendments to ensure they reflect the new curriculum arrangements in Wales. As a result, these provisions will not be appraised in the RIA:

- 1) **Ensuring Learners have choice between 14 -16** - This proposal is a technical change to an existing provision to ensure that the domains reflect a move away from traditional subject titles to reflect Areas of Learning and Experience. The policy intention which is reflected in

the legislation remains – to entitle learners to a wider choice and flexibility of suitable courses of study.

- 2) **English as a statutory part of the curriculum** – this is already currently a requirement of the curriculum and will be re-enacted as part of the new arrangements.
- 3) **Retain existing statutory requirement to provide careers education to learners in maintained schools in years 10 and 11** – the provision will be re-enacted.
- 4) **Disapplication of the National Curriculum** - This proposal is a technical change to an existing provision to reflect a change of terminology from ‘National Curriculum’ to ‘Curriculum for Wales.’ The policy intention and therefore the allowance for Head Teachers remains the same.
- 5) **Development and Work experiments** – The policy intention and use of these powers remains the same. The legislation will be amended to reflect a change in terminology from national curriculum.
- 6) **Welsh Ministers are prevented from allocating set times in the school timetable for particular AoLEs** –The policy intention remains the same. This provision will be amended to reflect the change from subjects to AoLEs.
- 7) **Welsh Ministers to issue guidance on how to exercise education functions in order to improve the standard of education to local authorities, governing bodies and head teachers** – this provision will be re-enacted.

Curriculum Structure Provisions

Proposals

The preferred option is to introduce legislation to include the following provisions (which have been grouped together in terms of this analysis):

- A general duty to be placed on schools and settings to deliver a curriculum designed to meet the four purposes of education.
- Duty to deliver a curriculum structured around six named AoLEs and removing the distinction between core and foundation subjects.
- Power to issue statutory guidance setting out the scope of each AoLE.
- Removal of Phases/Key Stages and organising the new national curriculum as a continuum of learning.
- Regulation making powers to set Progression Reference Points at ages 5, 8, 11, 14 and 16.
- A duty on the governing body and head teacher to design and implement a curriculum for their schools that enables pupils to reach or go beyond each Progression Step.
- Careers education and work related experiences embedded across the six AoLEs.

The 'Business as Usual' option would involve retaining the following legislative provisions: duty to deliver a broad and balanced curriculum that promotes the spiritual, moral, cultural, mental and physical development of pupils; a curriculum structured around Key Stages and Phases with specific subject requirements for each Stage or Phase; a distinction between core and foundation subjects; and the content of subjects and their assessment arrangements set out in Programmes of Study.

These provisions will have an impact on the following groups: learners; schools and practitioners; local authorities; regional consortia; Estyn and Qualifications Wales.

Costs and Savings

There are two main costs that will contribute to the enactment of the above provision. The cost of schools changing the curriculum arrangements that they deliver; and the Professional Learning and curriculum support costs associated with moving practitioners from existing practices to the practices enabled by the proposed provisions. It is anticipated that costs associated with developing statutory guidance will be a sunk cost as it will be completed ready for the final curriculum and assessment arrangements to be available in January 2020.

In terms of the cost of schools changing their curriculum arrangements, this is seen as part of their core activity. The essence of the duties on local authorities, head teachers and governing bodies will

not change as a result of the proposed legislation – but what will differ is how they deliver these duties and the considerations in preparing to deliver these duties in schools and classrooms. Curriculum delivery and support is integral to their roles. The legislation does not fundamentally alter the requirements of a school or the intent behind a national curriculum.

Funding to deliver the curriculum is part of the core funding given to schools. School funding is set by local authorities from their budgets which are made up of the Revenue Support Grant (RSG) from the Welsh Government, council tax and other local authority funding. This money is un-hypothecated – this means that local authorities can choose what they spend their whole budget on and schools can choose how to spend their budgets. Given this autonomy it would be misleading to gather this information to calculate local authority averages or national averages where there is likely to be variation at a school level. It would also not be suitable in this RIA to set out what is the ‘appropriate’ amount to be spent on delivering curriculum arrangements.

Scoping work undertaken with stakeholders resulted in the conclusion that breaking down the allocated schools budgets to focus on which tasks support which of the above duties would be a ‘false economy’ as schools do not think of their time in that way.

Therefore the cost of delivering a curriculum in schools will be shown as the average delegated schools budget. The Total Gross Schools Expenditure in Wales is budgeted to be £2,566 million for 2018-19. 84.2% of the total gross schools budgeted expenditure is delegated directly to schools in 2018-19.

Table 1: Gross budgeted schools expenditure by local authority 2018-19

2018-19	Minimum	Maximum	Welsh Average
Gross Schools budgeted expenditure per local authority (£000s)	50,934	300,156	116,657
Of the Gross expenditure, the delegated Schools Budget per local authority (£000s)	43,915	269,799	98,179

Source: Welsh Government (2018) <https://gov.wales/statistics-and-research/local-authority-budgeted-expenditure-schools/?lang=en>

Table 2: Total gross schools budgeted expenditure per pupil 2018-19

2018-19 delegated schools budget	Minimum	Maximum	Welsh Average
Average across all sectors (£000)	4,443	5,416	4,776
Primary (£000)	3,877	5,004	4,253
Secondary (£000)	4,572	5,564	5,069
Special (£000)	14,909	41,264	21,298

Source: Welsh Government (2018) <https://gov.wales/statistics-and-research/local-authority-budgeted-expenditure-schools/?lang=en>

This information will be used as a proxy of information to be used in the final RIA as to the cost of administering the new curriculum and assessment structure⁴.

The second area of proposed significant cost is related to curriculum support and professional learning (both funding to deliver but also the release of teachers to attend). The changes to the curriculum highlighted in the proposed provisions represent changes to teaching and learning in schools.

In 2017-18, Welsh Government provided approximately £6.458 million⁵ in the form of curriculum support. This involved funding for: core subject support, coding skills, and support for the Foundation Phase.

The Welsh Government has committed to £9 million in 2018-19 and £15 million in 2019-20 to support Professional Learning through the National Approach to Professional Learning (NAPL). This money will be hypothecated to ensure that it is used to create time for practitioners to make changes to practice in anticipation of the changes to curriculum and assessment arrangements. The money is intended to enable: cover for practitioners to give them time to be involved in Professional Learning; incentivising and rewarding staff to investigate the implications of changes to the curriculum; and creating roles and posts to support the changes being made.

⁴ These costs are included to as proxies to the types of information which will be included in the final RIA and as, we are still in the development process, are not commitments to future spend.

⁵ This figure excludes literacy and numeracy support as this is covered in the cross-curriculum responsibilities section.

It is proposed that this is used as a proxy for the information to be used in the final RIA on spend to support the Professional Learning for practitioners to deliver the arrangements as supported by the legislative provisions. Welsh Government (2019) supports this assumption as practitioners view the biggest cost associated with delivering the new curriculum and assessment arrangements is time to engage with the changes.

Finally, the curriculum in Wales requires resources to support the curriculum in both English and Welsh and these are developed commercially with financial support from the Welsh Government. It is likely that some of the costs associated with the production of resources will be a sunk cost and out of scope of the RIA. The other associated costs will be transitional and as the curriculum content is made available, the final RIA will accurately be able to assess which costs are within scope.

Social Impacts

The changes to the legislative provisions seek to enable changes to teaching and learning as indicated in Education in Wales: Our National Mission. There is evidence about what these changes schools may make as a result.

Estyn's thematic work in relation to preparing for the new curriculum⁶ provides some useful qualitative evidence about how schools behaviour and culture will change for the new curriculum and assessment arrangements. The report provides evidence about how schools are adapting their self-evaluation procedures to decide how they need to change their curriculum and pedagogy. The key findings highlight:

- Schools are embracing and embedding the Four Purposes.
- Developing approaches to instil confidence in practitioners to make changes to their practice.
- Engaging with research evidence.
- Developing educational experiences for learners.

The School Changes and Adaptations to Curriculum and Assessment Delivery research project (Welsh Government, 2019) highlights the variety of activity schools can undertake to deliver new arrangements as proposed in Successful Futures and how they adapt and reorganise their existing budgets to make the changes they choose. This is indicative of the impacts on schools to deliver the new statutory curriculum arrangements, including: time to plan to deliver the new curriculum

⁶ <https://www.estyn.gov.wales/thematic-reports/curriculum-innovation-primary-schools>

arrangements; costs to release teachers from the classroom to have this time or to undertake professional learning; teaching across year groups; and a focus on pedagogy.

Both of these sources of evidence give us an indication of what will happen in schools and with practitioners to enable them to deliver the arrangements and the types of behaviour and cultural changes which could result from the legislative proposals. This information could be used as a proxy for the social impact and cost impact of the changes to the proposed provisions.

Cross-curriculum responsibilities

Proposals

The preferred option is to place the three cross-curriculum responsibilities of Literacy, Numeracy and Digital Competence on an equal statutory footing in primary legislation.

Since 2013, Literacy and Numeracy have been statutory elements of the national curriculum in Wales supported by the Literacy and Numeracy Framework (LNF). Therefore it is assumed that there will be minimal impact of this provision. The 'Business as Usual' option would retain the different statuses of literacy, numeracy, and digital competence in law. Digital Competence across the curriculum would be a new statutory requirement for schools and their supporting stakeholders.

Introduced in 2016, the Digital Competence Framework (DCF) supports the embedding of digital competence within the curriculum. The development of the supporting frameworks is a sunk cost as this has already been completed.

It is assumed the greatest impact will fall on schools and governing bodies. Estyn have already adapted their inspection framework and their remit has included work around the publication of the Digital Competence Framework⁷ in 2016. Regional Consortia have already appointed digital leads working with Digital Pioneer Schools to support schools in integrating digital competence across their curricular. This change is therefore a sunk cost for these organisations.

Costs

The Welsh Government currently supports the delivery of literacy and numeracy across the curriculum through funding Professional Learning opportunities and curriculum support. Therefore, the RIA assumes that this will be where the largest costs fall in digital competence becoming a statutory component of the curriculum in Wales.

In 2017-18, the Welsh Government provided £413,000 to support schools to implement the National Literacy and Numeracy Programme. Additional funding (£500,000 in 2017-18) was provided to regional consortia to support literacy and numeracy in their schools. The cost of supporting the literacy and numeracy programme in schools highlight the information on costs which are proposed to be included in the RIA as indicative of the support for the proposed statutory status of digital competence.

⁷ <http://learning.gov.wales/resources/browse-all/digital-competence-framework/?lang=en>

The DCF has been designed not to refer to specific technology in the skill specifications, and therefore to be deliverable largely within the existing and planned capability of settings/schools. The main focus is in relation to developing practitioners' digital confidence and competence, and ideas for integrating digital competence in their teaching, rather than in hardware or software. Consequently, hardware and software changes and associated costs are out of scope of the RIA.

The development costs associated with the Digital Professional Learning offer are a sunk cost and not appraised in this RIA.

Social Impacts

There is evidence which highlights the benefits of subjects, disciplines or themes being cross-curricular, in ensuring that the curriculum is fit for purpose. The Cambridge Primary Review (Alexander, 2010) claim that cross-curricular themes or groupings more properly address changing times and uncertainty about the future, making the curriculum and the impact on learners better proofed for the future. Specifically, the impact of making digital competence a statutory cross-curricular responsibility is important to support the labour market where "computational thinking (is) influencing research in nearly all disciplines" (Bundy, 2007, in Wing, 2008). The Independent ICT Review Panel's report to Welsh Government noted that digital competence is as important in the twenty-first century as literacy and numeracy.

There are also likely to be impacts for the learners and for staff of adopting digital competence as a statutory part of the curriculum. These will need to be explored further as the RIA develops.

Estyn have already begun to look at how digital competence is embedded in the curricula of schools in Wales (Estyn, 2018). The report identifies examples of innovative and interesting practice in how schools are preparing for the DCF and shares these for other schools to consider. The report will help schools to understand their current strengths, areas for improvement and the changes which need to be made to embed the DCF in their provision. It provides an overview of the preparation that these schools have made about a year after the DCF was made available to schools.

Welsh Language

Proposals

The proposals retain Welsh language as a statutory part of the curriculum. This is similar to the current legislative requirement which sets out Welsh as a statutory part of Key Stages and Phases. However, the proposal to remove the first and second Welsh language Programmes of Study and set one continuum for the Welsh language marks a change for schools.

Welsh Government assumes there will be a greater impact on English-medium schools as a result of these proposals, although this will not necessarily be a financial impact. English-medium schools will have to focus more on their delivery of the Welsh language. Differentiated expectations for Welsh in Welsh-medium and in English-medium schools will be set out in the form of Achievement Outcomes, and will be used as a temporary scaffold to support teachers.

The Welsh Government proposes a transition period in these arrangements that will enable English-medium schools to improve their delivery of the Welsh language over time. These expectations, articulated through Achievement Outcomes, will be reviewed every three to five years and will gradually increase the challenge to reflect learners' changing experience and learning in Welsh as the new Curriculum is implemented.

This provision is not concerned with wider changes to the system to promote the use of the Welsh Language as part of Cymraeg 2050, but is focused on learner acquisition of Welsh language skills. Therefore, the RIA will appraise the curriculum specific impacts relating to Welsh language.

Costs and savings

Welsh Government currently supports the delivery of the Welsh language in the curriculum.

The Welsh Language Sabbatical Scheme is a key tool to supporting the workforce to deliver Welsh in English-medium schools. In 2017-18, £3.350 million was allocated to the scheme⁸. It is anticipated that in order to up-skill practitioners in the Welsh language to deliver against one continuum of progression this information will be indicative of the information used in the RIA for the first three to five years of the new curriculum and assessment arrangements (2021-22 to 2025-26), at which point expectations will be reviewed. However, this can be used as indicative of the information used to support an appraisal of spend to support the Sabbatical Scheme following changes to legislation.

⁸ The allocated spend for the scheme in 20018-19 and 2019-20 is a defined as a sunk cost in this RIA.

Welsh Government also provides financial support through the Education Improvement Grant (EIG) and Raising School Standards Grant to support local authorities and regional consortia to deliver activities. The EIG is not hypothecated; therefore it is not possible to indicate specific amounts allocated by local authorities and consortia to support the Welsh Language. However the activities include:

- In-school training to identified schools to improve teaching and learning of Welsh.
- Strengthening cluster leadership for Welsh and Bilingualism through Primary Cluster Welsh language coordinator network meetings
- Supporting clusters to develop transition in Welsh from KS2 to KS3 and to accelerate pupil progress in Year 7.
- Supporting late immersion programmes into Welsh-medium education.
- Developing cross-curricular resources to support the development of Welsh.

It is envisaged that this work will continue to support the development of Welsh in the curriculum.

The Welsh Government currently financially supports the development of Welsh medium teaching and learning resources that are not available commercially due to the size of the market, to support the delivery of the curriculum across schools in Wales.

New bilingual professional learning and curriculum support resources will need to be developed for the reformed curriculum. Costs incurred during the development of the curriculum guidance documentation will be a sunk cost as they will occur prior to the time period appraised by the RIA, however costs incurred for resources developed during implementation of the legislation will be included in the final RIA.

Social Impacts

This proposal supports the first strategic theme of Cymraeg 2050: Welsh language strategy 'Increasing the number of Welsh speakers.' Welsh Government suggest that the policy intentions included as part of the strategy will support the trajectory to reach one million Welsh speakers by 2050 (Welsh Government, 2017).

Estyn evidence has highlighted the impact of Welsh second language standards on pupil's attainment in the Welsh Language: *"In most schools, provision for Welsh second language is good in the Foundation Phase. In key stage 2, provision is less well developed. In secondary schools Standards*

in Welsh second language are good in a few schools and improving in a majority of them” (Estyn Annual Report 2011-12). This supports the proposal to remove the distinction between first and second language Welsh.

International Languages

Proposal

The preferred option is for the Achievement Outcomes for the Languages, Literacy and Communications AoLE, set out in statutory guidance, to set out an expectation for primary schools to teach an International Language(s). This option would give flexibility to schools as to when and how languages are introduced.

The 'Business as Usual' option would involve the Achievement Outcomes for the Languages, Literacy and Communications AoLE, set out in statutory guidance, to set out an expectation for learners to begin learning International languages at the start of secondary school. This option replicates the current requirements where modern foreign languages are statutory for KS3.

It is anticipated that the preferred option will have a greater impact on primary schools as they will be expected to provide for international language teaching where they currently do not. In addition, it will have an impact on Estyn inspection of primary schools. Regional Consortia currently support Primary Schools to deliver Modern Foreign Languages (MFL) through the Global Futures Programme. Therefore, it is anticipated that their role will not be impacted greatly.

Costs and Savings

The Welsh Government currently supports modern foreign languages through the Global Futures Project. This involves consortia providing support to primary schools to deliver MFL, including activities such as:

- Secondary schools working with feeder primary schools to provide opportunities for KS2 learners in MFL;
- German Digital Network Grant;
- Developing transition links between primary and secondary schools for MFL;
- Partnerships between primary schools to introduce at least one modern foreign language; and
- Development of primary teaching resources from Modern Foreign Languages.

It is anticipated that the cost information relating to Global Futures can be indicative of the information used to appraise the spend to support the delivery of International Languages in primary schools.

Social Impacts

There is evidence that early introduction of language learning in primary school improves the motivation and attitude of learners in studying a language throughout their schooling. Specifically,

the Barcelona Age Factor study (BAF) concluded that there are attitudinal benefits for learners in starting language learning in primary school (Muñoz, 2006).

There are also likely to be impacts for practitioners delivering international languages in primary schools. These will need to be explored further as the RIA develops and the curriculum is made available for feedback in April 2019.

Relationships and Sexuality Education

Proposals

The preferred option for provisions⁹ relating to Relationships and Sexuality Education are to:

- Sex Education to be renamed Relationships and Sexuality Education (RSE) in legislation.
- Teaching of age appropriate RSE as compulsory throughout the curriculum – N.B. this is not wholly a new provision
- Retain the requirement for schools and settings to publish and make available their policy on sex education, and extend this to include RSE.
- Retain the duty on Welsh Ministers to issue statutory guidance in this area.
- Removal of the requirement to deliver sex education for post -16 learners in schools.

The 'Business as Usual' option would involve retaining the statutory curriculum elements of Sex Education for learners in KS3, KS4 and 6th forms in maintained schools (i.e. retain requirement to deliver sex education in schools for post-16 learners); Personal and Social Education (PSE) for learners in KS2, KS3 and KS4; and retain the requirement for schools to publish sex education guidance. The development, publication and translation cost associated with statutory guidance for RSE in the new curriculum will be a sunk cost as this will be available alongside the new curriculum and assessment arrangements in January 2020.

The current curriculum requires delivery of elements such as Sex Education and PSE, which will form the basis of the proposed statutory Relationships and Sexualities Education (RSE), at different Key Stages. Therefore, for some practitioners there is no new requirement as a result of the changes. In addition, the expectations of practitioners around delivering age-appropriate RSE in the future will align with the current Foundation Phase requirements as part of the Personal and Social Development, Well-being and Cultural Diversity Area of Learning. However, the proposed provisions relating to RSE will introduce a new legislative requirement for KS2 pupils to provide this as part of the curriculum – this will be appraised as part of the RIA, as will the adaptation of the new form of the subject.

It is anticipated that the following groups will be impacted: learners; Schools; local authorities; and Regional Consortia. Estyn's role already encompasses inspection of PSE and Sex Education and

⁹ The Right to Withdraw is under consideration as part of the White Paper Consultation. Consequently, the options have not been appraised in this draft version of the RIA.

developing further understanding through their remit work¹⁰ so the impact on Estyn is anticipated to be minimal.

Costs and Savings

Given the proposed legislative changes, it is the assumption that support will be needed for practitioners to deliver age-appropriate RSE as part of the statutory curriculum. This will be an additional requirement for primary schools, and will come in the form of professional learning support for practitioners throughout compulsory schooling.

In 2018-19, Welsh Government provided £200,000 to Regional Consortia to support teachers to deliver Sex and Relationships Education. It is proposed that for the purposes of the RIA this is used as a proxy for the information to support the proposed statutory status of RSE in the new curriculum arrangements. This funding is expected to be transitional as the system moves towards the new arrangements.

Social impacts

Evidence from Sex and Relationships Education Expert panel indicated that the existing legislation around sex and relationships education in Wales is outdated and not fit for the current world in which children and young people exist.¹¹ Estyn's remit work on the teaching of healthy relationships in schools¹² highlights the mixed approaches to delivering relationships education in Wales currently.

The statutory status in the curriculum will require commitment from practitioners and school leaders to deliver age appropriate RSE in schools and settings. Moore, Littlecott, Fletcher, Hewitt and Murphy (2016) state that commitment in the senior management team to delivering health improvements are important for facilitating the delivery of comprehensive interventions.

The focus of much of the evidence of the impact of RSE on learners is often focused on public health benefits, on secondary school age learners and their experiences of RSE, and limited research on RSE in Early Years Settings and Primary Schools (Welsh Government, 2017). The resulting gaps in evidence will be assessed as part of the development of the RIA, and will be filled where proportionate.

¹⁰ [A Review of Healthy Relationships Education](#) (2017).

¹¹ <https://beta.gov.wales/sites/default/files/publications/2018-03/the-future-of-the-sex-and-relationships-education-curriculum-in-wales.pdf>

¹² <https://www.estyn.gov.wales/sites/default/files/documents/A%20review%20of%20healthy%20relationships%20education.pdf>

Religious Education

Proposals

The proposals in relation to Religious Education (RE)¹³ are to:

- a) Retain existing provisions around the adopting of an agreed syllabus for RE in each local authority, but ensuring that Agreed Syllabus Conferences and Local Authorities must give regard to the guidance developed to make links with the Humanities AoLE.
- b) Ensure provision of RE for all learners up to 16 (retained provision).
- c) Remove the current exemption from RE in school nursery classes to ensure parity with the other elements of the Humanities AoLE.
- d) Removal of the compulsion to deliver RE for registered pupils of post-compulsory education age at a school. However, this does not prohibit schools to provide or learners to participate in lessons on a voluntary basis.
- e) The description of an Agreed Syllabus to be amended to reflect non-religious beliefs.
- f) Retain the existing provisions regarding the delivery of denominational Religious Education in schools with a religious character.
- g) Update the description of the membership of Committee A of Standing Advisory Councils for Religious Education (SACREs) and Agreed Syllabus Conferences (ASCs) to acknowledge those representative non-religious beliefs analogous with religious beliefs.

The 'Business as Usual' option involves retaining the requirements of the agreed syllabus; statutory requirement to deliver Religious Education to all registered pupils in a maintained school; and retaining the exemption from delivering RE for nursery schools.

The proposals relating to Religious Education combine new legislative requirements and amendments to existing legislation. As the following provisions are re-enacted they will not be appraised in the RIA: requirements around the adoption of RE syllabus in each local authority (with the slight change of having regard for the supporting frameworks); and statutory provision of RE in the curriculum.

The proposals which are likely to have impacts are the removal of the exemption to deliver RE for nursery classes; and removing the requirement for school sixth forms to deliver RE. It is proposed that the following groups will be impacted as a result: post-16 learners; non-maintained settings;

¹³ The Right to Withdraw is under consideration as part of the White Paper Consultation. Consequently, the options have not been appraised in this draft version of the RIA.

maintained settings, local authorities, Agreed Syllabus Conferences, SACREs and religious/ non-religious belief groups.

Costs and Savings

Religious Education has been a statutory responsibility of local authorities since the introduction of the Basic Curriculum. Consequently, Religious Education (RE) as with broader curriculum duties is funded through local authority budgets which are made up of the RSG (Revenue Support Grant) from the Welsh Government, council tax and other local authority funding. As highlighted under the curriculum structure provisions, this money is un-hypothecated. Given this autonomy over the budgets and likely variation across local authorities and over time it would be a misrepresentation to appropriate specific amounts to the delivery of RE. These costs are highlighted in the section titled 'curriculum structure provision.'

However, it is acknowledged that there may be costs and/ or savings associated with the changes for nurseries delivering the curriculum and sixth form pupils in maintained settings. This is an evidence gap and it is proposed that understanding these impacts is a priority for the next stages of the RIA development.

In addition, the changes to the description of the agreed syllabus will impact on religious and non-religious groups. The extent of this impact will need to be explored further as the RIA develops.

The National Exemplar Framework was published in 2008 to support the agreed syllabus conferences and local authorities to fulfil their statutory obligations. The framework includes support for Foundation Phase practitioners to deliver RE. In relation to the new curriculum, a supporting framework will be developed, further developing and making links with the RE elements outlined in the Humanities AoLE. This will be to support the agreed syllabus conferences and local authorities as well as being available to practitioners. It is suggested that the development of this further guidance will be a sunk cost.

As recommendation 9 of *Successful Futures* states that Religious Education should form part of the Humanities AoLE, Welsh Government will fund both the Catholic Education Service and the Church in Wales to develop guidance that gives regard to the Humanities AoLE in order to make links between the relevant denominational RE syllabus and the AoLE itself.

Social impacts

There is evidence of the benefits to learners of religious education in the curriculum. Professor Donaldson states in *Successful Futures* that it develops ‘respect and understanding of different forms of religion over time and in different societies.’ The Commission on Religious Education (2018) highlighted, in their latest report, the importance of religious education to provide children and young people with awareness of the diversity of religious and non-religious world views to enable them to live and work well with people with different worldviews from themselves. Estyn (2013) state that Religious Education encourages pupils to explore religious beliefs, teachings and practices, and their impact on everyday life.

There are also likely to be specific social impacts on non-maintained settings delivering nursery funded education. This is an evidence gap and it is proposed that this is addressed through evidence provided as part of this consultation and evidence gathering from specific settings to support the development of the RIA.

Transformational Assessment Arrangements

Successful Futures sets out recommendations relating to assessment as part of a step change to improve teaching and learning in Wales. The existing legislation is suitable to support the proposed assessment arrangements as outlined in Successful Futures. As a result, the White Paper proposes provisions relating to assessment be re-enacted with technical changes. This means the provisions are already a statutory requirement in the current education system in Wales, as listed below.

- 1) **Formative Assessment has Primacy** – this requirement already exists in legislation, and is being maintained as part of the proposed Curriculum and Assessment legislative provisions.
- 2) **Moderation of Teacher Assessment to secure reliability of assessment results where these are used for comparison** - This requirement already exists in legislation and is being maintained as part of the proposed Curriculum and Assessment legislative provisions.
- 3) **Duty on schools to report to parents**- This requirement already exists in legislation and is being maintained as part of the proposed Curriculum and Assessment legislative provisions.
- 4) **Power to make regulations requiring Head Teachers to administer national tests** - This requirement already exists in legislation and is being maintained as part of the proposed Curriculum and Assessment legislative provisions. The legislation has already been altered to reflect the changes from paper-based assessments to online adaptive testing, and so is excluded from this RIA.
- 5) **Transition arrangements between Primary and Secondary schools** - This requirement already exists in legislation and is being maintained as part of the proposed Curriculum and Assessment legislative provisions.

Consequently, there is expected to be a lesser impact on schools and local authorities of these provisions as they will require them to continue to undertake activities they already undertake to fulfil the legislative requirements. Therefore, these provisions will not be appraised in the RIA.

New Provisions

The White Paper also proposes new powers to issue statutory guidance for the Assessment and Evaluation Framework, to include the use of E-portfolios in schools. The Welsh Government already publishes guidance to support assessment. The production of a comprehensive guidance document brings this together in one place. However, the proposals set out new requirements around e-portfolios which schools, head teachers and governing bodies will have to have due regard. This element will be appraised as part of the RIA.

In addition, the proposals suggest a duty for schools to have Achievement Outcomes, with schools having discretion as to what they are. Markers for Achievement Outcomes will be set out in Statutory Guidance to support schools. It is proposed that the impact of this provision will be part of the activity undertaken by practitioners and the sector to prepare for the new arrangements and is costed as part of 'curriculum structure provisions.'

E-Portfolios

Proposals

The proposals set out the preference for statutory guidance to support the use of E-portfolios in schools. The 'Business as Usual' option would involve e-portfolios being available to schools to use but without statutory guidance requiring head teachers to have due regard to their use.

The development of e-portfolio elements on a platform is planned to support the curriculum being available to schools in 2020. This means it is a sunk cost and will not be included in the RIA.

The proposals will impact on learners and schools, including head teachers and governing bodies.

Costs and Savings

The main costs associated with this provision are: writing, publishing and translation of statutory guidance; and familiarisation with the guidance for schools and practitioners.

Welsh Government has committed to the new curriculum and assessment arrangements being available in January 2020. Therefore, it is anticipated the development, publication and translation of statutory guidance relating to the assessment arrangements will be a sunk cost.

Welsh Government anticipate schools and practitioners will require time to familiarise themselves with the statutory guidance. We envisage that this will involve a cost in terms of practitioner time.

We propose that familiarisation costs are calculated using average hourly rates for the teaching workforce from the School teachers' pay and conditions document 2018.¹⁴ This methodology has been used in other Regulatory Impact Assessment's across the UK. It is envisaged that these costs will be borne in the financial years 2021/22 and 2022/23.

¹⁴https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740575/School_teachers_pay_and_conditions_document_2018.pdf

As the policy develops this will be calculated in addition to further evidence around how e-portfolios will be integrated into teaching and learning; the specific requirements on practitioners; and the impact on other elements of teaching practice.

Social Impacts

The impact on the learner is also an important consideration when appraising the requirements for e-portfolios. Evidence from beyond Wales highlights the benefits to the learner of using e-portfolios as it gives learners increased ownership of their own learning. Hillyer & Lye (1996) argue that using portfolios allows the learner to assume responsibility for their learning, better understand their strengths and limitations, and for learners to learn to set their own goals (supported by Camp, 1992; and Sweidel 1996). Wade et al (1996) argue that portfolios allow learners to develop: competencies relating to purposes, concepts, vocabulary, procedures and techniques of ICT; and skills relating to the development of different types of communication.

However, there is also evidence that e-portfolios can benefit classroom practices by representing a form of collaboration between learners and practitioners, providing pedagogical value to learning (Wade and Yarbrough, 1996).

Post-Implementation Review

The RIA should include the planned approach for monitoring, reviewing and evaluating the policy.

Successful Futures recommended that *‘separate and independent evaluation arrangements should be established to monitor the effectiveness of the change structure and the new curriculum arrangements in relation to improvements in the quality of learning and performance’*

(Recommendation 55).

Work has already been undertaken to evaluate the change structure through the Formative Evaluation of the Pioneer School Model. Officials are currently developing an approach to evaluate the new arrangements and wider reforms outlined in Education in Wales: Our National Mission and the proposals introduced in this White Paper will form part of that planning.

Next Steps

As the policy is further developed and finalised, taking into account the feedback from the White Paper and this consultation, the RIA will be further developed to provide detailed costs, savings and benefits of the ‘Business as Usual’ and preferred options based on the assumptions set out here.

Welsh Government appreciates that the impact of some of the legislative proposals outlined may not be fully understood by stakeholders until they see the content of the curriculum itself.

Therefore, there will be an opportunity to look again at the information in this document when the curriculum is made available in April 2019, if there are specific changes that need to be made as a result.

Where evidence gaps have been identified including where feedback identifies evidence gaps, the next stages of the RIA development will be to assess how to fill these gaps, in a proportionate way, to support the RIA.

The final RIA will be available alongside the final legislative proposals when they are introduced in the National Assembly for Wales.

Questions

1. Are there any other group or organisations in scope of the changes that are not already included in this paper?

2. Do you agree with our approach and assumptions set out in the draft RIA?
3. What evidence is available to further support the development of the RIA? Specifically
 - Religious Education
 - Relationships and Sexuality Education
 - E-portfolios
 - Cross-curricular responsibilities
 - Provision for Achievement Outcomes
4. What other impacts (both financial and non-financial) related to the proposed legislation not outlined in this document?
5. Are there any other comments on the paper?

Bibliography

Wing, J.M. (2008). "Computational thinking and thinking about computing." Philosophical Transactions of the Royal Society,
<http://rsta.royalsocietypublishing.org/content/366/1881/3717.short>

Camp, R. (1992). Portfolio reflections in middle and secondary school classrooms. In. K.B. Yancey (Ed.). Portfolios in the writing classroom (pp. 61–79). Urbana, IL: National Council of Teachers of English.

Commission on Religious Education. (2018). Religion and Worldviews: The way Forward – A national plan for RE. <https://www.commissiononre.org.uk/final-report-religion-and-worldviews-the-way-forward-a-national-plan-for-re/>

Estyn (2013). Religious education in secondary schools.
<https://www.estyn.gov.wales/sites/default/files/documents/Religious%20education%20in%20secondary%20schools%20-%20June%202013.pdf>

Estyn (2018). Preparing for the DCF.
<https://www.estyn.gov.wales/sites/default/files/documents/Preparing%20for%20the%20DCF%20eng.pdf>

Hillyer, J., & Lye, T.C. (1996). Portfolios and second graders' self-assessments of their development as writers. Reading Improvement, 133, 148–159.

Muñoz, C. (2006). "The Effects of Age on FL Learning: the BAF project." In *Age and the Rate of FL Learning*. C. Muñoz (Ed.) Clevedon: Multilingual Matters.

NFER. 2006. Pupil's experiences and perspectives of National Curriculum and Assessment.
<https://www.nfer.ac.uk/publications/NCA01/NCA01.pdf>

Sweidel, G.B. (1996). Study strategy portfolio: A project to enhance study skills and time management. *Teaching of Psychology*, 23(4), 246–48.

Welsh Government. (2017). Technical report: Projection and trajectory for the number of Welsh speakers aged three and over, 2011 to 2050. <https://gov.wales/docs/dcells/publications/170725-technical-report-projection-and-trajectory-for-the-number-of-welsh-speakers-en.pdf>

Welsh Government. (2017). The Future of Sex and Relationships Education Curriculum in Wales.
<https://beta.gov.wales/future-sex-and-relationships-education-curriculum>

Welsh Government. (2019). School Changes and Adaptations for Curriculum and Assessment Delivery. <https://gov.wales/statistics-and-research/school-changes-adaptations-curriculum-assessment-delivery/?lang=en>

William, D., Lee, C., Harrison, C., and Black, P. (2004). Teachers developing assessment for learning: impact on student achievement. *Assessment in Education: Principles, policy & practice* 11(1): 49-65.

Wing, J.M. (2008). Computational thinking and thinking about computing.
<http://rsta.royalsocietypublishing.org/content/366/1881/3717.short>