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How are we equipping our young people to flourish in *The Fourth Industrial Revolution?*

The role of creativity in the Junior Cycle Classroom

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Creativity and Innovation: Curriculum, assessment, teaching and learning provide opportunities for students to be creative and innovative

The World Economic Forum (WEF) stated in 2016 that we are already in the Fourth Industrial Revolution. This is significantly different to the three Industrial revolutions that preceded it- steam and water power, electricity and assembly lines, and computerisation – as the Fourth Industrial Revolution describes the exponential changes to the way we live, work and relate to each other due to the adoption of cyber- physical systems, the Internet of Things and the Internet of Systems. The Fourth Industrial Revolution is disrupting almost every industry in every country and creating massive change in a non linear way at unprecedented speed.

As smart machines become increasingly dominant within many sectors, there will be an increasing demand for the kinds of skills that machines are not good at. These are higher-level thinking skills that cannot be codified, sense-making skills that help us create unique insights critical to decision-making. Developing the creativity and innovation skills of our young people is central to meeting this need. The WEF in its *Future of Jobs report 2020* highlighted the top ten skills for the future workforce and listed creativity as the third most important skill for future jobs. This showed creativity rising in importance from tenth place on the 2015 skills list.

Across the globe, many developed countries have a strategic plan in place for developing the creativity/ innovation skills of their nation to meet this global workforce demand. In Ireland,

the Creative Ireland programme 2017-2022 sets out a clear vision and actions for what we hope to achieve in this time frame.

An Taoiseach Leo Varadkar TD, states in the foreword of the *Creative Ireland Plan 2017- 2022 (Creative Youth)* that good policy decisions made over the last fifty years, particularly in the area of education have allowed Ireland to achieve a level of prosperity in the information age. Ireland is now moving in to a different age with new opportunities and challenges and the Creative Ireland programme provides an opportunity to rethink and re-evaluate our ways of supporting young people to develop their full creative potential.

Knowledge and specialist expertise will always be important but so, too, will be the ability to apply the knowledge and expertise in new and previously unimagined ways. As workplaces become progressively more automated, our ability to be creative and innovative, solve problems, work collaboratively, think conceptually and imaginatively will become even more important.

Developing creative skills in young people is not only good for the economy but creativity brings greater opportunities to both individuals and society, makes learning more satisfying and enhances wellbeing. Education equips our young people to flourish in their personal lives as well as in the economic and social circumstances in which they are likely to find themselves.

Putting the arts and culture at the centre of education is important, not just for developing creative capacities and skills but also for encouraging social responsibility and personal capacities such as resilience, empathy, and a capacity for friendship.

Within our education system, creativity is at the core of the Junior Cycle Framework. Creativity is one of the eight guiding Principles which underpin the Framework for Junior Cycle. *It states: Creativity and Innovation: Curriculum, assessment, teaching and learning provide opportunities for students to be creative and innovative.*

This is developed in the classroom experience through the key skill of *Being Creative* (Toolkit: https://www.ncca.ie/media/1148/beingcreative_april_2015.pdf) and it is a key tenet of at least 6 of the 24 statements of learning.

HOW DO WE DEFINE CREATIVITY?

It is important at the outset to explore what we mean by the term 'creativity' as there is a wide spread reluctance to settle on a single definition of creativity, perhaps for the reason that it may seem a reductionist and un-creative thing to do. The Creative Ireland Programme ventured its own definition of creativity as:

...a set of innate abilities and learned skills: the capacity of individuals and organisations to transcend accepted ideas and norms and by drawing on imagination to create new ideas that bring additional value to human activity.

The Oxford English dictionary helps us to identify all the words that we associate with the term creativity and it defines it as *'the use of imagination or original ideas to create something; inventiveness'*. The synonyms associated with it are: imagination, innovation, originality, individuality.

Lucas (2016) explored creativity in education and proposed a five-dimensional model of what he described as 'creative habits of mind' (2016 p.280) which focused on being imaginative, inquisitive, persistent, collaborative and disciplined. Lucas argues that this model is mindful of the 'subject-specific nature' (2016 p.281) of teaching and learning at

second level and may offer an approach to the ongoing challenge of assessing creativity.

DEVELOPING CREATIVITY THROUGH THE CLASSROOM-BASED ASSESSMENTS

One potential area to support the development and assessment of creativity in Junior Cycle is the range of Classroom-Based Assessments (CBAs)

The CBAs are designed to support the student in being at the centre of their own learning experience. They support both the creative process and the development of a creative mindset. Within the CBA, the student has an opportunity to take ownership of the topic to be explored and the genre and style of the presentation of their work within the parameters of the guidelines. This echoes the Creative Ireland description of the creative process as 'involving or behaving imaginatively with a view to achieving an objective, and with an outcome that is both original and of value' (Creative Ireland programme)

Every CBA in each subject has a set of features of quality which are criteria against which the quality of the learning is assessed.

The descriptors which are awarded to students based on these features of quality of learning range from: Not reported; Yet to meet expectations; In

line with Expectations; Above Expectations and Exceptional.

Creativity, Innovation, imagination and originality are key words that occur both in the Exceptional range of the features of quality of the Classroom Based Assessments in some subjects and across a continuum in others. Highlighted below are some instances of where this occurs across a number of the subjects.

In the Exceptional range in English CBA 1 *Oral Communication*, students are challenged to see if through their oral skills, their 'Communication is **imaginatively** shaped to a clear purpose' while in CBA2 *The collection of the Student's Texts* in the Exceptional range, the students texts need 'to show **creativity** and command of the chosen genre and that the writing is highly competent marked by **original** ideas and **imaginative** word choices are perfectly suited to the purpose of the text'.

In the subject of History, both CBA1 *The Past in my place* and CBA2 *A life in time* have the same feature of quality in the Exceptional range which details that the student's display is compelling in connecting the local with a 'big picture' of the past, showing some **originality**'.

Creativity is a central theme running through all levels of the features of quality in both Home Economics CBA 1

STANDARDS	STATEMENTS OF EFFECTIVE PRACTICE	STATEMENTS OF HIGHLY EFFECTIVE PRACTICE
Promote a culture of improvement, collaboration, innovation and creativity in learning, teaching, and assessment	The principal and other leaders in the school work to promote a learning culture. They have generally high expectations for students and lead staff in striving for improved outcomes. They support reflective practice and promote a culture of improvement.	The principal and other leaders in the school foster a culture in which learning flourishes. They lead the school community to continuously strive for excellence by setting high expectations for students. They promote a culture of continuous improvement by supporting colleagues to become reflective practitioners.
	The principal, with those leading the process, uses SSE to encourage teaching that is engaging and challenging, and to increase students' interest in learning.	The principal, with those leading the process, uses SSE very effectively to encourage teaching that is engaging and challenging, and to enable all students to become active and motivated learners.
	The principal and other leaders in the school encourage teachers to develop their teaching, learning and assessment practices, and to share their practice.	The principal and other leaders in the school expect and encourage teachers to develop and extend their teaching, learning and assessment practices, and to share practices that have proven successful at improving students' learning.
	They encourage innovation and creativity. They recognise the value of individual and collective contributions and achievements.	They actively promote innovation and creativity. They welcome and celebrate individual and collective contributions and achievements.

Creative Textiles and Music CBA 1 *Composition Portfolio* and CBA 2 *Programme Note*. All of the three CBAs feature a continuum of how the student can demonstrate their level of creativity from 'In line with expectations- the student must demonstrate **some creativity** to in the exceptional range, students demonstrate a **very high level of creativity and originality** in Home Economics and in Music the focus is on **creativity and imagination**.

It is apparent from exploring the features of quality in the above Classroom-Based Assessments that to achieve at the highest level and be awarded an Exceptional descriptor, students' need to demonstrate their skill sets of original thinking, imagination, innovation and creativity, skills that are developed and supported through teaching and learning.

WHAT CAN SCHOOL LEADERS DO TO PROMOTE CREATIVITY IN THEIR SCHOOLS?

Looking at our School 2016: A Quality Framework for Post-Primary Schools encourages School Leaders to 'promote a culture of improvement, collaboration, innovation and creativity in learning, teaching and assessment' in their schools. Highly effective practice in this area calls on the school leader to 'actively promote innovation and creativity' and to 'foster a culture where learning flourishes'.

Schools can take several approaches to supporting creativity in the junior cycle classroom. Creativity stems from creative thinking processes. What strategies can schools employ to raise the level of creative thinking in the classroom experience for the student? Perhaps the work of Lucas can further support schools in moving towards highly effective practice.

THE ROLE OF EFFECTIVE QUESTIONING IN DEVELOPING THE SKILLS OF CREATIVITY, INNOVATION, AND ORIGINALITY IN THE CLASSROOM

Taking Lucas' model and focusing on being imaginative, inquisitive and persistent, it is clear that developing

approaches to questioning and dialogical interaction in the classroom can support students in developing their creative thinking skills. Asking good questions is central to learning. Sometimes asking the question can be more important than having the answer as it promotes critical thinking sets students on a path to considering possible solutions to their questions.

Questions are typically classified by the level of cognitive demand required to answer them. The best-known system for categorising the cognitive level of questions is Bloom's taxonomy (1956), in which six levels of cognitive demand move from the lower order processes to the highest. Lower order questions ask students to recall and comprehend material that was previously read or taught by the teacher. Higher order questions ask students to use information that was previously learned to create or support an answer with logically reasoned evidence. Both higher and lower order questions are useful and have their place in the teaching and learning process, but they serve different purposes.

Studies of classroom instruction (Gall, 1970) (Hare & Pullman 1980)) would tell us that only 20% of questions posed by teachers require more than factual recall, clearly pointing to a need for more teachers to become familiar with and using higher order questions to encourage deeper, creative thinking.

The following questions are examples of those that teachers can ask to encourage deeper student thinking and learning.

- Questions that ask for more evidence: What data is that claim based on?
- Questions that ask for clarification: can you put that another way?
- Linking or extension questions: Is there any connection between what you've just said and? How does your comment fit with earlier comment?
- Hypothetical questions: what might have happened if....?
- Cause and effective questions: what is likely to be the effect of....?

A different taxonomy (Gallagher & Aschner, 1963) categorizes four types of questions:

- Memory questions focus on identifying, naming, defining, designating, and responding with yes or no. Key words are who, what, where, when.
- Convergent thinking questions focus on explaining, stating relationships, comparing, and contrasting. Key words are why, how, in what way.
- Divergent thinking questions focus on predicting, hypothesizing, inferring, and reconstructing. Key words are imagining, suppose, predict, if...then..., how might, can you create, what are some possible consequences.
- Evaluative thinking questions focus on valuing, defending, judging, and justifying choices. Key words are defend, judge, justify, what do you think, what is your opinion.

When students begin to focus on the divergent questions, they are clearly in the creative thinking space where they are challenged to be innovative and original in their thought processes. This is a skill set that needs to be developed by the teacher and the student and peer to peer dialogical interaction in the classroom.

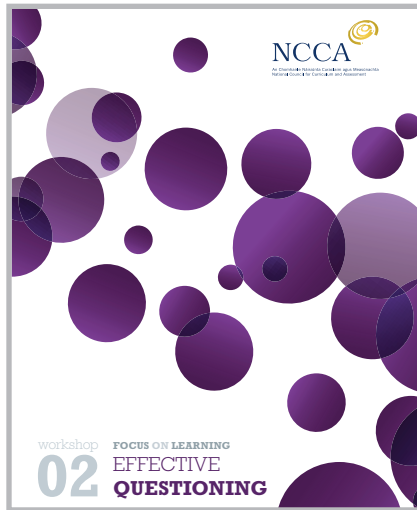
NCCA FOCUS ON LEARNING TOOLKIT 2: EFFECTIVE QUESTIONING

A good starting place for schools is to explore the resources in the *NCCA Focus on Learning Toolkit workbook 2: Effective Questioning*. This step-by-step guide can be used by individual teachers, subject departments or by the whole school staff as a strategy when focussing on creative thinking and questioning in the classroom.

https://www.ncca.ie/media/1924/assessment-booklet-2_en.pdf

USING THE SCHOOL SELF-EVALUATION PROCESS

Looking at our School 2016: A Quality Framework for Post Primary Schools encourages schools to use the School



Making questioning more effective

When planning effective questioning it helps to focus on **why** you are asking the question in the first place. The chart below shows some of the many purposes for asking questions in a classroom.

Purpose of question	Examples
To prompt students to reflect on their conceptual understanding	<ul style="list-style-type: none"> What is the most important idea from today's discussion? Can you explain this concept in your own words? Replace 'Do you understand?' with 'Give me an example so I know you understand.'
To ask a student to clarify a vague comment	<ul style="list-style-type: none"> Could you say a bit more on that point? Can explain a little more?
To prompt students to explore attitudes, values, feelings	<ul style="list-style-type: none"> What are the values or beliefs that inform this argument? What has influenced how you feel/what you believe about this topic?
To prompt students to see a concept from another perspective	<ul style="list-style-type: none"> How do you think that this issue might be viewed by those with whom you disagree? Imagine how this might apply to another situation or problem?
To prompt students to support their assertions and interpretations	<ul style="list-style-type: none"> How do you know that? What has led you to that conclusion? Where is the evidence? Is it reliable?
To prompt students to respond to one another	<ul style="list-style-type: none"> What do you think about the idea just presented by your classmate? Do you agree or do you see the issue differently? Explain.
To extend and deepen students thinking	<ul style="list-style-type: none"> What are the assumptions that informed your thinking? What/who influenced your thinking?
To ask students to predict possible outcomes	<ul style="list-style-type: none"> What might happen if... What are some possible consequences of...? What would be the result if a different set of assumptions were used to set up this experiment?
To prompt students to connect and organise information	<ul style="list-style-type: none"> How does this shed light on the concept we studied last week? Can you develop a graph or table that organises this information in a helpful way?
To ask students to apply a principle or formula	<ul style="list-style-type: none"> How does this principle apply to this situation? Who can suggest how we might use this new formula to solve the problem we examined earlier?
To ask students to illustrate a concept with an example	<ul style="list-style-type: none"> Can you think of an example of this, drawn from your experience? Can you point to a specific part of the novel that shows this theme? Can you identify a painting or design that exemplifies that idea?

Self-Evaluation process to engage all stakeholders to encourage teaching strategies which are both challenging and engaging. School leaders are familiar with planning for this process. As highlighted in previous JCT leadership workshops, strategic planning in schools needs to happen at different levels within the school to be effectively implemented.

Leaders need to think strategically when implementing change and planning for developing and enhancing creativity in the school curriculum. The purpose of planning is to achieve the teaching and learning aims of both the school and the system. Through planning, school leaders and teachers decide how to organise the school's curriculum and

how that is experienced in the classroom by the students. To be effective, planning for change should be examined on three levels:

1. THE WHOLE SCHOOL

At this level schools are examining the systems and structures as to how teaching, learning, assessment and reporting are organised in their own school and what they would like to improve. If schools are focussing on developing creativity skills, they may choose to begin with one of the NCCA toolkits and explore where the school's practice is at. After gathering data, schools decide as to where the area of need is and how they would like to proceed.

2. TEACHERS SUBJECT PLANNING AND TEAMS

Teams of teachers are the engine that drives change in schools. Teachers collaborating on an area of interest or concern have the power and capacity to make significant change in many areas of school life. A catalyst for discussion may be the features of quality in the different Classroom-Based Assessments and what would innovation, creativity and originality look like with in their subject areas.

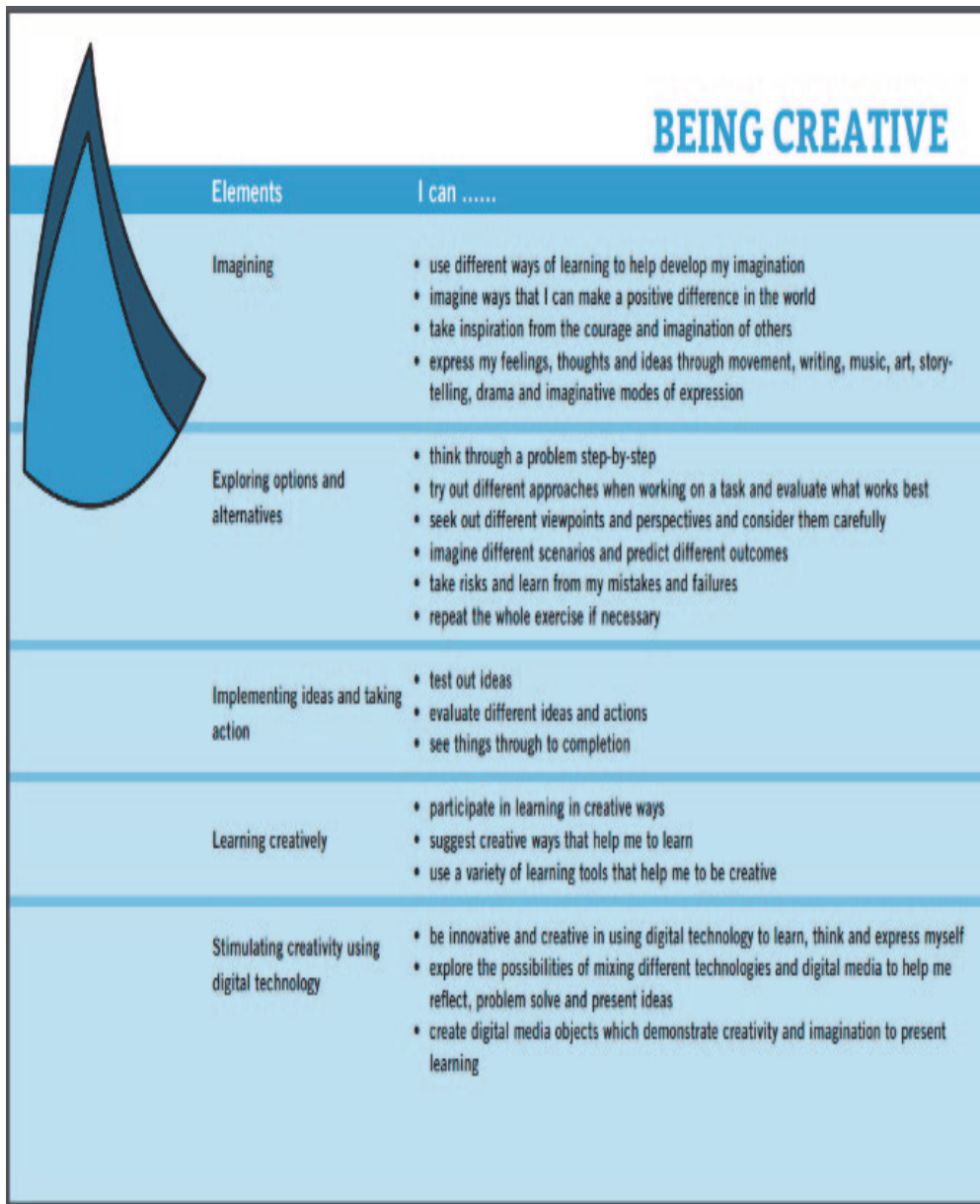
3. IN THE CLASSROOM

The teacher with the students explores what strategies and ideas need to be implemented to enhance creativity and innovation in the student's experience in the classroom daily.

IN SUMMARY

The ability to be creative and innovative has always been important in teaching and learning but as our young people move in to living and working in the age of The Fourth Industrial Revolution, it will become even more prized as an essential skill. The challenge for us as educators is how to support young people in our Irish classrooms in developing these skill sets.

The system changes to teaching, learning, assessment and reporting at Junior Cycle with the introduction of the Classroom-Based Assessments is empowering young people to take ownership of their learning, to be



creative and innovative in how they engage with the tasks, solve problems and work collaboratively and imaginatively with their peers. Classroom-Based Assessments allow the students learning to be demonstrated and assessed at particular moments on their learning journey over the three years of junior cycle but developing these skills maybe dependent on a change in the teachers daily pedagogical practice in the classroom. Schools can support and enhance this system change, by exploring how they can take a whole-school approach to developing teaching and learning strategies such as effective questioning with in their SSE process. To be strategic in its implementation, a school needs to plan for this at the whole school, subject department and classroom level.

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