Primary Curriculum Review and Redevelopment

Written submission template for organisations, groups and individuals responding to the *Draft Primary Curriculum Framework*

This template is intended to support you (and your colleagues/organisation) in developing a written submission in response to the *Draft Primary Curriculum Framework*. Please e-mail your completed submission to PCRRsubmissions@ncca.ie

Individual submission details

Name	
Date	
E-mail	

Organisation submission details

Name	PACT team
Position	
Organisation	Maynooth University, Department of Computer Science
Date	25th February 2022
E-mail	

The NCCA will publish written submissions received during the consultation. The submissions will include the author's/contributor's name/organisation. Do you consent to this submission being posted online?

Yes ✓ No

Please provide some brief background information on your organisation (if applicable).

PACT team - Programming, Algorithms, Computational Thinking (Maynooth University).

The PACT team at Maynooth University Department of Computer Science develops computer science resources and supports for teachers at both primary and secondary school level. All our workshops, school visits, and materials are available free of charge. Teachers do not need any prior knowledge of computer science to attend our teacher CPD workshops. We specialise in computational thinking.
Our "unplugged" teaching materials are adapted from our involvement as the national representatives developing tasks for the International Bebras Computational Thinking Challenge, through the Irish Computer Society's National Bebras Challenge. Our teacher training and school visit programme is currently funded by Science Foundation Ireland Discover Programme (InSPECT and CoCoA projects) and Maynooth University. Since 2012, our PACT team has directly engaged with over 500 teachers and 25,000 students.

The remainder of the template includes two sections. Section 1 invites your overall comments and observations on the *Draft Primary Curriculum Framework*. Section 2 is structured to align with the six key messages related to the framework. Each message is summarised as a support for you in working on the submission.

Section 1

Please outline your overall response to the *Draft Primary Curriculum Framework.*

We have three aspects to our overall response.

(1) In the introduction it mentions that there are demands to include Coding and Computational Thinking in the curriculum. We strongly support this proposal as we believe computational skills are essential skills for children to acquire for their future studies and careers.

The domain-independent problem solving skills one gains through Computational Thinking are important in all STEM subjects: all scientific and technical domains have been shown to make use of Computational Thinking. Jeannette Wing in her seminal paper "Computational Thinking," [Commun. ACM 49,33–35 (2006)] argues why all children should be taught Computational Thinking, equal in importance to reading, writing, and arithmetic. Also, problem solving and computational thinking are recognised as valuable means for evaluating students' performance in both the Programme for International Student Assessment (PISA) study and the Trends in International Mathematics and Science Study (TIMSS). The Maths component of the PISA tests now explicitly incorporates Computational Thinking, and PISA national representatives are currently discussing including Computational Thinking as a separate line item for country ranking.

(2) We suggest highlighting the importance of Computational Thinking in the Primary Curriculum Framework by mentioning it also after the Introduction chapter. We can suggest the following potential locations:

- In section "Key competences": Mention Computational Thinking under "Being mathematical" (p. 8). For example: "Children need to be able to think and communicate quantitatively, to make sense of data, to have a spatial awareness, to understand patterns and sequences, and ***to think computationally***."
- In section "Key competences", Table 2 (p. 10): Being mathematical: "Thinking and communicating mathematically ***and computationally***"
- In section "Curriculum areas and subjects" under "Mathematics, Science and Technology Education" (p.13): "Mathematics provides the foundation for science and technology and is the study of the relationships, connections and patterns that surround us. ***Mathematical thinking underpins scientific thinking and computational thinking.*** The overarching aim of mathematics is the development of mathematical proficiency."

(3) It is very welcomed that there are designated monthly hours for Science and Technology Education in the Draft Primary Curriculum Framework.

Section 2

Agency and flexibility in schools

The Draft Primary Curriculum Framework proposes that the redeveloped curriculum will:

- Be for every child.
- Recognise teachers' and principals' agency and professionalism to enact the curriculum in their individual school context.
- Give more flexibility to schools in terms of planning and timetabling to identify and respond to priorities and opportunities.
- Connect with different school contexts in the education system.
- Give greater opportunities for flexibility and choice for children's learning.

The *Draft Primary Curriculum Framework* outlines important messages in relation to agency and flexibility in schools. Please give your overall feedback in relation to this key message.

We agree with the added flexibility to include new aspects of learning in the curriculum such as Coding and Computational Thinking.

Regarding page 15, we have the following questions:
How does a subject such as Computational Thinking, which provides for a *cross section* of disciplines, get timetabled in practice? Has the teacher a mechanism for allocating time to it without specifying it under one specific curriculum subject? We support the idea that teachers should have flexibility when planning and timetabling.

Curriculum connections between preschool, primary and post-primary schools

The Draft Primary Curriculum Framework proposes that the redeveloped curriculum will:

- Provide a clear vision for children's learning across the eight years of primary school.
- Link with learning experiences provided through the themes of the *Aistear*: *the Early Childhood Curriculum Framework* and connect with the subjects, key skills and statements of learning in the *Framework for Junior Cycle*.
- Support educational transitions by connecting with what and how children learn at home, in preschool and post-primary school.

The *Draft Primary Curriculum Framework* outlines important messages in relation to curriculum connections between preschool, primary and post-primary schools. Please give your overall feedback in relation to this key message.

Regarding page 19 “Links with other curricula” we find this section very important. It is essential to provide clear transitions, continuity, and progression in children's learning. We are also very interested in continuity and supports between post-primary and third level.

In the introduction, it mentions that there are demands to include Coding and Computational Thinking in the curriculum. We strongly support this proposal as computational skills are essential skills for children to acquire for their future studies and careers in STEM.

Including Computational Thinking in the Primary Curriculum creates a link to the Framework for Junior Cycle key skills of *Managing Information* and *Thinking and Being Numerate*. It particularly ties in with the secondary school Computer Science program (Junior Cycle Coding and Leaving Certificate Computer Science).

In addition, Computational Thinking also links with the Aistear’s focus on play, tactile problem solving, and the Aistear theme of Exploring and Thinking.

Emerging priorities for children’s learning

The Draft Primary Curriculum Framework proposes that the redeveloped curriculum will:

- Embed seven key competencies across children’s learning outcomes from junior infants to sixth class.
- Focus on developing children’s skills, knowledge, dispositions, values and attitudes. The Learning Outcomes and the Key Competencies are broad in nature to describe this wider understanding of learning.
- Have increased emphasis on some existing areas such as PE and SPHE (Wellbeing) and digital learning, and have new aspects such as Modern Foreign Languages, Technology, Education about Religions and Beliefs (ERB) and Ethics, and a broader Arts Education.

The *Draft Primary Curriculum Framework* outlines important messages in relation to emerging priorities for children’s learning. Please give your overall feedback in relation to this key message.

Computational Thinking addresses all seven of the competencies, however it does focus on "being mathematical". We suggest highlighting the importance of Computational Thinking in the Primary Curriculum Framework by mentioning it in the Key Competences section. Our suggestion is to add Computational Thinking under "Being mathematical":

- Page 8: "Children need to be able to think and communicate quantitatively, to make sense of data, to have a spatial awareness, to understand patterns and sequences, and ***to think computationally***."
- Table 2 (p. 10): Being mathematical: "Thinking and communicating mathematically ***and computationally***"

Computational Thinking addresses the seven key competencies in following ways:

- Being an active citizen (Computational Thinking problem solving tasks help children question, critique, and understand what is happening in the world),
- Being creative (exploring, communication, collaboration),
- Being a digital learner (develop their knowledge, skills, and concepts through problem-solving, experimenting and creating, learning logic and understanding algorithms),
- Being mathematical (think and communicate quantitatively, to make sense of data, to have a spatial awareness and to understand patterns and sequences),
- Communicating and using language (collaboration, explaining solutions and strategies, reading, presenting),
- Fostering wellbeing (by combining Computational Thinking with physical activity, teamwork, solving problems together),
- Learning to be a learner (learning problem solving strategies, collaboration, reflective leaving, active learning)

Changing how the curriculum is structured and presented

The Draft Primary Curriculum Framework proposes that the redeveloped curriculum will:

- Be broad and balanced in purpose and content.
- Be structured in five broad curriculum areas;
  - Language
  - Mathematics, Science and Technology Education
  - Wellbeing
  - Social and Environmental Education
  - Arts Education.

(In addition to the five areas above, the Patron's Programme is developed by a school's patron with the aim of contributing to the child's holistic development particularly from the religious and/or

ethical perspective and in the process, underpins and supports the characteristic spirit of the school. These areas connect to the themes of *Aistear* and to the subject-based work in Junior Cycle.)

- Provide for an integrated learning experience, with curriculum areas in Stages 1 and 2 (junior Infants – second Class) and more subject-based learning in Stages 3 and 4 (third class – sixth class).
- Use broad learning outcomes to describe the expected learning and development for children.
- Incorporate the new *Primary Language Curriculum* / *Curaclam Teanga na Bunscoile.*

The *Draft Primary Curriculum Framework* outlines important messages in relation to changing how the curriculum is structured and presented. Please give your overall feedback in relation to this key message.

It is very welcomed that there are designated monthly hours for Science and Technology Education in the Draft Primary Curriculum Framework.

We do agree with the proposal for integrated learning experiences in Stages 1 and 2. Our experience from our teacher workshops is that teaching Computational Thinking is a cross discipline activity (maths, science, art, language). Integrated learning, where teachers are teaching multiple disciplines in one setting, suits Computational Thinking well.

To highlight where Computational Thinking would fit in more subject-based learning, Stages 3 and 4, we would like to suggest adding a sentence “Mathematical thinking underpins scientific thinking and computational thinking” in section “Curriculum areas and subjects” under “Mathematics, Science and Technology Education” (p.13) as follows: “Mathematics provides the foundation for science and technology and is the study of the relationships, connections and patterns that surround us. ***Mathematical thinking underpins scientific thinking and computational thinking.*** The overarching aim of mathematics is the development of mathematical proficiency.”

Within the subject of Mathematics Science and Technology Education, Computational Thinking also fits in "playful experimentation and investigation", "to generate new ideas or solutions as part of a design process" (we can argue that learning Computational Thinking skills can help with solution generation).

Supporting a variety of pedagogical approaches and strategies with assessment central to teaching and learning

The Draft Primary Curriculum Framework proposes that the redeveloped curriculum will:

- Promote high quality teaching, learning and assessment.
- Conceptualise assessment as an essential and critical part of teaching and learning.
- Highlight the importance of teachers' professional judgement in supporting progression in children's learning.
- Encourage teachers to make meaningful connections with children's interests and experiences.
- Recognise the significance of quality relationships and their impact on children's learning.
- Recognise the role and influence of parents and families in children's education.

The *Draft Primary Curriculum Framework* outlines important messages in relation to supporting a variety of pedagogical approaches and strategies with assessment central to teaching and learning. Please give your overall feedback in relation to this key message.

Regarding page 20:
We support the idea of "Working in partnership with and communicating with the child's family and the wider community."

With respect to building up connections between primary schools and third level institutions, for example, we suggest that each school should have a STEM champion teacher with public contact details so that it would be easy for third level representatives to contact schools to offer school visits, resources, and teacher training opportunities.

Building on the successes and strengths of the 1999 curriculum while recognising and responding to the challenges and changing needs and priorities.

The 1999 curriculum contributed to many successes including:

- Enhanced enjoyment of learning for children.
- Increased use of active methodologies for teaching and learning.
- Improved attainment levels in reading, mathematics and science as evidenced in national and international assessments.

The Draft Primary Curriculum Framework proposes that the redeveloped curriculum will:

- Address curriculum overload at primary level.
- Take stock of strategies, initiatives and programmes and clarify priorities for children's learning.
- Link with *Aistear* and *the Framework for Junior Cycle.*

The *Draft Primary Curriculum Framework* outlines important messages in relation to building on the successes and strengths of the 1999 curriculum while recognising and responding to challenges and changing needs and priorities. Please give your overall feedback in relation to this key message.

As we mentioned before we value highly the established links between Primary Curriculum Framework and Framework for Junior Cycle and would welcome further links to third level.

From our point of view a valuable addition is the designated monthly hours for Science and Technology Education in the Draft Primary Curriculum Framework.

In the introduction of the Draft Primary Curriculum Framework it mentions that there are demands to include Coding and Computational Thinking in the curriculum. We strongly support this proposal as computational skills are essential skills for children to acquire for their future studies and careers.

The domain-independent problem solving skills one gains through Computational Thinking are important in all STEM subjects: all scientific and technical domains have been shown to make use of Computational Thinking. We strongly believe that all children should be taught Computational Thinking in primary school, and would wish to see it grow in importance beyond the Mathematics Curriculum.

For Ireland to continue its improving attainment levels in international assessments such as PISA and TIMSS, recognising the importance of problem solving and Computational Thinking in the Primary Curriculum Framework is essential. The Maths component of the PISA tests now explicitly incorporates Computational Thinking, and PISA national representatives are currently discussing including Computational Thinking as a separate line item for country ranking.

Covid-19

Since the publication of the *Draft Primary Curriculum Framework*, Covid-19 has presented a big challenge for schools. Please give your views on the implications of schools' experience of the pandemic for the finalisation of the *Primary Curriculum Framework*.

n/a

Data Protection

The NCCA fully respects your right to privacy. Any personal information which you volunteer to the NCCA will be treated with the highest standards of security and confidentiality, strictly in accordance with the Data Protection Acts. If you require further information related to data protection please visit www.ncca.ie/en/privacy-statement or you can contact the NCCA's Data Protection Officer at dpo@ncca.ie.

Thank you for your submission.