NCCA
An Chomhairle Náisiúnta Curaclaim agus Measúnachta
National Council for Curriculum and Assessment

Background Paper and Brief for the Review of Leaving Certificate Design and Communication Graphics

December 2024

Contents

Introduction

The Senior Cycle Review: Advisory Report (NCCA 2022) was published in March 2022 following the response from the Minister for Education, Norma Foley, TD. Actions outlined in the Advisory Report include a review of existing curriculum components - subjects, modules, and programmes. In March 2022, the Minister for Education requested that NCCA undertake a series of actions to support the realisation of her vision for a redeveloped senior cycle as set out in Equity and Excellence for All (Department of Education, 2022.) One key action set out in this plan was that a schedule of senior cycle subjects and modules for redevelopment be prepared for approval by the Minister.

NCCA subsequently prepared a schedule of subjects for review, which was organised into a number of tranches. The redevelopment of Design and Communication Graphics (DCG) is included in Tranche 3, which will be completed in 2026 for introduction to schools in September 2027.

This paper provides a context for the review of DCG and has been informed by the views of teachers, school leaders and students gathered through school visits conducted in a representative sample of schools. It begins by considering the background of Leaving Certificate DCG with Section 1 presenting an overview of the current context, including consideration of relevant policy developments. Section 2 sets out how DCG related education is currently provided for within the Irish curriculum, before focusing in more detail on Leaving Certificate DCG. Section 3 provides an overview of the insights gained through the school visits conducted and the lived experience of schools, teachers, and students. Section 4 considers similar DCG subject offerings internationally and presents an overview of three different jurisdictions. Section 5 draws on the previous three sections to categorise and briefly discuss some issues identified for consideration in the redevelopment of Leaving Certificate DCG before finally setting out a proposed brief for this work in Section 6, which will guide the work of the development group.

1. Background and Context

This section sets out some of the significant developments in DCG since its initial introduction, before focusing on the education and broader policy landscape which are important contextual considerations for the review and redevelopment of DCG.

The current Leaving Certificate DCG syllabus, introduced in September 2007 and examined for the first time in 2009, replaced the previous Technical Drawing syllabus. DCG emphasises the development of students' abilities to communicate ideas and designs through graphical means, using manual drawing techniques, freehand sketching, and parametric modelling computer-aided design (CAD) software. DCG shapes and develops the technical, symbolic, and conventional principles to provide students a means in which they can communicate their thinking and designs. This helps students build graphicacy, a competency comparable to numeracy and literacy, which develops the capability to encode and decode information, knowledge, and ideas that are difficult or even impossible to convey through other means. The subject encourages creativity and innovation, preparing students for various fields such as engineering, architecture, product design, and graphic design. By equipping students with these competencies, DCG aims to enhance their capability to thrive in a technologically advanced and design-oriented global economy.

The integration of parametric modelling CAD software into the curriculum serves to enhance students' spatial abilities, problem-solving skills, design intent, and critical thinking. These abilities, in turn, reinforce their overall CAD proficiency, creating a holistic foundation for understanding in the subject. This approach also equips students to engage more effectively with 3D modelling and digital visualisation tools, reflecting the growing importance of digital literacy. Studying DCG also supports students' understanding of Leaving Certificate Mathematics, especially in Geometry and Trigonometry, due to the complementary teaching and learning in both subjects.

Since 2007, the rapid pace of technological advancement, industry developments, the Covid-19 pandemic, and the urgent need to address climate change have dramatically transformed the world of work and society. Advancements in 3D printing, augmented reality (AR), virtual reality (VR), gaming, and the Internet of Things (IoT) have revolutionised design and technology professions, while artificial intelligence (AI) and automation have enhanced efficiency but also raised concerns about job security and ethics.

In today's dynamic world, developing spatial cognition and design thinking skills have become vital tools for addressing complex societal challenges. Spatial Cognition is concerned with the acquisition, development, representation, organisation, and use of knowledge about spatial objects in real, virtual, or hybrid environments and processed by human or artificial agents (Spatial Cognition Conference, TU Dublin 2024). Building strong spatial cognition skills is critical in general education and especially vital in STEM fields, where they underpin problem-solving and innovation. Research has shown that high levels of spatial ability correlate with success in STEM disciplines (Projective geometry and spatial reasoning for STEM learning, 2024).

The recent report, Education in a Dynamic World: the performance of students in Ireland in PISA 2022, highlights that although students in Ireland perform above the OECD average in mathematics, further progress is needed in the area of 'space and shape,' where geometry plays a

central role (Educational Research Centre, 2023). Redeveloping the DCG specification offers a valuable opportunity to support student learning in this area by enhancing their understanding of spatial reasoning, geometric principles, and their practical applications.

Understanding graphics as a language supported by specific cognitive (spatial) factors is central to the experiences of students engaged in DCG. The subject fosters skills in visualising, manipulating, and designing complex structures, crucial for fields like aerospace, robotics, medicine, urban planning, and emerging areas like augmented reality and autonomous vehicles. Strong spatial and design thinking skills are becoming increasingly important across these sectors. To keep pace with these evolving fields, the redevelopment of DCG will be essential for equipping future professionals with the abilities needed to navigate and influence our rapidly changing world.

From a curriculum perspective, there have been many significant developments at both Junior Cycle and Senior Cycle levels. In line with the Framework for Junior Cycle (DE, 2015), revised subject specifications for Junior Cycle Applied Technology, Engineering, Graphics and Wood Technology were introduced in schools in September 2019. These subjects replaced the four technology subject syllabuses in Materials Technology (Wood), Metalwork, Technical Graphics and Technology which were introduced in 1989.

At senior cycle, the publication of the Senior Cycle Review: Advisory Report (NCCA, 2022) set out an agreed purpose for senior cycle education and outlines a vision for the redevelopment of senior cycle that is underpinned by a set of guiding principles. Responding to this report, Minister Foley initiated a programme of senior cycle redevelopment. As part of this redevelopment, a set of student key competencies are being embedded across learning outcomes in new and redeveloped subjects and modules.

Within the education policy landscape, Ireland's Literacy, Numeracy and Digital Literacy Strategy 2024- 2033: Every Learner from Birth to Young Adulthood was published in 2024. The strategy provides definitions of literacy, numeracy and digital literacy. It also and details how the learner will experience literacy, numeracy and digital literacy at each level from early learning and care to post-primary school. The Digital Strategy for Schools to 2027 focuses on the potential of digital technology in the curriculum, placing an increased emphasis on the role of digital technology in supporting and enhancing teaching, learning and assessment and in fostering the development of 21st century skills.

The STEM Education Implementation Plan to 2026 was published in March 2023. The vision for STEM education is that Ireland will be internationally recognised as providing the highest quality STEM education experience for learners that nurtures curiosity, inquiry, problem-solving, creativity, ethical behaviour, confidence, and persistence, along with the excitement of collaborative innovation (DES, 2023 p.4). A recent report on STEM education highlighted the need to actively promote and develop learners' creative and critical thinking skills, skills that are essential for the next generation. Not only does STEM education promote these skills, but it also supports the development of life skills, ingenuity and problem-solving and it promotes empathy for issues including sustainability and the natural environment (Government of Ireland, 2020 p.7).

Beyond education policy, there have been many significant developments in government policies and strategies. The United Nations Sustainable Development Goals (SDGs) aim to end poverty, protect the planet, and ensure peace and prosperity for all by 2030. The Second National Strategy on Education for Sustainable Development - ESD to 2030 sets out the government's commitment

to integrating the SDGs into policy and planning at both a national and international level (Government of Ireland, 2022). The strategy seeks to integrate Education for Sustainable Development (ESD) principles into all aspects of curriculum development. The redevelopment of Leaving Certificate DCG can support this strategy by promoting sustainable design and responsible innovation among students.

Ireland's National Skills Strategy 2025 is a government plan to enhance the skills of the Irish workforce and increase the supply of skilled workers to meet the current and future needs of the economy and society (Government of Ireland, 2016). Several sectors can benefit from the implementation of the strategy, including the advanced manufacturing sector, Information and Communication Technology (ICT) sector, and the construction sector. This strategy highlights the importance of the quality and relevance of our education and training base, which is responsive to the changing and diverse needs of our people, society and the economy (DES, 2016 p.10).

Such broad-ranging and dynamic changes make the redevelopment of Leaving Certificate DCG timely. It presents a valuable opportunity to align the curriculum with the realities of students' daily lives, their local communities, and the evolving demands of the professional world.

Section Summary

- The current DCG syllabus was introduced in 2007, replacing the older Technical Drawing syllabus.
- DCG emphasises the development of students' abilities to communicate geometric understanding and design through graphical means, using manual drawing techniques, freehand sketching, and CAD. It aims to build graphicacy, comparable to numeracy and literacy, and prepares students for careers in fields like engineering, architecture, and graphic design.
- Since 2007, rapid advancements in 3D printing, augmented reality (AR), virtual reality (VR), Internet of Things (IoT), artificial intelligence (AI), and automation have transformed industries, impacting job security and ethics. Global connectivity improvements have created new opportunities.
- The development of spatial cognition and design capabilities is crucial for tackling complex challenges and excelling in STEM fields, as it supports problem-solving and innovation.
- In curriculum redevelopment, new specifications for the four junior cycle technology subjects were introduced in 2019.
- Recent national policies and developments in curriculum specifications emphasise enhancing senior cycle key competencies, literacy, numeracy, and digital literacy, fostering STEM skills, and integrating sustainability in education.
- The redevelopment of Leaving Certificate DCG is timely and presents a valuable opportunity to align the curriculum with the realities of students' daily lives, their local communities, and the evolving demands of the professional world.

2. DCG in the curriculum

This section provides an overview of the opportunities for learning related to DCG currently available to students within both junior cycle and senior cycle. It then focuses on the participation rates in DCG outlining the uptake of the subject and explores findings from the most recent subject inspection reports from the Department of Education (DE).

Technology education in junior cycle

Junior Cycle Graphics

A new Junior Cycle Graphics specification was introduced to schools in 2019 replacing the Junior Certificate Technical Graphics syllabus.

The specification aims to:

- develop the student's creativity, spatial ability, and capacity to reason and communicate ideas through engagement with abstract and applied geometric problem-solving activities
- encourage the development of the cognitive and practical dexterity skills associated with graphical communication
- instil an appreciation of the role of graphics in the world around them
- equip all students to make judgements on the best mode through which to represent their ideas and solutions
- encourage the production of drawings that promotes the skills of communicating through graphics
- develop students cognitive and practical skills associated with modelling and graphical communication.

The specification for Junior Cycle Graphics focuses on developing students' understanding of and skills in the applications and impact of technologies in the world around them. These will be achieved through three inter-connected contextual strands: 2D graphics, 3D graphics and Applied graphics. The framework presented in Figure 1 sets the context for the learning outcomes.

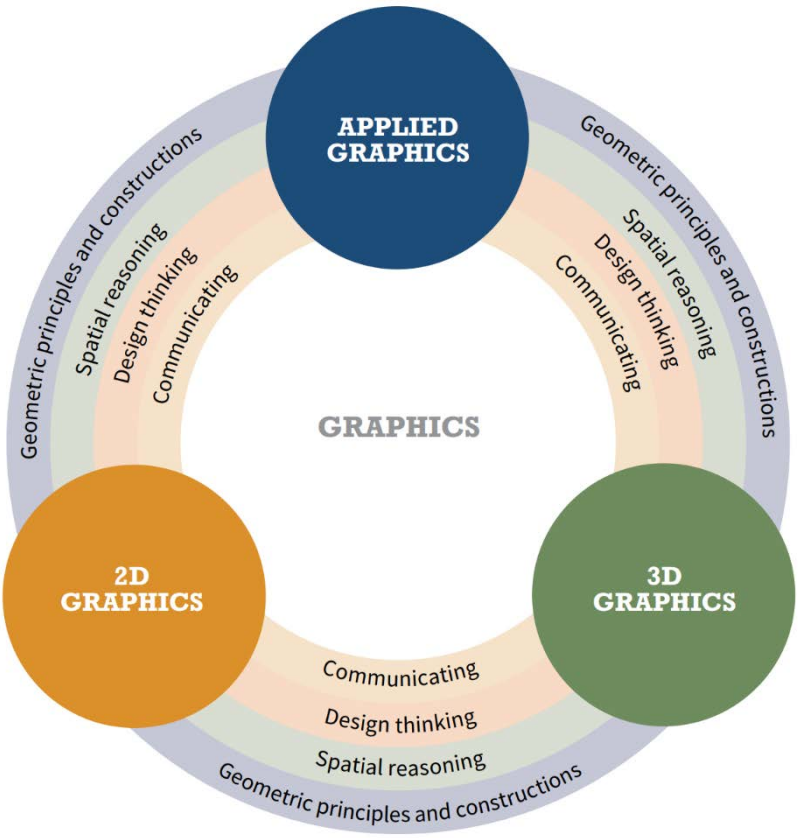

Figure 1: The strands and elements of Junior Cycle Graphics

Assessment in Junior Cycle Graphics includes two Classroom-Based Assessments: Communicating through sketching, and Graphical presentation skills. The final assessments, which are externally assessed by the State Examinations Commission, consist of a project and a written examination (NCCA, 2019).

Other areas of junior cycle

Students also have opportunities to further develop knowledge, understanding, skills and values related to Graphics in other junior cycle subjects and short courses such as Mathematics, Visual Art, Science, Coding, and through other areas of learning such as competitions.

Technology education in senior cycle

Students in senior cycle have opportunities to study technology-related subjects and modules across the Leaving Certificate Established (LCE) and the Leaving Certificate Applied (LCA) programme. In Transition Year (TY), schools have a high degree of autonomy in designing their own programme therefore technology education is a suggested area of experience for TY students.

Leaving Certificate Established

As part of their Leaving Certificate Established curriculum, schools can offer DCG, Construction Studies, Engineering, and Technology to students.

The current syllabus for Leaving Certificate DCG was introduced in September 2007 and examined for the first time in 2009. Leaving Certificate DCG involves comprehending, analysing and communicating information presented verbally or graphically. Problem solving and creative thinking skills are developed through the analysis and solution of problems in both two- and three-dimensions graphics. Graphics and design are communicated using a variety of media, including computer-aided design (CAD).

SolidWorks is the prescribed CAD software used in DCG. Students can use the software at home with a stand-alone student license if their computer meets the necessary system requirements to run the software. In recent years, Onshape has gained popularity, especially in junior cycle technology subjects. Like SolidWorks, Onshape focuses on parametric CAD modelling, and offers a cloud-based platform, making it more accessible to students without high-performance computers at home.

The main areas of study in DCG are: Plane and Descriptive Geometry, Communication of Design and Computer Graphics, and Applied Graphics.

The syllabus comprises three fundamental areas of study:

- Plane and Descriptive Geometry

  Students are encouraged to explore Plane and Descriptive Geometry in an integrated way, emphasising the connections between topics. Using various techniques—formal drawing, freehand sketching, modelling, and CAD—they develop spatial reasoning through practical applications. This area of study includes Projection Systems, Plane Geometry, Conic Sections, Descriptive Geometry of Lines and Planes, and Intersection and Development of Surfaces.

- Communication of Design and Computer Graphics

  This area of study develops students' graphic representation skills, emphasising form, light, and shading techniques essential for communicating ideas. Proficiency in freehand drawing and CAD is encouraged for design communication and visualisation. This area of study includes Graphics in Design Communication, Communication of Design, Freehand Drawing, and Information and Communication Technologies.

- Applied Graphics

  Students undertake two optional areas of study from this part of the syllabus. The optional areas of study are Dynamic Mechanisms, Structural Forms, Geologic Geometry, Surface Geometry, and Assemblies. Students are encouraged to explore their environment and apply plane and descriptive geometry principles to solve practical problems. At all times the development of the student's spatial abilities and graphic intelligence is to be fostered and encouraged.

DCG is assessed at two levels, Ordinary level and Higher level, by means of two assessment components: a student assignment, of which CAD forms a significant and compulsory element, and a terminal examination paper (NCCA, 2024).

The Leaving Certificate DCG syllabus is designed to provide continuity from the Junior Cycle but can also be studied ab initio. The areas of learning identified above are, in general, common to ordinary and higher levels with some designated for assessment at higher level only.

DCG in focus

This section explores participation rates in Leaving Certificate DCG drawing on statistics from the State Examinations Commission (SEC) and provides an overview of assessment for certification and insights from recent DE reports.

Student participation

Year	Higher Level	Ordinary Level	Total Candidates	Total LC candidates	DCG as a % of total candidates
2019	4567	1024	5591	56,071	10.0%
2020	4720	926	5646	57,668	9.8%
2021	5010	856	5866	57,952	10.1%
2022	5035	735	5770	58,056	9.9%
2023	5234	794	6028	58,006	10.4%
2024	5371	793	6164	56,791	10.9%

Table 1: Number of students sitting Leaving Certificate DCG (DCG) at higher and ordinary Level 2019-2024

Assessment for certification

DCG is assessed through two components at both higher and ordinary levels.

1. Student assignment 40% (160 marks)
2. A terminal examination paper 60% (240 marks).

The assignment provides a medium through which students can display their understanding of the communication of design. The assignment focuses on areas of the subject which cannot be readily assessed in a terminal examination paper, for example, freehand sketching and CAD. Candidates respond to a thematic brief issued by the SEC in September of 6th year. The assignment is completed by January of 6th year.

The terminal examination paper (one examination paper) consists of three sections (see Table 2). The examination allows students to demonstrate their problem-solving skills and to convey their knowledge and understanding of the underlying principles involved in plane and descriptive geometry. Both higher and ordinary level examinations are of three hours duration.

The structure of the student assignment and terminal examination paper for ordinary and higher level (pre-adjusted arrangements) are set out below.

Component	Assessment requirement	Marks	Weighting
Student assignment			
Response to a thematic brief set by the SEC each year	Portfolio - 9 Outputs required at both HL and at OL. Maximum of 14 pages at HL. Maximum of 12 pages at OL. *Pre-adjusted arrangements	160 - OL/HL	40% - OL/HL
Terminal examination paper			
Section A (Core short questions)	Answer any 3 of 4 questions. Each question carries 20 marks.	60 – OL/HL	15% - OL/HL
Section B (Core long questions)	Answer any 2 of 3 questions. Each question carries 45 marks.	90 – OL/HL	22.5% - OL/HL
Section C (Applied Graphics long questions)	Answer any 2 of 5 questions. Each question carries 45 marks.	90 – OL/HL	22.5% - OL/HL

Table 2: Student assignment and terminal examination structure for ordinary and higher level (pre-adjusted arrangements)

Insights from Inspection Reports

As part of the scoping work for this Background Paper, a review was conducted of five subject inspection evaluations from 2022 and 2023, focusing on Junior Cycle Graphics and Leaving Certificate DCG. The findings and recommendations outlined below can inform the design of the new DCG specification.

The inspection reports highlighted that the overall quality of teaching, learning, and assessment in DCG was good, with some lessons reaching very good standards. Most students demonstrated a good understanding of key geometrical concepts and applied this knowledge to solve problems graphically. The reports emphasised the importance of integrating both physical and digital resources, particularly CAD models, to enhance students' understanding and visualisation of these concepts.

Some reports also highlighted the importance of developing students' design thinking skills, recommending a greater focus on design intent and economy when modelling and sketching solutions. Collaborative learning activities were also noted to enhance student engagement, though more structured and varied opportunities are needed to boost student interaction.

Section Summary

- Students have multiple opportunities to engage in graphics-related learning across senior cycle.
- The specification for Junior Cycle Graphics focuses on developing students' understanding of and skills in the applications and impact of technologies in the world around them. These will be achieved through three inter-connected contextual strands: 2D graphics, 3D graphics and Applied graphics.
- Graphics integrates practical skills, problem-solving, innovation, communication, collaboration, and exploration. It enhances creativity, spatial ability, and graphical reasoning through geometric activities, fostering effective communication and modelling skills. The development of these skills is also supported through the Classroom-Based Assessments.
- The study of Graphics at junior cycle develops the foundations for a student to continue their studies in the suite of technology subjects in senior cycle.
- DCG shares comparable popularity with Leaving Certificate Engineering in terms of student uptake.
- Assessment in the current DCG syllabus is based on two components: a student assignment and a terminal examination paper. Students following both Higher and Ordinary level are expected to demonstrate a knowledge and understanding of the syllabus content with some areas of content designated for assessment at higher level only.
- Recent inspection reports highlighted effective teaching and learning practices in DCG, with most students demonstrating good understanding of geometry. Recommendations included integrating physical and digital resources to enhance students' understanding. The reports also emphasised the importance of developing students' design thinking skills and fostering collaborative learning opportunities in DCG.

3. Insights from school visits

School visits were conducted as part of the scoping work for this Background Paper. A representative sample was selected from the 37 schools that expressed an interest in becoming involved in DCG curriculum developments. The six schools were selected using criteria relating to DEIS status, gender, school size and type. Visits to these schools took place in September and October 2024 and involved focus group meetings with 45 senior cycle students, 10 teachers of DCG and 10 school leaders. The following section provides an overview of the insights gathered through these visits.

The broad context of DCG

DCG is widely regarded as a popular and relevant subject among teachers, students, and school leaders. The current DCG course is valued for fostering essential skills in young people, including spatial awareness, problem-solving, communication, and digital proficiency. It is seen as an important subject that prepares students for many career paths, such as architecture, product design, medicine, engineering, construction, gaming, and for living in a modern society.

Both teachers and students appreciate the current scope of the syllabus, though they noted that completing the course within the designed 180 hours can be challenging. There is also a perception amongst some participants that DCG is geared more towards high-achieving students. In their view, this perception may discourage some students from choosing the subject.

The uptake of students studying DCG varied significantly across the schools visited, with class sizes ranging from as few as 5 or 6 students to a class of 24. Feedback from students highlighted that a major reason why they choose to study DCG is their positive experience with Graphics at Junior Cycle. Participants highlighted several factors that positively influence the uptake of DCG in senior cycle, including the provision of a DCG-related module during Transition Year and the importance of the teacher-student relationship. While most students have prior experience in Junior Cycle Graphics, a small number enrol in DCG without it, often because they have a specific career path in mind. Introducing DCG as a subject was a challenge for one school, in the context of securing funding and upskilling a teacher to teach the subject. Recruiting and retaining DCG teachers in schools in Dublin was also highlighted as a challenge in the provision of DCG.

Some participants highlighted concerns about students' preparedness for the transition from Junior Cycle Graphics to Leaving Certificate DCG. Other participants raised concerns about whether the title of the subject accurately reflects the status of teaching, learning, and assessment in the subject.

Teaching and learning

During the school visits, participants shared a range of opinions on the course content, teaching and learning strategies, and the overall learning experience in DCG. Both teachers and students emphasised how important it is to develop spatial awareness and understand geometry for students' growth in the subject. Many teachers noted challenges in managing the workload, finding it difficult to cover all topics thoroughly within the designed time. Some students noted

that the pressure to complete the course content often shifts the focus from understanding underlying concepts to following a step-by-step process to finish the drawings. Although there was no unanimous agreement on specific areas of learning that might be outdated, most teachers and students agreed that the optional areas of study in the current syllabus should be reconsidered for their relevance.

Teachers recognise the importance of an integrated approach to teaching and learning, where board drawing, freehand sketching, computer-aided design (CAD) and other resources are appropriately integrated to support student learning. However, classroom logistics and time were highlighted as constraints that sometimes hinder this approach in practice. Typically, students learn SolidWorks and sketching in separate blocks throughout 5th and 6th year, with board drawing remaining the primary method of communication.

Many students enjoy the practical nature of board drawing and value the opportunities it provides for collaborative learning. The project-based learning approach, as experienced through the student assignment, encourages design thinking and creativity. However, some students feel that the curriculum, especially in 5th year, lacks sufficient opportunities for genuine design exploration. Freehand sketching is valued by both students and teachers as a critical skill for design communication. However, some students noted that there are limited opportunities to sketch.

SolidWorks is widely regarded by both teachers and students as an essential tool for supporting teaching and learning. However, some students struggle to become proficient in the software and express frustration over their inability to use it at home due to computer hardware requirements and difficulties in obtaining student licenses. Both teachers and students would like CAD software such as SolidWorks to be more accessible for home use. While some students prefer alternative CAD programs like OnShape for its cloud-based convenience, both teachers and students recognise the importance of using standalone CAD licenses to ensure the authenticity of student work for assessment purposes.

Assessment in DCG

Most teachers were satisfied with the current weightings of the student assignment (40%) and the terminal examination (60%). Although most students appreciated the 40% weighting of the student assignment, some noted that the marks awarded did not adequately reflect the effort required.

Student assignment

The student assignment is highly valued by both teachers and students as it allows students to explore geometry in the context of real-world product design and communicate their understanding through various media. Some teachers noted that assignments were more positively received when they were relevant to students' lives, and they recommended choosing products for CAD modelling in SolidWorks that are not too geometrically complex. Students found that the development of research skills through their Junior Cycle Classroom-Based Assessments (CBAs) was particularly helpful when working on the research element of the student assignment. However, other students encountered challenges early on, which they linked to their limited prior experience with research in Junior Cycle Graphics. Teachers and students suggested that the assignment could place greater emphasis on problem-solving and addressing the needs of end-users.

Many teachers and students raised concerns about the workload and suggested refining the outputs to reduce the over-assessment of skills. In reducing the workload, some participants would welcome the completion of the student assignment before the Christmas break in 6th year.

Some students struggled to maintain focus throughout the assignment, leading to requests for clearer expectations and a more detailed marking scheme. Teachers highlighted the importance of clear communication and clarity of timelines, as additional assessment components (AACs) are introduced across all subjects at Senior Cycle.

Terminal examination paper

Teachers and students generally agreed that the terminal examination paper was fair and appreciated the relevancy of the questions to real-world applications. However, some students would like to see a greater connection between the examination paper content to real-world contexts. The structure and layout of the terminal examination were also well received. Opinions varied on the relevance of certain topics and regarding what learning should be assessed through core questions and what learning should be assessed in the option questions. Both groups emphasised the need for careful consideration of this when designing the terminal examination paper for the redeveloped subject.

While some students considered the workload of the terminal examination paper manageable, others suggested that it was too demanding, with the three-hour duration placing a significant strain on students. Additionally, some teachers and students expressed a desire for more choice in the redeveloped final examination format.

Resourcing and Implementation

School leaders emphasised that the successful resourcing and implementation of the redeveloped DCG subject will require early decisions regarding funding and software, with clear guidance on funding streams and IT grants. School leaders and teachers highlighted the need for comprehensive, in-person training, sufficient time for continuous professional development (CPD), and timely access to assessment guidelines and sample papers. Many teachers cited the T4 CPD model[1] for its effectiveness in providing support, networking, and upskilling, and recommended that similar approaches are taken in the design of future CPD events. School leaders also highlighted the need for an early review mechanism to review the roll out of the redeveloped subject, once it is introduced. Both school leaders and teachers noted that budget management support and access to resources are essential, with a focus on integrating digital technologies like Augmented Reality (AR)/Virtual Reality (VR) tools and 3D printing to support teaching and learning.

As part of the overall implementation strategy for the revised DCG specification, participants recommended improving communication with parents and students through an information campaign. Students also suggested offering taster modules on DCG during Transition Year to help them efficiently progress from junior to senior cycle.

[1] T4 was a professional development service for teachers of technology subjects. The T4 support service was later subsumed by PDST, which is now part of the Oide support service.

Section Summary

- DCG is widely regarded as a popular and relevant subject, valued for developing essential skills in young people such as spatial awareness, problem-solving, communication and digital proficiency. However, concerns have been raised by participants that it may cater more to high-achieving students. Recruiting and retaining teachers of DCG is a particular challenge in Dublin.
- While both teachers and students appreciate the current syllabus, they face challenges managing the workload and covering all topics in the 180 hours. Teachers emphasise the importance of integrated teaching and learning methodologies, but time and logistical constraints often impede these approaches in practice.
- Some students feel there are limited opportunities for design exploration in the subject, particularly in 5th year. CAD software, specifically SolidWorks, is regarded by teachers and students as a vital tool for learning, but many students struggle with proficiency due to hardware requirements for personal computers and difficulties accessing the software from home.
- The student assignment is highly valued by both teachers and students. To enhance its effectiveness, teachers and students recommend that the themes remain relevant, reduce over-assessment, and provide clearer expectations and marking schemes. While the terminal examination paper is seen as fair and relevant, some concerns were raised about the overall load placed on students sitting the examination.
- For the successful implementation of a redeveloped DCG curriculum, school leaders stress the importance of early decisions on funding and IT resources. School leaders and teachers highlighted the need for comprehensive, in-person training, sufficient time for continuous professional development (CPD), and timely access to assessment guidelines and sample papers. They also recommend improved communication with parents and students, along with the integration of new technologies like AR, VR, and 3D printing to enhance teaching and learning.

4. International trends in DCG education

Introduction

This section looks at subjects similar to DCG as offered to students in New Zealand, Scotland, and Victoria (Australia). It briefly covers the place and purpose of the study of DCG subjects in the senior secondary phase and provides a brief overview of curriculum content and of how the subject is assessed.

Design and Visual Communication (DVC) in New Zealand

Context: place and purpose of DVC

Design and Visual Communication (DVC) in New Zealand develops skills in spatial and product design, drawing, drafting, design thinking, and visual communication. It prepares students for fields like construction, architecture, engineering, and urban planning, as well as careers in marketing, product design, web design, fashion, and visual media. DVC integrates with other Technology subjects such as Digital Technologies and Computer Science and links well with science, mathematics and statistics, and visual arts. It is an approved university entrance subject, requiring students to achieve 14 credits at National Certificate of Educational Achievement (NCEA) Level 3, typically in their final year of secondary education (Year 13).

Curriculum

DVC is a practice-led subject in which students explore and develop their own three-dimensional design ideas, focusing on both product and spatial design. The curriculum emphasises visual communication, design thinking, and the use of various tools and technologies to present and refine design concepts.

Product design focuses on creating tangible items with specific functions that meet people's needs. It involves two- and three-dimensional visualisation methods, technical knowledge, and tools such as market research, mock-ups, and models. Students also gain expertise in materials, assembly, sustainability, and environmental factors. The visual communication techniques used in product design include drawings, prototypes, models, and animation.

Spatial design relates to designing three-dimensional spaces that are experienced, occupied or used by people. It draws on fields like architecture, interior design, and urban planning. It addresses technical aspects of construction, materials, and environmental factors, as well as design tools like sketching and mock-ups. Visual communication for spatial design often includes architectural drawings, models, and animations to represent design ideas.

DVC integrates design thinking, the process of generating and refining ideas for practical outcomes, with design influences that reflect a designer's perspective. It focuses on how design ideas are communicated to the viewer effectively. The curriculum is built around five 'Big Ideas' which, emphasise improving people's lives, balancing divergent and convergent thinking, incorporating diverse perspectives, design heritage, and utilising visual literacy skills to evaluate and present design concepts in product and spatial contexts.

Assessment

Students taking DVC for university entrance via the National Certificate of Educational Achievement (NCEA) at Level 3 must achieve 14 credits through internally and externally assessed Achievement Standards. There are five Achievement Standards for DVC:

Achievement Standards	Assessment requirement
91627: Initiate design ideas through exploration	4 credits, externally assessed
91628: Develop a visual presentation that exhibits a design outcome to an audience	6 credits, internally assessed
91629: Resolve a spatial design through graphics practice	6 credits, internally assessed
91630: Resolve a product design through graphics practice	6 credits, internally assessed
91631: Produce working drawings to communicate production details for a complex design	6 credits, externally assessed

Table 3: The five Achievement Standards for DVC

External assessments are portfolio-based and submitted to the New Zealand Qualifications Authority (NZQA) in digital or physical formats. Internally assessed standards are graded by teachers using NZQA guidelines. Students use a range of media and design tools, such as CAD, sketching, and models, to create portfolios that display their design concepts. For Achievement Standard 91631, students must produce a set of related working drawings, up to 15 A3 pages, using appropriate computer applications or traditional drafting tools to communicate design details for a complex spatial or product design. The drawings should include both 2D and 3D representations and may be supported by animations, with the focus on clearly communicating key design aspects necessary for construction or assembly. Portfolios must be original, and students cannot use AI-generated content.

Higher Graphic Communication in Scotland

Context: place and purpose of Graphic Communication

Higher Graphic Communication in Scotland equips senior secondary students with skills in graphic communication techniques, creativity, and the ability to evaluate the effectiveness of graphics. It emphasises understanding standards, protocols and conventions, and the societal and environmental impact of graphic communication technologies. It prepares students for further qualifications, such as Advanced Higher Graphic Communication, and future study or employment in related fields. Typically completed in one year with 160 hours of study, it allows students to pursue further education or career opportunities in design and communication.

Curriculum

Higher Graphic Communication develops skills in two key areas: 2D graphic communication and 3D and pictorial graphic communication. Computer-aided design (CAD) and ICT are integral to

learning and teaching. Areas of study include 2D orthographic sketching, CAD production drawings, and designing multi-page promotional publications. Students also create 3D CAD models, produce 3D illustrations of everyday objects, and plan and produce promotional materials incorporating pictorial and/or 3D models, enhancing their graphical literacy and technical drawing skills. The curriculum enhances spatial awareness, visual literacy, and the ability to interpret given drawings, diagrams, and other graphics. The course develops skills in and assesses graphic types; manual techniques; computer-aided techniques; drawing standards, protocols and conventions; geometric shapes and forms; views and techniques, and desktop publishing (DTP). Students apply graphic design skills, including creativity, to solve tasks and understand the impact of graphic technologies on society and the environment.
The course encourages the use of technology, such as interactive boards, tablets, and visualisers, to support learning in manual sketching, rendering, and shadowing. It helps students apply graphic standards, develop advanced visual literacy, and extend their ability to interpret unfamiliar graphic forms. Students also learn to evaluate their work, suggest improvements, and use graphic communication tools effectively. The course encourages students to develop an informed understanding of the impact of graphic communication technologies on the environment and society.

Assessment

Assessment for Higher Graphic Communication includes a 2.5-hour written examination (64% of the total grade) and an assignment (36% of the total grade). The examination, marked by the Scottish Qualifications Authority (SQA), has a total mark allocation of 90, and assesses CAD techniques, interpretation of graphics, digital technology, drawing standards, and design elements. Candidates may include sketches to further illustrate and support their response, however, sketching is not a requirement. Candidates are not required to draw with instruments. The assignment, which has a mark allocation of 50, assesses students' ability to apply their graphic communication skills in response to a problem or situation. It covers three areas including preliminary graphics, production graphics, and promotional graphics, and incorporates CAD. The assignment is completed over eight hours under supervision, starting once all course content has been delivered. There are no interruptions from other learning activities during this time. Students are graded from A to D based on their overall performance across both components.

Visual Communication Design (VCD) in Victoria (Australia)

Context: place and purpose of Visual Communication Design

The Visual Communication Design (VCD) course aims to cultivate future-ready designers through exposure to the cultures and traditions of design practice. Students learn how designers visually communicate ideas for specific contexts, using both manual and digital methods. They develop skills to manipulate type, imagery, media, and materials, applying design elements and principles to solve problems and improve services, systems, and spaces. The course emphasises teamwork and independent work, to use drawings to visually represent relationships, ideas, and appearances; and creating models and prototypes for testing. With no prerequisites, the VCD course is completed in two years with 200 hours of study and sits under the Visual Arts learning area alongside other art-focused courses in Victoria.

Curriculum

The VCD course aims to enable students to learn how to design for specific contexts, purposes, and audiences using a mix of manual and digital methods, media, and materials. Students explore

the role of visual language, aesthetics, and human-centred design in communicating ideas, and learn to address design problems for services, systems, and environments. They develop skills in drawing, creating models, and prototypes for testing and presentation, while considering factors like sustainability, culture, and social impact. The course fosters future-ready designers, guiding them through the design process, from discovering and defining problems to delivering solutions. It emphasises divergent and convergent thinking, ethical practices, and the use of design elements and principles. The curriculum includes four units:

- Unit 1: Finding, reframing, and resolving design problems,
- Unit 2: Design contexts and connections,
- Unit 3: Visual communication practice, and
- Unit 4: Delivering design solutions.

Each unit covers areas like design analysis, communication, and professional practice, blending theory with practical application in drawing, modelling, and using technology.

Assessment

For each VCD unit in the Victorian Certificate of Education (VCE), students must demonstrate specific outcomes to achieve satisfactory completion. All assessments for Units 1 and 2 are school based. Units 3 and 4 assessments are set by the Victorian Curriculum and Assessment Authority (VCAA) and include School-Assessed Coursework (SAC) and a School-Assessed Task (SAT). These account for 20% and 50% of the final study score, respectively. An external examination contributes the remaining 30%.

Section summary

- DVC in New Zealand focuses on developing skills in spatial and product design, drawing, and visual communication, preparing students for careers in areas like architecture, engineering, marketing, and web design. It integrates with other subjects like Digital Technologies and visual arts. The curriculum emphasises design thinking, visual communication, and practical design skills, covering both product and spatial design. DVC is assessed through a combination of internal and external assessments. Assessments include creating portfolios with drawings, models, and presentations to communicate design ideas effectively.

- Higher Graphic Communication in Scotland equips senior secondary students with skills in 2D and 3D graphic communication, including CAD and ICT, to enhance visual literacy and spatial awareness. The curriculum covers orthographic sketching, CAD modelling, and promotional design, emphasising drawing standards, protocols and conventions, and the environmental and societal impact of graphic technologies. Assessment includes a 2.5-hour written examination (64%) and an assignment (36%). The course is typically one year in duration and requires 160 hours of study.

- The VCD course in Victoria develops future-ready designers through manual and digital design methods. The course enables students to visually communicate ideas, solve design problems, and create models and prototypes. The curriculum covers design

problems, contexts, visual communication, and delivering solutions, with a focus on aesthetics, human-centred design, and ethical practices. The course requires 200 hours of study over two years, and includes four units: Finding, reframing, Design contexts and connections, Visual communication practice, and Delivering design solutions. Assessment comprises school-based work for Units 1 and 2, with Units 3 and 4 assessed by the VCAA and includes an external examination.

5. Issues for Consideration

This section sets out a number of issues for consideration in the redevelopment of DCG. These arise from the nature of the subject itself, in addition to drawing on themes emerging in the previous sections of this background paper.

Competencies for emerging social and economic needs

As society faces new social and economic challenges such as technological advances, global connectivity, and climate change, it's important to equip young people with competencies they need for the future.

Leaving Certificate DCG can support the needs of young people by fostering competencies in spatial cognition, graphicacy, and design thinking. These competencies are increasingly important in industries like gaming, aerospace, robotics, medicine, urban planning, augmented reality, and autonomous vehicles.

By emphasising these competencies, DCG can strengthen the subject's identity and better prepare students to solve complex problems, innovate, and adapt in a rapidly changing world. The ability to visualise and manipulate spatial objects helps students bridge abstract and concrete thinking, which is crucial in STEM fields.

Such developments will ensure that students acquire the essential competencies needed for future careers. Redeveloping DCG is a crucial step in meeting the growing demand for spatial and design thinking abilities, enabling young people to contribute meaningfully to emerging social and economic challenges.

Breadth and depth of the subject

Recent insights into the current DCG syllabus indicate that both teachers and students value the richness of the subject. However, concerns have been raised that the syllabus is overly extensive, leading to difficulties in covering the course content within the available timeframe.

The 2007 DCG syllabus was designed with both core and optional areas of study, offering teachers some flexibility in how the subject was taught. The development of new senior cycle subject specifications emphasises an integrated approach to learning where students engage with learning across multiple strands of study.

In this context, it is important to identify what constitutes essential learning in DCG in order to design a new specification that offers a manageable curriculum.

Pedagogies to support learning

The redevelopment of DCG should prioritise pedagogies that foster both practical and technological skills, ensuring students are well-prepared for future challenges. Spatial awareness, geometry, graphicacy, and digital proficiency are core elements of student learning in DCG.

Recent school visits highlighted the importance of an integrated approach to teaching and learning. In this approach, board drawing, freehand sketching, CAD and other resources are used appropriately to enhance student learning. This approach aims to deepen students' understanding of geometric principles through their engagement with topics. However, classroom logistics and

time are highlighted as constraints that sometimes limit the effectiveness of this approach in practice.

To support a deeper understanding of geometry through an integrated approach to teaching and learning, careful consideration should be given to the design of the specification, as well as to the development and provision of continuous professional development (CPD) for teachers.

Additionally, pedagogies should also focus on creating a balance between conceptual understanding and practical application. Project-based learning, as experienced in the student assignment, encourages creativity and problem-solving. Creating more opportunities for genuine design exploration is necessary.

Assessment in DCG

As outlined in Appendix 1, the redevelopment of the DCG specification provides a valuable opportunity to review and enhance assessment arrangements for certification in the subject. The proposed structure includes a written examination and one additional assessment component (AAC).

Currently, the assessment arrangements in DCG consists of a student assignment (40% of the overall grade) and a terminal examination (60% of the overall grade). While this structure has generally been well-received, it requires careful review to ensure that future assessments remain relevant and manageable for students.

It is important for the AAC to evaluate learning without over-assessment, and to ensure that the workload aligns with students' efforts. Additionally, it’s important to consider the format of the terminal examination; exploring options for increased choice and flexibility could help reduce strain on students and foster deeper learning experiences.

Student access to CAD software

CAD software, specifically SolidWorks, is regarded by teachers and students as a vital tool for learning. However, many students have difficulty in accessing SolidWorks at home due to the software's computer hardware requirements and difficulties in obtaining a student license.

In recent years, the landscape of CAD software licensing has evolved, with a noticeable shift toward cloud-based and subscription models. These options provide greater flexibility and remote access, making it easier for students to engage with the software outside of the classroom. This trend is likely to continue, and integrating cloud-based CAD solutions could significantly enhance students' ability to complete homework and deepen their understanding beyond the classroom setting. For example, the availability of online tutorials can improve students' spatial skills and understanding of geometric principles, offering valuable additional learning support.

Consequently, an issue to consider in the redevelopment of Leaving Certificate DCG is students' access to CAD software at home.

Continuity and progression of learning

In redeveloping the DCG specification, it is essential to ensure continuity and progression of learning for students moving from junior cycle to senior cycle. Some students face challenges due

to gaps in their foundational knowledge, especially if they have not taken junior cycle Graphics. To create a more inclusive and supportive learning environment, strategies should be explored to bridge gaps in understanding and application of geometry, ensuring all students are adequately prepared to succeed in DCG, regardless of their prior experience.

Section Summary

- Leaving Certificate DCG is essential for equipping students with competencies such as spatial cognition, graphicacy, and design thinking. These skills are vital for future careers in various industries, enabling students to innovate and solve complex problems in a rapidly changing world. Redeveloping DCG is essential to enable young people to contribute meaningfully to emerging social and economic challenges
- Recent evaluations of the current DCG syllabus show that while both teachers and students appreciate its content, concerns exist about its extensiveness and time constraints. To address this, the new specification should streamline essential learning and integrate applied learning, ensuring the course remains manageable and effective.
- The redevelopment of DCG should emphasise pedagogies that enhance cognitive, practical and technological skills, focusing on spatial awareness, geometry, graphicacy, and digital proficiency. An integrated approach towards teaching and learning approach is essential for deeper understanding. Effective continuous professional development for teachers is essential for effective implementation.
- The redevelopment of the DCG specification offers an opportunity to enhance assessment arrangements. The current arrangements, comprising a 40% student assignment and a 60% final examination, requires a review for relevance and manageability. Key considerations include maintaining a balanced workload, evaluating learning without over-assessment, and incorporating choice and flexibility to reduce cognitive strain and foster deeper learning experiences.
- CAD is considered essential for teaching and learning in DCG. Many students face challenges accessing SolidWorks at home due to computer hardware requirements and student licensing. The shift to cloud-based and subscription models can enhance accessibility and supports remote learning.
- Redeveloping the DCG specification must ensure continuity in learning for students transitioning from junior cycle to senior cycle. It should address any foundational knowledge gaps to support all learners effectively.

6. Brief for the review of DCG

NCCA has established a development group to undertake the task of redeveloping a curriculum specification for Leaving Certificate DCG. The work of the Development Group is, in general terms, agreed by the NCCA Board for Senior Cycle and by the Council in the form of the brief set out below.

This brief is designed to provide the basis for redeveloping the Leaving Certificate DCG curriculum specification. While the brief is derived from the key insights and issues for consideration identified in the previous sections of this paper, it is also guided by the parameters for the design of assessment arrangements in the development of specifications for all Tranche 3 subjects (Appendix 1).

The specification will be student-centred and outcomes-based and in general terms, the specification should be broadly aligned with levels 4 and 5 of the National Framework of Qualifications. It will be available at both Higher and Ordinary level, and it will be designed to be taught and assessed in a minimum of 180 hours.

The specification will align to the template, agreed by NCCA Council, for curriculum specifications as set out in the *Technical form of curriculum specifications for subjects and modules in a redeveloped senior cycle* (NCCA, 2023). The Senior Cycle Key Competencies will be embedded in the learning outcomes.

The specification will be completed for Q2 2026.

More specifically, the development of the new specification for DCG will address:

- How the specification aligns with the guiding principles of senior cycle and the vision for senior cycle education.
- How it can support continuity and progression, including how to connect with and build on related learning at junior cycle, transition year, and in other senior cycle subjects and modules as well as future learning in life, study, entrepreneurship, further education and training, higher education, apprenticeships, traineeships, and the world of work.
- A review of the subject's identity, focusing on its role in equipping young people with the knowledge, skills, values, and dispositions necessary for 21st century living.
- The identification of core areas of learning within the subject and the examination of how this learning can be applied in meaningful and relevant ways.
- The need to ensure that the breadth and depth of the subject support sustainable teaching, learning, and assessment practices.
- The design the specification and associated CPD to facilitate the realistic implementation of integrated teaching and learning methodologies in the classroom.

- Opportunities to enhance access to CAD for students, enriching their educational experiences.
- Strategies to expand the subject's appeal, promoting broader student engagement and participation.
- Efforts to foster greater awareness and appreciation among students for the diverse fields and STEM professions relating to DCG.

The work of the Development Group will be based, in the first instance, on this brief. In the course of the work and deliberations of the Development Group, elaborations of some of these points and additional points may be added to the brief.

Appendix 1: Overarching parameters for the design of assessment arrangements in the development of specifications for all Tranche 3 subjects

1. **Executive summary**
    - The Minister for Education announced an update on September 20, 2023, on the approach to be taken to the introduction of new and revised subject specifications including how assessment would be addressed in those specifications. Specifically, each subject shall have an assessment component in addition to the final written examination.
    - This assessment component (an AAC) will be worth at least 40% of the total available marks.
    - Each subject is to have one written examination; typically marks for the written examination will be 60%,
    - Typically, there should be two assessment components: One written examination and one other assessment component (an AAC).
- More than one AAC or written examination may be justified in exceptional circumstances and after extensive consideration of the overall assessment load on students. Such exception, however, would be based on strong, clear evidence that a second AAC or a second written paper in the final examination is essential to assess student learning which cannot be achieved through a single AAC and a single written examination paper.

2. **Introduction**

This document outlines the overarching assessment arrangements and parameters to guide the design of specifications for all Tranche 3 subjects which include:

- Agricultural Science
- Computer Science
- Design and Communication Graphics
- History
- Home Economics
- Mathematics
- Music
- Physics and Chemistry.

This advice is informed by ongoing work with Tranche 1 and 2 subjects and will be amended, as appropriate, for future tranches which may take account of their subject areas and existing assessment arrangements.

The arrangements as detailed here reflect the policy direction issued by the Minister of Education that all subjects will have an assessment component, to be in a form that is not a traditional written examination, for those components to be set and assessed by the SEC and thereby lead to a reduced emphasis on final examinations in June of 6th year.

Specifically, the arrangements for all assessment components as outlined in this document are framed by the Minister's announcement(s) on March 29, 2022, and subsequently on September 20, 2023. Underpinned by the following understandings, the assessment components:

- will not take the form of traditional written examinations.
- will be set and marked by the SEC.
- will be subject to SEC arrangements for their completion, authentication, and submission.

In developing the arrangements outlined below, the following rationale for moving towards all subjects having another assessment component is central. This rationale is informed by deliberations on research commissioned by the NCCA and the SEC, and on the assessment literature more generally. From this work, it is evident that these components have the potential to:

- **Reduce dependence** on written summative examinations and therefore provide for a **broader assessment system**; written examinations have an important role but can be seen as a 'snapshot' of learning and can lead to teaching and learning having an excessive focus on examination preparation; other forms of assessment can mitigate the potential for this narrowing of learning by assessing aspects of student learning better and/or more comprehensively than written examinations alone can do; or assess learning that is not readily assessable through written examinations.
- Support and enhance teachers' understanding and assessment of **key competencies** by contributing to a greater understanding of how students' knowledge, skills, values, and dispositions are assessed.
- Provide opportunities for students and teachers to **reflect on student learning,** boost students' motivation to learn and enhance opportunities for formative feedback practices.
- Extend the range and diversity of assessment opportunities; including **spreading the assessment load** over the course of the last two years of senior cycle and thus contribute to a reduction in or spreading of pressure on students.
- Build and develop **teachers' assessment skills and assessment literacy** as teachers support students in working through the assessment activities as detailed within assessment briefs or guidelines.
- Generate student assessment data which can help reduce the vulnerability of the system to future unprecedented or unexpected system shocks such as COVID.
- Allow for assessment opportunities that are more **authentic** than a system relying on terminal written examinations solely.

It is also important to note that a review of the assessment literature more generally also indicates that when introducing other assessment components, it is necessary to consider how to mitigate risks, for example, of:

- over-assessment of students
- over-rehearsal of assessments
- the assessments becoming overly structured, compartmentalised, repetitive, and routine.

As is already the case where other forms of assessment apply, the new assessment arrangements will be guided by the overarching principles of equity, fairness, and integrity.

In addition, at a programme wide level (i.e. taking account of all subjects and modules implemented across schools), it is necessary to have regard to the overall assessment load on students primarily as well as on schools more generally. Whilst it can be expected that SDGs might focus on the approach to assessment in their own subject initially, they are encouraged to be mindful of the overall assessment load across all subjects and modules. Such programme level considerations will also include the methods of assessment being undertaken. As stated above more than one AAC or written examination may be justified in exceptional circumstances and the following section outlines the process for such cases.

3. Process

This section sets out the process through which a variation to the parameters defined in this document will be considered and decided upon; for example, an additional AAC or a second final written examination.

1. Following extensive discussion by the SDG and after exploration of a range of options for a single suitable AAC/single written examination for the subject, the NCCA Executive generates a written note setting out the strong, clear case being made by the Development Group.
2. The written case is agreed and signed off by the Development Group.
3. The written case is discussed with the Board for Senior Cycle.
4. The written case is discussed with the Council. On foot of this discussion, the Council decides whether or not to send the case forward to the Department.

   a) Having considered the importance of managing and spreading the assessment load for students, if the Council decides that the case isn't sufficiently strong to merit consideration by the Department, the Council requests the Development Group to work on the basis of one AAC and one written examination.

   OR

   b) Having considered the importance of managing and spreading the assessment load for students, if the Council decides that the case is sufficiently strong to merit consideration by the Department, the Council agrees to send the case forward to the Department of Education.
5. In the case of 4b, the written case is sent to the Senior Cycle Redevelopment Programme Management Office (SCRPMO) in the Department of Education for consideration and response.
6. The Department may convene the Senior Cycle Redevelopment Implementation Group (SCRIG) to support its consideration of the request for a variation. The SCRIG is a Department-led structure established to provide oversight and support the co-ordination of work across the key agencies/organisations contributing to the redevelopment of senior cycle. Its members include senior officials from the Department (Curriculum and Assessment Policy Unit, Inspectorate, Teacher Professional Learning [TPL]), NCCA, SEC and Oide.
7. The Department decides to support or decline the request for the variation sought and communicates its decision in writing to the NCCA in a timely manner.
8. The Subject Development Group progresses its work in line with the Council's response (arising from 4a) or the Department's response (arising from 4b and 7).

4. Timelines

The process outlined above will require time. Such time, if involving a number of weeks, could have significant implications for the timeline for specific stages of work on the subject specification and/or the overall completion of the specification ahead of sending it to the Department for consideration. This time factor may necessitate NCCA organising additional online meetings of the Board for Senior Cycle and the Council in order to ensure the development work remains within the overall timelines.

Table 1 below sets out the general parameters and processes to guide the work of the subject development groups (SDG) as they consider the most appropriate assessment for each subject. The specific parameters for each of the Tranche 3 subjects are set out in Table 2.

Table 1: Assessment parameters and processes – general application to tranche 3 subjects

Considerations	Parameters to guide the work of the development group.
Nature	The purpose and nature of the assessment component will be clearly outlined in the subject specification and accompanying guidelines to support the completion of the assessment. Details will be provided on the nature of the component. Existing examples include: • research project/extended essay • oral assessment • performance assessment • portfolio assessment • creation of an artefact • field study • experiment/ proof of concept/ practical investigation. The subject specification and the accompanying guidelines will articulate clearly what the students are required to do, the form(s) in which it can be carried out and submitted, and the workload expectations associated with the assessment. The alignment of the assessment component to a particular set of learning outcomes from the subject specification will be provided, as well as details on which key competencies and associated learning outcomes will be assessed. This does not preclude the same LOs from being assessed in the final examination.
Weighting	The assessment component in each subject will be worth at least 40% of the total available marks.
Timing	The SDG will advise on the time required for the carrying out of the assessment component across the course of study.
Completion and Submission	While the SDG may suggest when this may occur (as referenced above having regard to the assessment load on students in particular), a final decision will be made by the SEC following consideration of the overall schedule of completion dates for all assessments across all subjects. This will be finalised by the SEC following engagement with the NCCA and DE. The dates for final completion and\or submission of the assessment component by the student will be published by the SEC and this detail will not be included in the subject specification. (See table 1 below in relation to Mathematics also)
Design	The majority of assessment components will result in a completed item that is materially different to a traditional written examination and which tests different competencies being transmitted to the SEC and assessed by the SEC. In some instances, the design of the assessment may require examiners to visit schools to conduct the assessment but manageability at school and system level will need to be considered.

Guidance	Guidelines to support the assessment components will be specific to each subject. These guidelines will be developed collaboratively by the NCCA and SEC. They will be informed by the deliberations of the SDG during the development of the specification and will detail: • the purpose of the component concerned i.e., what it is intended to assess. • the nature of the assessment component/activity. • descriptors of quality in the form of a graduated rubric and details on assessment standards at higher and ordinary levels if deemed necessary by the assessment method. • details on the timing of the assessment (its duration and when it could happen). • guidance on the processes that may be used for the administration of the assessment.

Table 2: Parameters for assessment arrangements for each Tranche 3 subject

Subject	Current arrangements	Parameters for new assessment arrangements
Agricultural Science	Written examination is 2.5 hours duration for higher level and ordinary level students and is awarded 300 of the 400 marks available (75%). Coursework is an Individual Investigative Study, which is done in response to a common brief from SEC and is worth 100 marks (25%).	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component would be based on one submission to SEC in response to a common brief.
Computer Science	The final examination is worth 70% and is 2.5 hours duration on one day towards the end of May. There is a paper-based element (1.5 hrs.; 130 marks) followed by a computer-based element (I hr.; 80 marks). The coursework is worth 30% of the final marks. The common brief is released in December of 6th year and a report and summary video (90 marks) is typically submitted in March of 6th year. This is completed over a 10-week period. Coursework and practical are set at a common level but are graded in line with the standards that apply to the level at which the candidate sits the written examination.	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component would be based on one submission to SEC in response to a common brief.

	Written examination is examined at higher and ordinary levels.	
Design and Communication Graphics	Written examination has 1 paper worth 240 marks which is 60% of the marks available. This paper is 3 hours in duration. Written examination is examined at higher and ordinary levels. Student assignment is worth 160 marks which is 40% of the marks available. The student assignment at higher level differs from the student assignment at ordinary level with a different brief set for HL and OL students. There are 9 outputs required in a portfolio for both levels with the HL page limit set at 14 pages and OL page limit 12 pages.	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component would be based on one submission to SEC in response to a common brief.
History	Written examination is worth 80% of the total marks available, and the exam is 2 hour 50 minutes in duration. Coursework is a Research Study Report (RSR) and is allocated the remaining 20%. There is a different word count for HL and OL students, with the OL word count set at 800 words and the HL word count set at 1600.	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component would be based on one submission to SEC in response to a common brief.
Home Economics	Written examination is 2 hr 30 minutes duration and worth 280 or 320 marks (out of 400) depending on the elective chosen. For students who choose the **Home Design and Management** or **Social Studies** electives, the written examination is worth 80% and the **Food Studies Coursework** is worth 20%. For those who choose the **Textile Fashion and Design** elective, the written exam is worth 70%; the **Food Studies Coursework** is worth 20% and the **TFD Coursework** is allocated 10%. **Food Studies Coursework** is based on 4 assignments completed by the	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component would be based on one submission to SEC in response to a common brief.

	beginning of November of 6th year and submitted to the SEC.	
Mathematics	There are 2 written papers that are worth the full allocation of marks. Paper 1: HL OL and FL is 2.5 hrs duration. Paper 2: Hl and OL 2.5 hrs duration.	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher ordinary and foundation levels and it would be expected to take the form of a single paper Assessment component would be based on one submission to SEC in response to a common brief. Assessment component to be completed in Year 1 of the two-year programme.
Music	There are 3 areas for assessment: Composing element is worth 25% and assessed by a written paper of 1.5 hours duration. Performing element is worth 25% and is assessed by a performance of 3 or 4 pieces depending on the selection of one performance format or 2. Listening element is worth 25% and is assessed by an aural exam and written paper of 1.5 hours duration. HL Elective: Higher level students select one of the 3 areas above and choose to increase mark allocation to 50% by including an additional assessment activity. For ordinary level students, their best mark in one out of the three areas is doubled to reach 100%-mark allocation.	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component will be based on a brief issued by the SEC.
Physics and Chemistry	Written paper at HL and OL worth full mark allocation of 400 marks. 3-hour paper. Section 1 Physics worth 200 marks. Section 2 Chemistry worth 200 marks.	Written examination: typically, 60% weighting. Assessment component: minimum 40% weighting. Written examination will be set at higher and ordinary levels. Assessment component would be based on one submission to SEC in response to a common brief.

Whilst an AAC in each subject must have a minimum weighting of 40%; an SDG may propose a weighting of 50%. In these circumstances, the process outlined at Section 3 above will apply to determine if such a weighting receives further consideration as to whether it shall be applied or not. It would not be anticipated that an SDG would seek to apply a weighting to the AAC above this level.

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