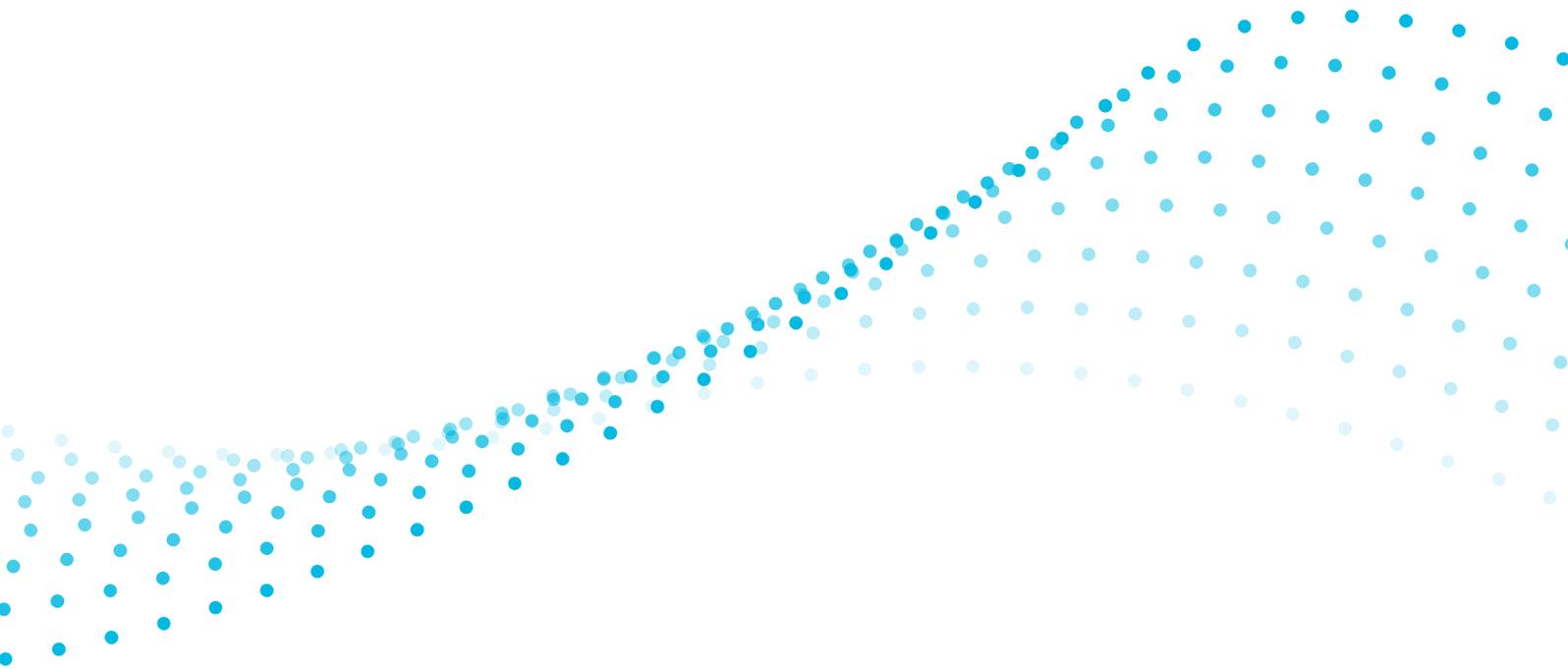


Putting Creative Thinking at the Core of the English School Curriculum

An exploratory study



About this Report

This report is an independent evaluation by The Australian Council for Educational Research UK (ACER UK) of a small-scale study undertaken by Rethinking Assessment. The study was led by Professor Bill Lucas with colleagues from Rethinking Assessment. It explored the degree to which it was possible for teachers in English primary and secondary schools to integrate creative thinking skills into five subjects within the existing National Curriculum and learn how to evidence the progress of their pupils. The findings of the study will feed into debates on the content of contemporary curricula today, curriculum design, the choice of pedagogies and the ways in which assessment methods can be developed to improve creative teaching and learning. The study sought to evaluate the challenges for schools in teaching for creativity in the current English school system, sharing practical insights that might be applied in the event of a systemic shift towards the integration of creative thinking within the English National Curriculum.

About Rethinking Assessment

Rethinking Assessment is a broad-based coalition which includes school leaders from both state and independent sectors in the UK, leading researchers, key policy-makers, employers, and representatives from higher education. Its goal is to make assessment more equitable and fit for purpose in today's fast-changing world, complementing a curriculum that better prepares all young people for their futures. Rethinking Assessment argues that the best way of doing this is for every young person to be supported in creating a learner profile while at school, capturing evidence of their strengths - knowledge, skills and dispositions - a profile that they can then take with them to build on through life. International evidence increasingly suggests that creative thinking, communication and collaboration are essential dispositions today. Rethinking Assessment's work draws on leading evidence-informed assessment practices being trialled in jurisdictions around the world.

About ACER UK

The Australian Council for Educational Research (ACER) is a not-for-profit, education research organisation with offices in the UK, India, Dubai, Indonesia and across every State in Australia. ACER has world-renowned expertise in evaluation, assessments, and the use of data and evidence to improve learning. ACER has conducted large-scale evaluations and research projects for national governments and a wide range of international organisations including the World Bank, UNICEF and the Global Partnership for Education. It is currently implementing the international contract for the Programme for International Student Assessment (PISA) 2025 which will review the achievement level of 15-year-olds in English, maths and science across more than 90 countries. ACER is also leading groundbreaking work on the assessment of general capabilities and transversal skills such as critical thinking, collaboration, and creativity.

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Glossary of Terms and Abbreviations

Action research	Action research is a practice-based research method, designed to bring about change, while at the same time reflecting on its impact.
All-through school	All-through schools combine at least two stages of a child's education - typically primary and secondary - in one establishment.
Competence	A dynamic combination of the knowledge, skills and attitudes learners need to thrive and participate effectively throughout life - a dynamic combination of knowledge, abilities, skills, experiences and behaviours.
Community Special School	A community special school, also known as a Special Educational Needs (SEN) school, is a school that provides specialist education for children with special needs or disabilities.
CPD	Continuous professional development (increasingly referred to as CPDL or Continuous Professional Development and Learning).
Creative thinking	The process by which knowledge, intuition and skills are applied in context. Specifically, the exercise of imagination and inquisitiveness, along with the persistence that novel thinking requires.
Creativity	The capacity to imagine, inquire and persist in expressing or making something that is novel or individual in its context (Durham Commission, 2019).
Deeper learning	Learning that goes beyond knowledge acquisition to include the process of learning for transfer, enabling a pupil to take something learned in one situation and apply it to another.
Disciplined inquiry	Like action research, a process which requires teachers to use evidence to support deeper thinking into how they are going to improve their teaching, evaluating the impact that change is having on their pupils' learning.
Disposition	A habit of mind in action, a competence that it is regularly deployed.
Key Stage 2	The legal term for the four years of schooling in maintained schools in England and Wales when the pupils are aged between 7 and 11 years.
Key Stage 3	The legal term for the four years of schooling in maintained schools in England and Wales when the pupils are aged between 11 and 14 years.
Multi-modal assessment	Assessment which uses three or more methods to ensure more reliable judgments are made.
National Curriculum	A defined set of subjects for primary and secondary schools outlining the standards children should reach in each subject.
OECD	The Organisation for Economic Co-operation and Development, an intergovernmental organisation with 38 member countries.

PISA	The Programme for International Student Assessment is a worldwide study by the OECD intended to evaluate educational systems by measuring 15-year-old school pupils' performance in mathematics, science, reading, and, most recently creative thinking.
Portfolio	A systematic collection of pupils' work including activities, achievements, samples, photographs and testimonials over a specific period of time in one or more areas of the curriculum.
Professional learning	A process of enquiry, training or study designed to stimulate educators' thinking and professional knowledge and to ensure that their practice is evidence-based and current.
Programmes of Study	Sets out what should be taught at each stage of the National Curriculum.
Self-report	A survey, questionnaire or quiz in which respondents read a question and select a response without any external help.
SEND	Special Educational Needs and Disabilities.
Skills	The expertise or ability to do something well.
Subject discipline	The content of a subject such as maths or geography, along with the ways of thinking associated with it.

Executive Summary

Across much of the world, in more than 20 educational jurisdictions, the ability to think creatively is seen as a core aspect of what it is to be a successful learner today and, consequently, it has been included within various national curricula (Taylor et al., 2020). In England this is not yet the case, despite a strong argument being made for creative thinking being a core part of the curriculum in the Durham Commission on Creativity and Education (2019). In 2021, in response to the Durham Commission's recommendations, eight clusters of schools across England - Creativity Collaboratives - were given funding to explore the practical issues associated with embedding creative thinking in schools. In 2022, PISA introduced a new test of creative thinking in which 66 educational jurisdictions across the world chose to take part (though not England).

During the Spring term of 2023, Rethinking Assessment conducted an exploratory study examining the feasibility of integrating creative thinking into five subjects at Key Stages 2 and 3, over the course of one term, with a cohort of teachers drawn from a wide range of schools in England. To prepare teachers for the intervention, specially designed CPDL was offered in the Autumn of 2022 and this support continued during the Spring term of 2023. ACER UK, as the external evaluation partner to the study, contributed advice throughout the process and gathered data in 2023 which is published and analysed independently in this report.

There were three overarching research questions examined in this study:

- 1 What are the benefits of embedding and evidencing creative thinking in schools?
- 2 How effective is Rethinking Assessment's model of creative thinking and its associated progression framework (see Appendix 1), the suggested approach to curriculum design, and the three proposed assessment methods in enabling effective implementation in schools?
- 3 To what extent can creative thinking be embedded in schools within the current system in England and what would be needed to do this at scale?

Overall, there was strong support from teachers on the importance of embedding and evidencing creative thinking, with a majority reporting several benefits to pupils, their own teaching, and their own professional development. Reported benefits for pupils included increased engagement in subjects, greater teamwork and collaboration with their peers, and a noticeable increase in some pupils' self-esteem and confidence. Most teachers reported that this was a positive professional experience that encouraged them to continue developing their own creative growth, as well as enhancing their relationships with their pupils.

Schools strongly endorsed the model of creative thinking developed through this study, finding its clarity enabled them to develop an accessible common language across their school as well as improving their ability to integrate creative thinking into the programmes of study in their chosen subjects. This integration may help develop skills that enhance confidence, intrinsic motivation, and engagement, all valuable tools to aid pupils and teachers to thrive and excel in the face of future challenges and opportunities.

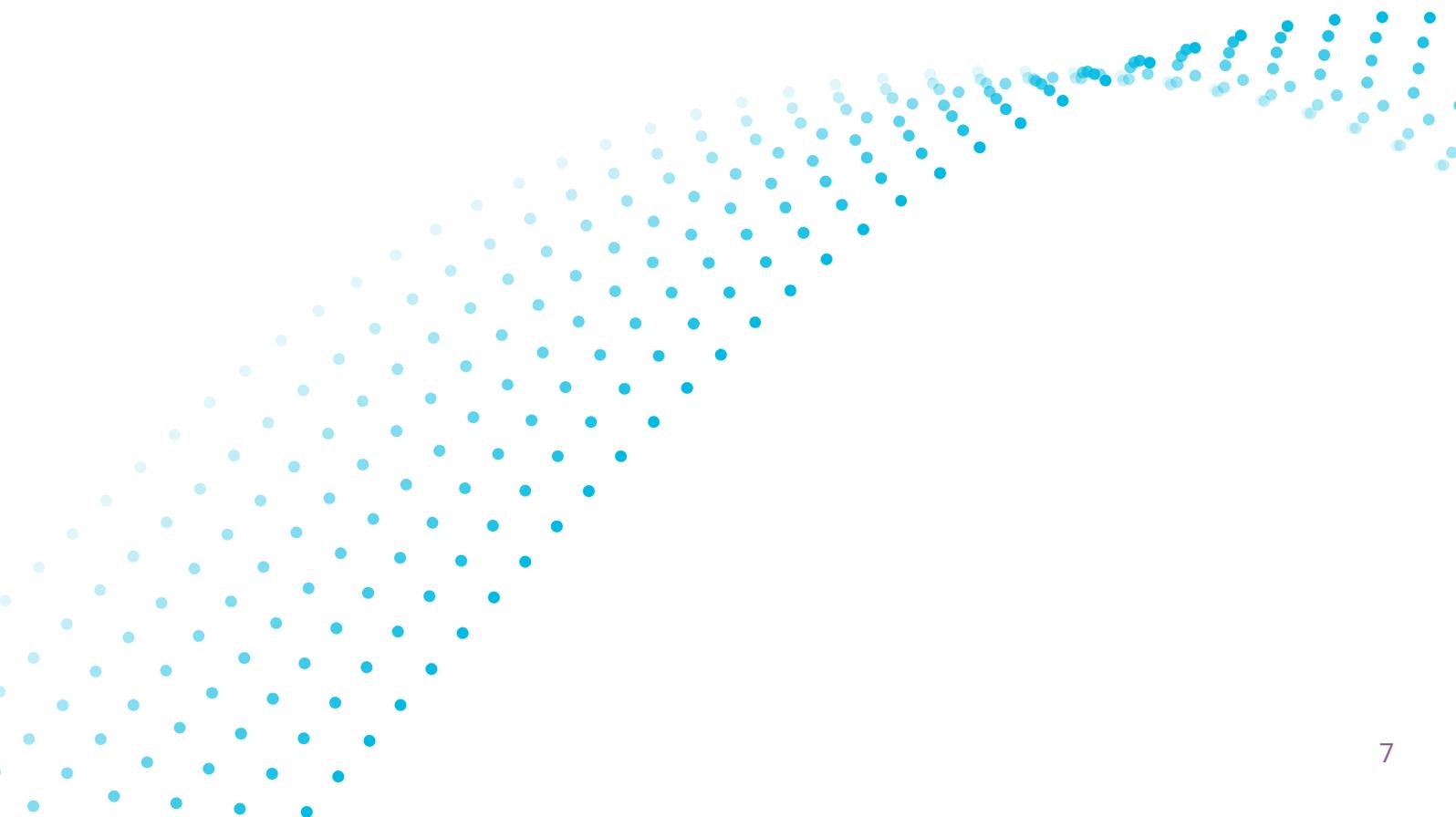
Teachers were able to develop and apply three methods of assessment - teacher assessment, pupil portfolio and pupil self-report - and most of them managed not only to trial these but, in addition, to gather additional data for ACER UK. In terms of assessment methods, teachers liked the idea

of using portfolios of evidence and were able to encourage pupils to gather these. Unsurprisingly, teachers found the process of evaluating their pupils' progress against the progression framework challenging having had no previous experience of the framework and the organisation of teacher moderation sessions took considerable amounts of time and planning.

Perhaps most importantly, this study demonstrates that, where there is active support from school leaders and where teachers believe that it is in the best interests of their pupils, it is possible to nurture creative thinking in classrooms today in England, even within a National Curriculum where mention of creativity is largely absent.

Looking ahead, it is possible to begin to see the elements of a national support structure - a clear model of creative thinking, guidance materials mapping creative thinking against each subject discipline and showing progressions from Key Stage 1 through to the end of formal schooling, training in the use of multi-modal assessment methods, and the development of a digital learner profile and portfolio for all pupils into which the evidence of their knowledge, skills and experiences of creative thinking could be fed.

From the experiences of the leaders of individual schools, it is also possible to infer some lessons for the leadership of such a change in policy and practice nationally; that Ministers, the Department for Education, Ofsted officials and all those in a position to influence need, systematically, to advocate for the value of creative thinking, while at the same time developing the infrastructure in which it can thrive.



Introduction

We live in unpredictable times. Consequently, curricula across the world have been adapting to include new areas of study to better prepare young people for a changing world. There is growing consensus as to which dispositions, competencies and clusters of skills will be required, with well-regarded organisations such as the World Economic Forum (2015) suggesting that creativity, critical thinking, collaboration and communication will need to be explicitly included in curricula. These, it is suggested, will sit alongside both traditional disciplines (literacy, numeracy, science) and newer ones (digital and financial literacy, for example).

Research by the Brookings Institution has identified that more than 20 educational jurisdictions across the world including, for example, Australia, Canada, Finland and South Korea, now specify the inclusion of creativity and critical thinking (Taylor et al., 2020). The question is increasingly becoming not *whether* such dispositions should be included but rather how they should be taught and *how* assessed.

A significant number of recent reports have argued that the current educational system in England is failing to prepare young people to thrive in the 21st century and that current assessments are too narrow (House of Lords, 2023; Burgess, 2023; Lucas, 2023; Times Education Commission, 2022; HMC, 2021).

If England is not to lag behind its international competitors, it is important to consider ways in which schools can equip young people with the necessary skills to help them navigate a complex world with innovation and resilience. To do this requires systematic integration of these skills into school curriculum, pedagogy and assessment.

In many of the curriculum models in other jurisdictions one of the core skills or dispositions is creative thinking, sometimes 'split' into two elements, creativity and critical thinking. In 2022, PISA introduced a new test to assess creative thinking, and understanding how best to foster creative thinking skills in the classroom has been the subject of several studies lately (Vincent-Lancrin, 2017; Perry & Karpova, 2017). While there is no one universally agreed definition of what creative thinking involves in schools (just as there is not a single agreed approach to science or geography, for example) there is widespread agreement about its key elements - innovation, imagination, curiosity, idea-generation, and critical, reflective and synthesising thinking - and that these are manifest in curricula from across the world (Lucas, 2022a).

Creative thinking and critical thinking are described as complementary and related, but not identical processes (Ülger, 2016; Halpern, 2003). The ability to think creatively, or 'outside the box', is something that can help pupils approach problems from different angles and unlock their potential to innovate (OECD, 2022). In a post-Covid world, where society is dealing with the effects of climate crisis, war, and other global challenges, the ability to address real-life challenges with creativity, adaptability and resourcefulness is likely to prove extremely valuable.

OECD research suggests that assessing creative thinking improves the quality of teaching by helping teachers to be more precise about the focus of their lesson delivery, enabling the development of a common language, and raising the status of creativity in schools. A synthesis of research by PISA also validates the importance of assessment in supporting pupils to understand how they are progressing as they develop their creative thinking skills (OECD, 2019).

Other benefits associated with creative thinking include better collaboration with peers, deeper learning, greater pupil engagement, enhanced pupil confidence and motivation, improved wellbeing and, in some cases, improved attainment as has been well summarised in the first report of the Durham Commission on Creativity and Education (2019) and in research by the OECD (Vincent-Lancrin et al, 2019). Unsurprisingly, due to curriculum demands, many teachers still feel overwhelmed when trying to integrate creative thinking into their classroom and need guidance as to how best to do this. In terms of resources, there are a number of evidence-based resources on which teachers can draw (Vincent-Lancrin et al, 2019; Lucas & Spencer, 2017; Beghetto & Kaufman, 2014).

The theoretical case for systematically and intentionally teaching and assessing the concept of creativity and its associated creative thinking skills has been well made. This study explores the practicalities of attempting to do so in an educational jurisdiction, England, where creativity is currently not emphasised in the National Curriculum.

About the study

Between 2022 and 2023 Rethinking Assessment and ACER UK undertook a small-scale study in English schools to explore whether creative thinking could be introduced into the curriculum, and whether teachers could then assess the progress of their pupils.

The model of creative thinking used in this study draws on the model of creativity developed by the Centre for Real-World (CRL) (Lucas et al., 2013; Lucas, 2016; Lucas and Spencer, 2017), Figure 1, now used in more than 30 countries across the world:

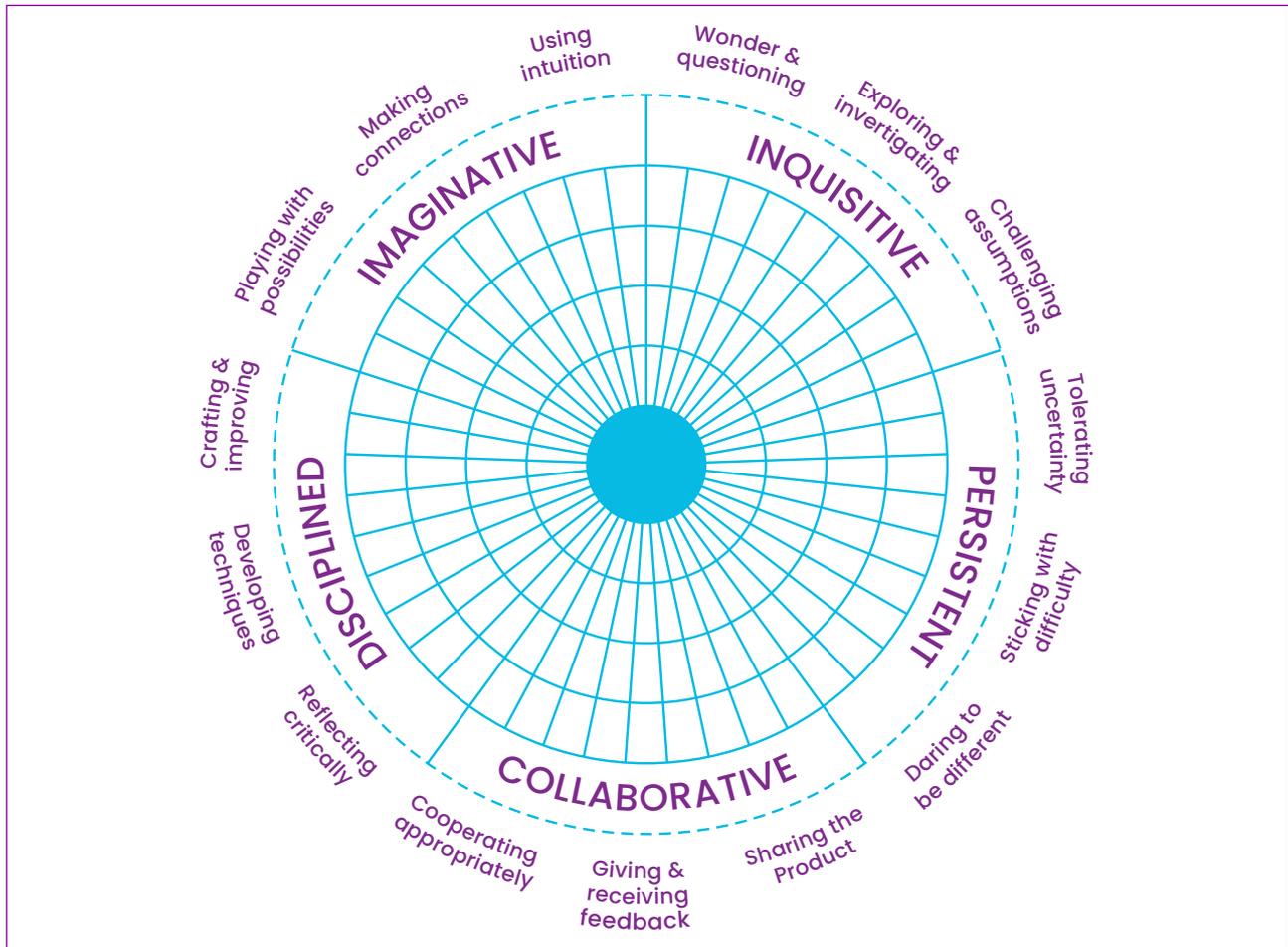


Figure 1. CRL's five-dimensional model of creativity (Lucas et al., 2013)

CRL’s model has five core dimensions each one of which breaks down into three sub-elements or clusters of creative thinking skills. The model sits well with the definition used in the PISA 2022 Test of creative thinking which was influenced by it:

...the competence to engage productively in the generation, evaluation and improvement of ideas, that can result in original and effective solutions, advances in knowledge and impactful expressions of imagination (OECD Directorate for Education and Skills, 2019, p.8).

The definition of creative thinking developed by the Durham Commission also draws on CRL’s model:

A process through which knowledge, intuition and skills are applied to imagine, express or make something novel or individual in its contexts. Creative Thinking is present in all areas of life. It may appear spontaneous, but it can be underpinned by perseverance, experimentation, critical thinking and collaboration (Durham Commission, 2019, p.2).

It also aligns with approaches trialled by ACER in Australia. ACER’s framework for creative thinking identifies crucial factors that form the bedrock of creative thinking development, with an emphasis on observable skills and teachable strategies for creative thinking (Ramalingam et al, 2020). There are three strands – Generation of ideas, Experimentation and Quality of ideas (Ramalingam et al., 2020), see Figure 2.

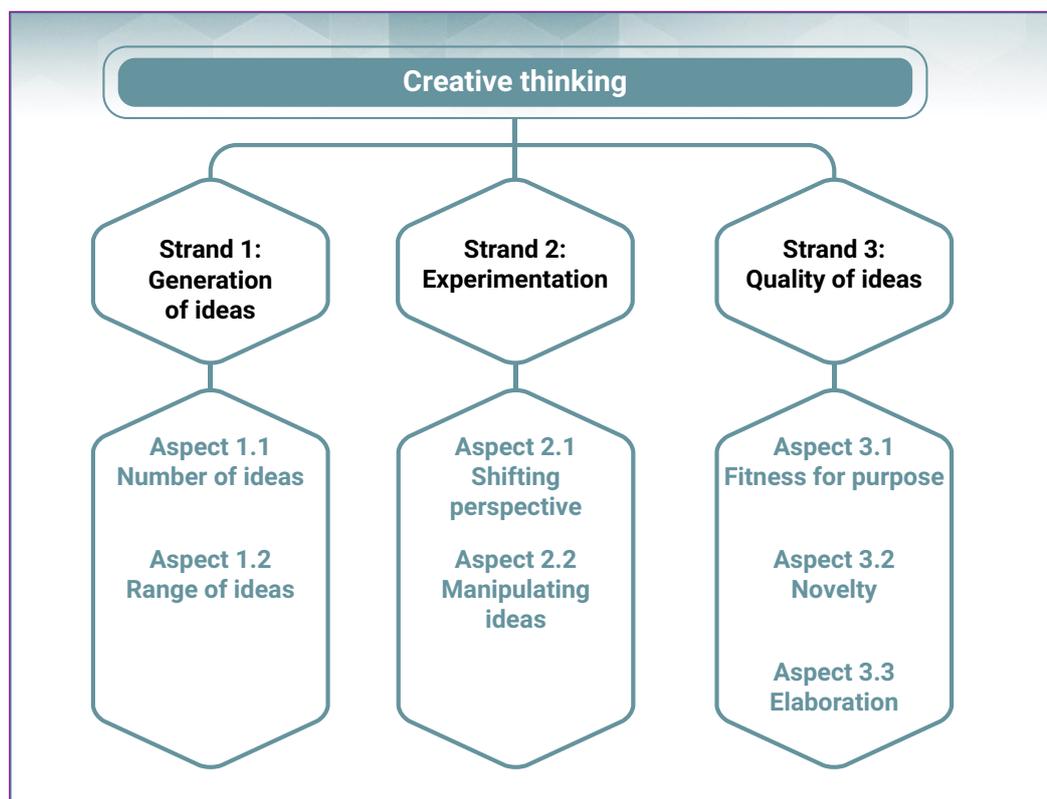


Figure 2. ACER Creative Thinking Skills Framework (Ramalingam et al., 2020, page 6)

In preparation for this study a number of schools took part in action research with Rethinking Assessment during 2022 using the five-dimensional CRL model. From discussions with these pilot schools, it became clear that, to ensure a focus on the development of creative thinking in individual pupils, it would help to focus more tightly on the dimensions of being imaginative and inquisitive, recognising too that these require persistence, see Figure 3.

Throughout this report creativity and creative thinking are used almost interchangeably. The difference of emphasis is made clear in the Glossary on page 4; creativity is the abstract concept; creative thinking are the skills by which creativity is brought to life.

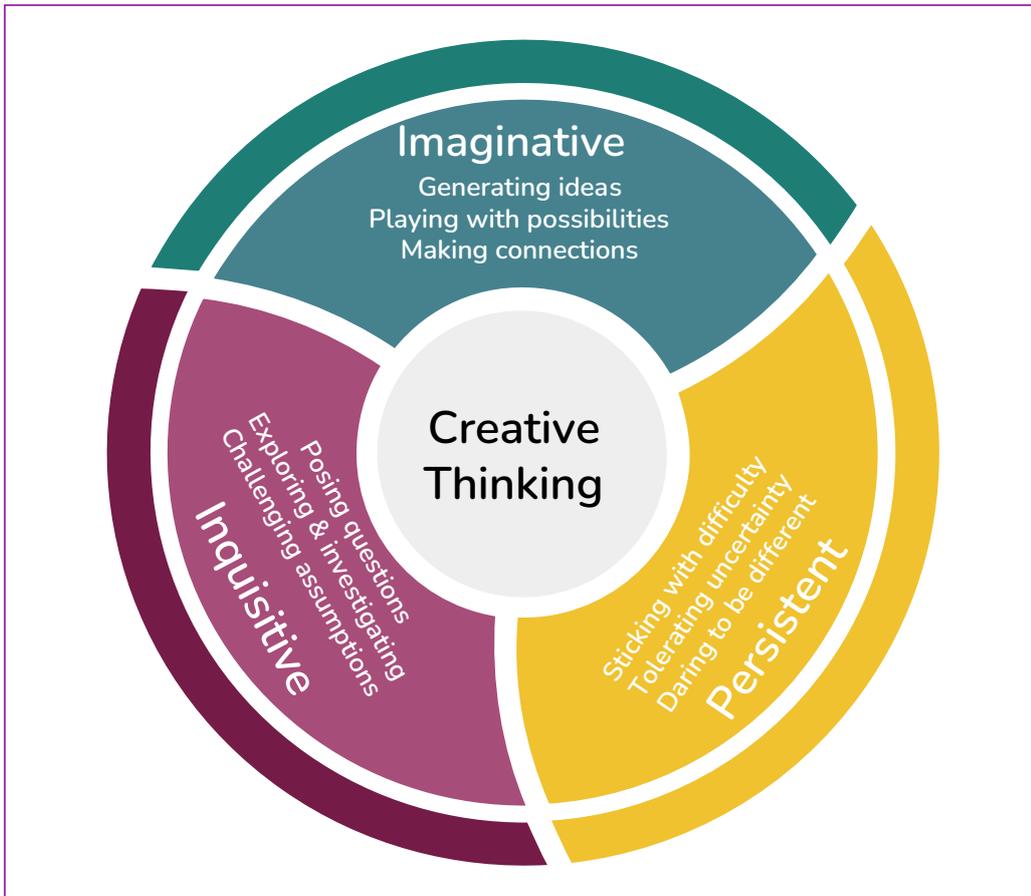


Figure 3. Rethinking Assessment's three-dimensional model of creative thinking

As Figure 3 demonstrates, the Rethinking Assessment model of creative thinking consists of three dimensions - being imaginative, inquisitive and persistent - and each dimension has three strands (see Appendix 1).

Methodology

The primary objectives of the study were to develop and test a model of creative thinking in schools and to explore the ways in which such skills can best be evidenced. The hypothesis was that if you collaborate with school leaders and teachers who believe that creative thinking skills are important, and if teachers are offered high-quality CPDL and then supported to undertake small-scale interventions (Cordingley, 2015), they will be able to embed creative thinking within the curriculum and learn how to assess their pupils progress in this area.

There were three overarching research questions examined in this study:

- 1 What are the benefits of embedding and evidencing creative thinking in schools?
- 2 How effective is the Rethinking Assessment model of creative thinking and its associated progression framework, the suggested approach to curriculum design, and the three proposed assessment methods in enabling effective implementation in schools?
- 3 To what extent can creative thinking be embedded in schools within the current system in England and what would be needed to do this at scale?

Figure 4 offers an overview of the study.

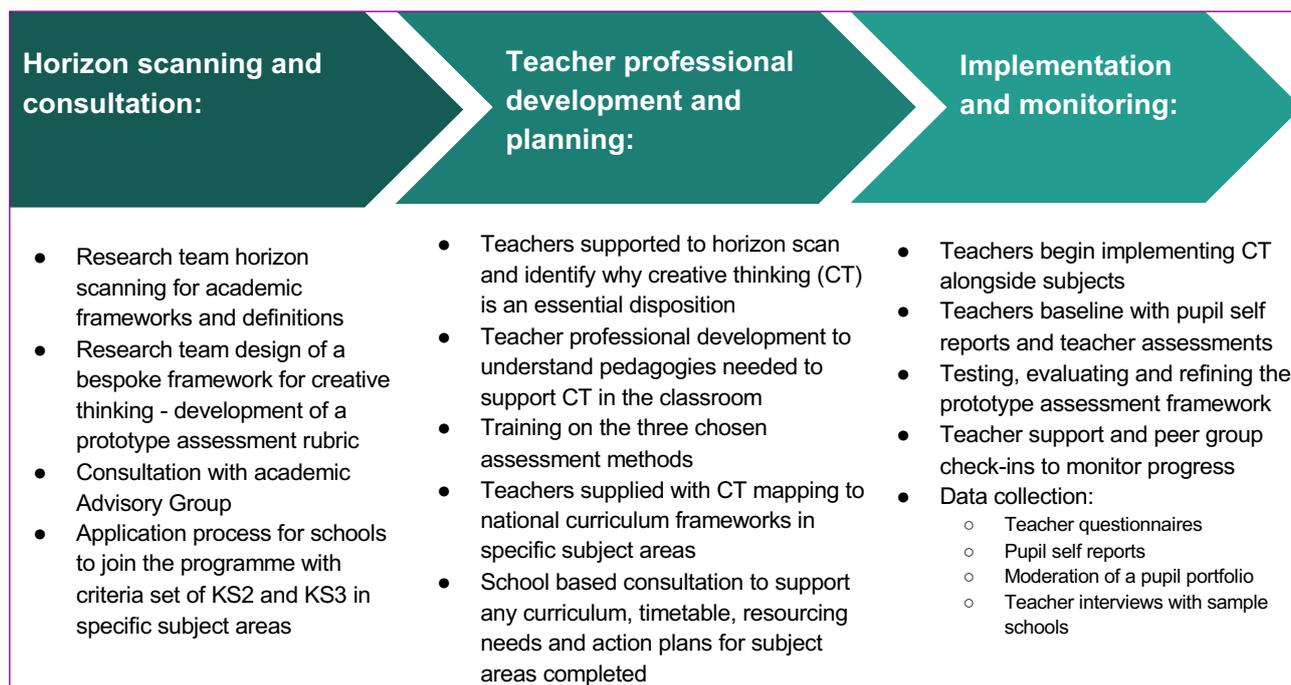


Figure 4. An Overview of the Study

This was an exploratory study, examining what impact integrating creative thinking activities into a classroom for one school term would have on teaching, learning and assessment practices. The methodology involved consultation with the academic Advisory Group to develop prototype materials. Using the Rethinking Assessment database, schools were invited to apply to be part of the study. Each school committed to attending 6 research-led sessions for teachers, focusing on how to teach and assess creative thinking across KS2 and KS3, and how to conduct action research. Three initial online ninety-minute CPDL sessions were provided to ensure that participating schools were given the opportunity to develop an understanding of the changes necessary to their curriculum, pedagogies and assessment practices, and receive feedback on a school action plan. The final three online sessions focused on providing support for teachers implementing the intervention and collecting data. As part of these sessions the model was introduced (Figure 3) along with its Progression Framework (Appendix 1).

The intervention consisted of a disciplined inquiry (Timperley, 2007) supported by these online sessions with the opportunity for participating teachers to benefit from one-to-one mentoring and online consultations with the Rethinking Assessment team. A range of data sets were collected such as pre- and post- intervention online surveys of all participating teachers, several semi-structured individual interviews with a selection of teachers after the intervention, and review of schools' assessment data and practices, which included teacher moderation of pupils' work.

In total, approximately 45 teachers from 13 schools took part, involving some 790 pupils. From a total of 13 schools, four were Primary/Middle, four Secondary, one Community Special and one an All-through School. Eight were state maintained schools and five independent schools. There was a wide geographic spread across England including the North-West, the North-East, the Midlands, Central, South West England and East Anglia, representing a variety of social and cultural demographics.

Curriculum designs and pedagogy

To ensure a breadth of disciplines covered, this study focused on five core subject areas in Key Stages 2 and 3 - Science, English, History, Art & Design or Design & Technology. Teachers were

required to focus on at least one of these subjects and plan to embed in their practice at least one of the three dimensions of creative thinking - being imaginative, inquisitive or persistent. The breadth of disciplines partly reflected evidence that creative thinking skills vary according to context (McLean, 2023), and the pragmatism of choosing some of these enabled understanding of appropriate pedagogies and testing of a range of assessment methods across different subjects.

Teachers mapped one or more of the three dimensions of the Rethinking Assessment model against one of the five subjects, then designed lessons using appropriate pedagogies (Lucas & Spencer, 2017; Vincent-Lancrin, et al., 2019). Teachers were also asked to select assessment methods from three complementary approaches offered to them (Lucas, 2022b). The progression frameworks in Appendix 1 supported teachers in evidencing progress and when conducting moderation sessions.

Table 1 shows examples of the range of Key Stages, creative thinking dimensions, subjects and approaches to pedagogy.

	Key Stage	Dimension of Creative Thinking	Curriculum Area	Curriculum Focus and Pedagogical Approach
School 1	KS2	Inquisitive	English and Science	<ul style="list-style-type: none"> • Science focus: Preserving woodland habitats; How might we do this? What is the change we wish to see? • English focus: Linguistic acquisition of vocabulary for this ecosystem and structures for eco activism • Pedagogical approach: Using a thematic approach linking work in English and Science: 'How can purposeful inquisition support an imaginative in-role response to an issue that needs to be resolved?' • Activities: Use of dialogic questions overlapping with work in science on woodland habitats.
School 2	KS2	Imaginative, Persistent, Inquisitive	History	<ul style="list-style-type: none"> • History focus: Exploring and investigating Hitler's rise to power. • Pedagogical approach: Using Mantle of the Expert, focusing on the theme of evacuation with teacher as facilitator, creating a 'freeze frame' radio announcement scenario as provocation. • Activities: Pupils create a timeline, discuss the threat of bombing, Battle of Britain and The Blitz. Role play scenario used as motivation to design a propaganda poster to persuade war-time parents to send their children to safety.
School 3	KS2	Inquisitive	English	<ul style="list-style-type: none"> • English focus: Drawing inferences such as inferring characters' feelings, thoughts and motives from their actions; justifying inferences with evidence; predicting what might happen from details stated and implied; discuss and evaluate how authors use language, including figurative language, considering the impact on the reader. • Pedagogical approach: Group discussions, building on their own and others' ideas and challenging views courteously; asking questions to improve their understanding. • Activities: Pupils will plan, draft, evaluate and edit their own work and that of others.

School 4	KS3	Imaginative, Persistent, Inquisitive	DT	<ul style="list-style-type: none"> • DT focus: BBC Microbit coding project. • Pedagogical approach: Pupils encouraged to explore a wide range of ideas as they design and develop their own unique concepts. As pupils develop, model, manufacture and test their own products they will be encouraged to persevere as they take design risks and solve problems. • Activities: Pupils will work from the set design brief/problem to design, develop, model and manufacture their own working product/design solution. Pupils explore existing products as they consider different approaches and potential solutions.
School 5	KS2	Persistence	History	<ul style="list-style-type: none"> • History focus: Migration enquiry unit aiming to understand historical concepts such as continuity and change, cause and consequence, similarity, difference and significance. • Pedagogical approach: Pupils supported to make connections, draw contrasts, analyse trends, frame historically-valid questions. Pupils supported to place their growing knowledge into different contexts, understanding the connections between local, regional, national and international history; between cultural, economic, military, political, religious and social history; and between short- and long-term timescales. • Activities: Pupils create their own structured accounts, including written narratives and analyses.
School 6	KS3	Imaginative	English	<ul style="list-style-type: none"> • English focus: Crime and Punishment unit. • Pedagogical focus: Pupils focus on the generation of arguments relating to evaluative questions surrounding the aims of punishment, the causes of crime and attitudes to criminals. • Activities: Pupils devise a strategy to overcome an issue they have identified in the UK prison system.
School 7	KS3	Imaginative	English	<ul style="list-style-type: none"> • English focus: Novel study. • Pedagogical approach: Relating text to self and experience; visualisation and prediction. • Activities: Using the '5 whys' technique to examine the main problem in a novel. 'What does this remind you of?' Pupils will predict how the text will finish and then read the end of the text.
School 8	KS3	Inquisitive	Science	<ul style="list-style-type: none"> • Science focus: Forces and Magnets • Pedagogical approach: Problem based learning; Exploring and investigating using Mantle of the Expert; Challenging assumptions using Philosophy for Children (P4C). • Activities: Co-construct 'The Big Question' with learners e.g. 'How does the universe work?' Wondering and questioning (I wonder/wicked questions/question of the week/cards).

School 9	KS3	Inquisitive	Science	<ul style="list-style-type: none"> • Science focus: Biology investigation into how exercise affects heart rate. • Activities: Respiration/Osmosis practicals; Investigating and exploring osmosis in plant tissue.
School 10	KS2	Inquisitive	English	<ul style="list-style-type: none"> • English focus: Novel study. • Pedagogical focus: Inquisitive questioning, 'Should Lila travel to Mount Merapi?' Pupils work collaboratively to develop a style of media (News report/panel (video)/Drama/Speech to an audience) to present their argument. • Activities: Learners create an English working wall – main question in the centre. Children invited to produce reasons 'for' and 'against' Lila making her journey. Sample children to take post-it notes and 'challenge other children's opinions'. Pupils film and create timeline to support the visual essay.
School 11	KS3	Inquisitive Imaginative	DT and History	<ul style="list-style-type: none"> • History focus: Creating a Bayeux Tapestry and exploring links between tapestry and current social media. • DT focus: Explore moving from 2D to 3D. • Pedagogical focus: Pupils focus on design, process and prototyping, rather than a focus on a specific and 'realistic' representation. • Activities: First task to produce a research page on visual imagery; then a focus on design and creation of their own stylised version of tapestry.
School 12	KS3	Persistent	Art	<ul style="list-style-type: none"> • Art focus: Claes Oldenburg inspired cardboard sculptures. • Pedagogical approach: Pupils focus on designing and associated practical tasks, particularly on challenges that they experience. • Activities: Pupils create a 3D model from a 2D drawing.
School 13	KS3	Imagination	English	<ul style="list-style-type: none"> • English focus: Study of Macbeth • Pedagogical approach: Oblique strategies (cards to encourage lateral thinking); Use of Visible Thinking Routines. • Activities: Pupils 'create' a final stylized production for the play with incremental variation. Use of a 'lottery' to create variables for weekly planning session for final filming session.

Participating teachers were given complete freedom to develop their own action plans for any of the proposed dimensions of the creative thinking model. When asked to report on their plans, their comments included:

- *I want to teach the 'Inquisitive' dimension in History: Teachers modelling how to ask ever 'deeper' questions - moving away from the cult of the 'answer'.*
- *I want to teach the 'Making connections' dimension in Liberal Arts at KS3: Exhibition showcase where pupils are exposed to multiple different sources exploring the life of a refugee.*

- *I want to teach the 'Inquisitive' dimension in science looking at circuits - giving parts of a circuit and asking them to create simple circuits.*
- *I want to teach the 'Imaginative' dimension in English / Poetry - exploring poetry through dance, rap, drama, peer teaching*
- *I want to teach the 'Inquisitive' dimension and challenging assumptions by posing a question for a class to discuss in DT lessons; 'Are electric cars truly environmentally friendly?'*

Assessment designs

From a range of possible assessment methods (Lucas, 2022b; Vincent-Lancrin et al. 2019) the research team selected three. These were chosen to balance breadth of perspectives (pupils and teachers, individuals and groups) with the pragmatism of what is possible in the busy lives of teachers.

The assessment methods selected were:

1. *Pupil self-report*

An approach similar to that developed for the International Baccalaureate (ACER, 2022), a self-report template for pupils was developed (Appendix 2) with the aim of using this study to assess its fitness for purpose, engagement and ease of use. One advantage of this method is that it tends to be fast and easy to score (Kanli, 2020). All pupils who participated in this study were asked to fill in the template at the beginning and at the end of the term.

2. *Teacher assessed product/process assessment using the Creative Thinking Progression Framework*

This approach was inspired by the Consensual Assessment technique (Kaufman, Plucker & Baer, 2008), with views of teachers collected and collated to establish an overall rating. Teachers were asked to conduct these assessments at the beginning and the end of the research period by documenting their observations and by interviewing their pupils using the format 'Can you show me evidence of how good you are at evidencing <one of the strands>?'

3. *Pupil portfolios*

There are many examples of using pupils' portfolios as an assessment tool (Stables, 2014; Jones, 2012), with a major advantage of allowing pupils the flexibility to showcase their work using a multitude of styles and formats. For this study, either a hard copy or a digital portfolio was used in conjunction with the other two assessment methods. Using the Creative Thinking Progression Framework, teachers undertook moderation sessions at the end of the intervention to validate their individual judgments and as a form of ongoing CPDL for their own learning as assessors. Moderation sessions were held at the end of the research for teachers to agree their assessment ratings, guided by the Creative Thinking Progression Framework (Appendix 1).

Data collection

The data collection part of the study ran from January to April 2023 (one school term). The data was collected through two online surveys (pre- and post- intervention), and via interviews with a selection of teachers to gather feedback regarding their implementation practices, the barriers and enablers they encountered, as well as any particular activities used to foster creative thinking skills. Several schools provided additional data in the form of pupils' portfolio examples.

Data was processed and analysed during the summer term. The review of findings involved a mixed methods approach, where data was analysed both quantitatively (e.g., structured parts of teachers' feedback and pupils' reports) and qualitatively (e.g., notes of teachers' observations, open-ended feedback, portfolio). These methods have been used to examine the implementation of particular

interventions (for example, Dyrstad et al. 2018), and were used to supplement the initial review of current practices.

A thematic analysis approach was applied to identify common themes across the data sources and to develop a conceptual understanding of the study's impact (Xu & Zammit, 2020). There were a series of internal workshops with the study participants for reflection on the project, and several subsequent discussions of all findings within the project team, all of which contributed to the final analysis.

Wherever possible, a consistent approach to reporting was used, to ensure possibilities for comparison and identification of contradictory evidence, gaps in evidence, and emerging themes. The following section focuses on findings from the research questions, based on the collected data that included teachers' questionnaires (36 responses), interviews with a selection of schools (9 interviews), and regular keep-in-touch group sessions (4 per term).

Findings

In this section we summarise firstly, high-level findings from the study, and secondly, more detailed findings, together with suggestions as to what can be learned. Both high-level and detailed findings are aligned to the original research questions:

- What are the benefits of embedding and evidencing creative thinking in schools?
- How effective is the Rethinking Assessment model of creative thinking and its associated progression framework, the suggested approach to curriculum design, and the three proposed assessment methods in enabling effective implementation in schools?
- To what extent can creative thinking be embedded in schools within the current system in England and what would be needed to do this at scale?

High-level findings

The benefits of embedding and evidencing creative thinking in schools

The study found strong support from participating teachers on the importance of embedding and evidencing creative thinking, with most reporting several benefits to pupils (such as increase in engagement, teamwork, self-confidence), their own teaching (deepening learning opportunities), and their own professional development (confidence in their skills).

The findings also indicate that incorporating creative thinking into day-to-day teaching and learning involves a process of reflection, dialogue, and articulation of the possible approaches and underlying beliefs that the school fosters in its teachers, as well as ensuring practical and logistical support is in place to make implementation possible.

The effectiveness of the Rethinking Assessment approach

The majority of respondents (over 70%) reported that this approach, with its proposed model of creative thinking and associated progression framework, is an effective tool that can be used with different types of learners and enables teachers to understand the process of evidencing creative thinking in their students.

The findings also show that having a variety of assessment methods that can be used by teachers (such as teachers' rubrics with mapped progression, learners' self-reports, and portfolios) ensures there are practical and easily attainable ways of collecting data on students' progress and achievement.

The extent to which creative thinking can be embedded within the current system in England

The study was explorative in nature, but the insights gained are very encouraging for the future of creative thinking in English schools. Prior to the teacher training outlined in Figure 4, the research team used the National Curriculum Programmes of Study across the five subject areas and mapped opportunities for the integration of creative thinking within existing curriculum planning, which was then shared with teachers. Participating schools had a limited time to try to embed creative thinking into their teaching and learning practice, in addition to experiencing the added complexity of liaising with an external evaluator and providing additional data. Nonetheless, they not only managed to complete the challenge, but did so with enthusiasm and determination.

Looking ahead, it is possible to envisage how this and similar approaches can be the basis for a national support structure: having a clear model of creative thinking, providing guidance materials that align creative thinking with each subject discipline, mapping progressions from Key Stage 1 through to the end of formal schooling, and by training teachers in the use of multi-modal assessment methods. The evidence of pupils' knowledge, skills and experiences of creative thinking could be incorporated into a digital learner profile or portfolio.

The following sections present our findings in more detail regarding each of the areas.

Findings in more detail

This study revealed a range of benefits to pupils and teachers which are explored more fully here.

The benefits of embedding and evidencing creative thinking in schools

The benefits of embedding and evidencing creative thinking in schools could be summarised under two major themes:

- Pupils' engagement, attitudes and skill development
- Teachers' attitudes, development and motivation.

Pupils' engagement, attitudes and skill development

This study suggests that by encouraging and implementing creative thinking activities in their classrooms, pupils showed increased engagement in subjects, which is significant when considering the current climate. Teachers reported that these activities increased pupils' interest and curiosity, making learning more engaging and enjoyable. As some teachers commented:

"The kids absolutely loved it. Yes, they knew we were taking part and were trying something different, because it would help them to learn in other areas."

"It's definitely had a massive impact on the behaviour of three learners in the class in particular, who were incredibly challenging to the point where I had parents in, who are now absolutely, completely, and utterly a dream in the classroom. They have got hands up left, right and centre. They are answering questions, asking questions. They're probing into the information..."

Several teachers reported that the activities boosted children's self-esteem and confidence. By delivering activities designed to develop creative thinking, they were encouraging the children's internal desire to learn and explore as well as providing them with an opportunity to prove to

themselves what they can accomplish, thus increasing intrinsic motivation and fostering a growth mindset. For example:

“It was marvellous to see and ultimately it gave them confidence, it built their self-esteem, and they were proud of their end product. I think it gives them that personal, social and emotional development ... We have one girl who’s working towards expected in reading, writing, maths. But this project, she absolutely shone. She came out of herself. She knew exactly what she was designing, what she wanted her end product to be. She was vocal about it; she had her own decisions ... But it was giving her that confidence, that self-esteem and ‘in this area you are amazing’ feeling...”

“So, what we found particularly incredible was just how proud they were to present their learning. And they were going away and coming back with sculptural work that they’d made at home that they hadn’t been asked to produce. And they were bringing it in into school because they were aware that they had an audience, and they were so very excited about it.”

“It could be also attached to their own sense of self-confidence. Their own self-confidence in their own ability, their own kind of sense of self-worth, because I think there is safety within those safe school parameters that get set out.”

Some teachers reported how their chosen activities involved group work and collaboration, and how they saw an increase in teamwork, communication skills, and the ability to work effectively with others, again an important skill to be fostered.

“... a lot of the work was a lot more collaborative - that was actually one finding we had. Initially they were all overwhelmed and didn’t know what to do. Then they started having the language model [Figure 3] and they started using some of those words more (such as creative thinking and questioning/what it means to be inquisitive). And then once they settled into that and knew what was expected, they actually started to be better at teamwork ... they were really egging each other on and saying, ‘I wonder if that’s what they used’ or ‘I wonder if that works’, or ‘Shall we try that?’”

In addition, several teachers reported noticing that the activities promoted more engagement with different types of pupils, even those with whom they sometimes find it difficult to engage. This implies that encouraging these activities may lead to a more successful approach with a wider range of pupils. For example:

“We noticed the difference [with] pupils, who would sometimes not engage, not be confident, what we saw here is, we really saw an improvement ... And what it’s then impacted on is their engagement in other subjects’ areas which were not part of this research. We definitely saw this in both year 5, year 4 and year 6, the boys especially, yes.”

“I would say it wasn’t about ability, it was about mindset ... potentially low achieving English learners whose verbal science work would be good, but their written science work would not be good because they can’t write it. But if they had an open mindset, they were able to ... think about it in a deeper way and go for other options. But those other kids that were, like, very rigid and kind of they could do things by rote sometimes weren’t able to do this ...”

These findings are consistent with other research that shows creative thinking activities encourage pupils to think critically and come up with innovative solutions to problems (Avci & Durak, 2023) and that in turn can boost their self-confidence. These skills are valuable not only in academic settings but also in real-life situations where creative problem-solving is essential.

Teachers' attitudes, development and motivation

Teachers reported that taking part in this study was recognised, not only by them, but also by other teachers in their school, as sharing in a positive professional experience. They suggested that incorporating creative thinking into the curriculum is important for the future, and it is therefore useful for them to be involved, showing them as being ahead of the curve and more prepared for changing educational trends. This may also give them recognition in the eyes of pupils, parents, and administrators. One teacher commented:

“Certainly, it was in terms of staff, it was great because it really focused and helped with my professional development in terms of looking at subjects as a collaborative school. It then helped me to really think about inquisitiveness in English and what that could look like, so it benefited me, which in turn benefits the school because I would lead CPD, linked to that. So most definitely it would benefit me.”

It had an additional positive effect in encouraging teachers to continue developing their own creative thinking skills, as they were thinking of and researching new and innovative activities, methods, and projects, which were stimulating and enjoyable. For example:

“The teachers have already said they've already started doing it in other subject areas, and they said the biggest impact was seeing how it can be transferred across all subjects, so they definitely want to do it more... I think one of them said that it 'challenged their previous assumptions of what creativity was'. They felt that creativity was just a way of doing something practically, but this showed them about how creativity is a way of thinking as well as practical.”

“I bet that was really beneficial to the new teachers, the newly qualified teachers, because it inspires them on how they can do it more, especially if they are new to creativity in general. And what it also did was it made that teacher realise that what she's doing is really good. It's on par with somebody who's been teaching for 10 years. So, it was just that affirmation and confidence. And one of the words they used was transformational.”

Finally, several teachers commented on how this study enhanced pupil-teacher relationships, by making their shared experience of taking part in this study feel special and creating a more positive and trusting relationship between them. This in turn can be highly rewarding for teachers and can boost their job satisfaction and motivation. For example:

“I enjoyed the project. I didn't think I would because as, I've said to you before, I'm a direct instruct teacher. But it was taking that step back. You've got to look at behaviour as well, haven't you? When you're instructing the children, the children have to listen. And with this, you're giving them that freedom... We've worked hard to create activities that would capture their imagination, and that they would be focused [on], and I think it takes a lot of planning. It's hard work, hard work for us, hard work for the children. It's not an easy project. I think what you get out of it has been immeasurable.”

Teachers reported that incorporating creative thinking activities into regular lessons had a multifaceted impact on teaching and learning. They mentioned benefits in combining this approach with their traditional teaching style, in particular reflecting on an increase in 'deeper learning'. The activities often required pupils to apply what they were learning in novel and practical ways, and that active application of knowledge enhanced their understanding of the subject. For example:

“... it cements knowledge. We’ve given them the knowledge, and I think because they’re using and applying it. When they’re posing questions and they’re finding out about World War 2, they’re finding out about the evacuees, and then we’re asking them to write a letter or write a diary, it sticks. It embeds it. It’s that sticky knowledge.”

“And I think for the children as well, having a full unit where we were only looking at inquisitiveness, it really then focuses the children’s attention on that habit, and it deepened their understanding of that habit. So, I think that was a good idea. This was beneficial for us and the children, because they do now have a deeper understanding.”

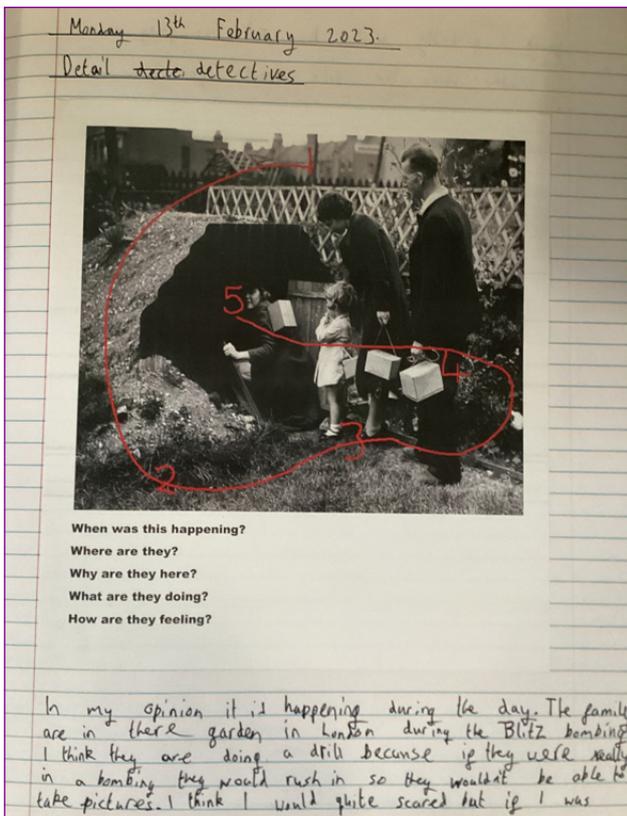
“Like I said, it really also had an impact on engagement. Definitely had an impact on questioning... 100% had an impact on progress. And what was interesting is these topics were all topics that were on my syllabus. They were all there originally. I didn’t come up with anything new. I just changed the way I did it.”

These findings indicate that incorporating creative thinking into teaching could allow for a broader, deeper and more balanced approach to education, acknowledging that learning is not just acquiring and often memorising knowledge, but also about developing a range of cognitive and interpersonal skills that are vital for success in life.

A diverse range of materials were created by schools and their pupils in a wide array of media including videos, art collages, journals, presentations, wall posters, display boards, and more. Additionally, the work generated in lessons varied, with some having a prime focus on ‘subject’ content whilst others had a particular focus on one or more dimensions of creative thinking.

A selection of examples of the final work is presented below.

History: Generating questions from pictures about the Second World War



Focusing on big questions



- Imaginative (Strands: Generating ideas; Playing with possibilities; Making connections).
- Inquisitive (Strands: Posing questions; Exploring & investigating; Challenging assumptions).
- Persistent (Strands: Sticking with difficulty; Tolerating uncertainty; Daring to be different).

The following tables present the findings from the survey.

Table 2. Summary of findings regarding the Imaginative strand of definition

N = 36 respondents	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
It makes sense to you	3%	3%	14%	58%	22%
It is written in plain English	3%	0%	19%	53%	25%
It is equally applicable to different ability pupils in your school	3%	0%	22%	53%	22%

As presented in Table 2, the majority of respondents (over 75% in all questions) agreed or strongly agreed that the first strand made sense, was written in plain English, and was equally applicable to different ability pupils in their school.

Table 3. Summary of findings regarding the Inquisitive strand of definition

N = 36 respondents	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
It makes sense to you	3%	3%	8%	58%	28%
It is written in plain English	3%	0%	19%	50%	28%
It is equally applicable to different ability pupils in your school	0%	12%	18%	50%	21%

As presented in Table 3, the majority of respondents (over 70% in all questions) agreed or strongly agreed that the second strand made sense, was written in plain English, and was equally applicable to different ability pupils in their school.

Table 4. Summary of findings regarding the Persistent strand of definition

N = 36 respondents	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
It makes sense to you	3%	3%	11%	61%	22%
It is written in plain English	0%	0%	25%	50%	25%
It is equally applicable to different ability pupils in your school	0%	6%	23%	46%	26%

As presented in Table 4, the majority of respondents (over 70% in all questions) agreed or strongly agreed that the third strand made sense, was written in plain English, and was equally applicable to different ability pupils in their school.

As presented here, surveyed teachers overall found the proposed definition of creative thinking to be helpful. A couple of teachers suggested that some of the strands may be less tangible to evidence (e.g., Daring to be different), and collaboration was mentioned by a few teachers as a potential strand to be added. Several teachers added that having some examples of the dimensions and strands would make it easier to evidence in the classroom. Overall, teachers felt that having a shared framework and shared language around specific competencies had a positive impact on both teachers and pupils.

The three methods of evidencing the development of creative thinking

All participating teachers were asked to use three methods for evidencing the development of creative thinking. The three methods were explained during one of the CPDL sessions with teachers, and templates for reporting the data were provided. The following sections provide findings and feedback on each assessment method.

1. Pupil Self-report

The first assessment method that was used in this study was Pupil Self-report. The report had nine statements, three for each strand of the creative thinking model. Each pupil was asked to indicate whether the statement was: Not at all like me, A little like me, Quite a bit like me, Very much like me. All pupils were asked to complete this self-report before and after the intervention, and at the end of the study teachers submitted their average before and after the intervention scores.

Figure 5 shows aggregated results from the respondents.

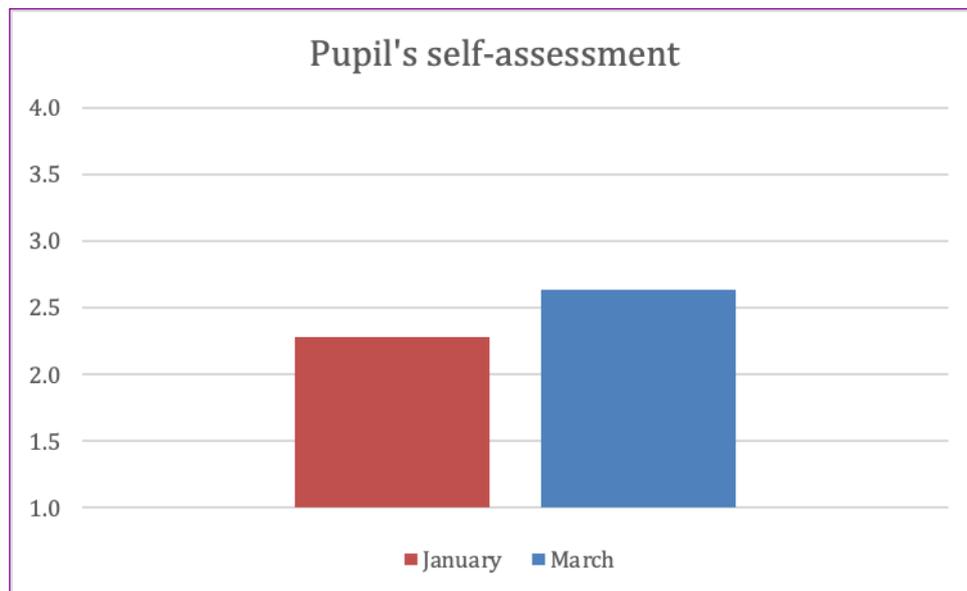


Figure 5. Pupil's self-assessment results

Figure 5 shows aggregated results of how pupils rated themselves against the pupil self-report questionnaire (see Appendix 2). Given that this research lasted for one term only, and that many of these terms were new to many pupils, there were no expectations of significant impact. Nonetheless, the results show that following the intervention there was a small increase in the level at which pupils rated themselves as imaginative, inquisitive, or persistent.

Most respondents reported that the Pupil Self-report was easy to implement (64%), and that it made sense to them and their pupils (58%). In terms of exactly how useful and easy to use the Pupil's Self-report was, a smaller percentage of teachers found it helpful for assessing creative thinking

(47% compared to 23% who did not find it useful, and 29% who were neutral). This variation is not surprising as it was a new approach for many teachers. Despite this, however, most of them were able to use it constructively. This view was confirmed in the interviews, although several teachers pointed out that not all of their pupils were familiar with self-assessment.

2. Teacher Assessment

The second assessment method was Teacher Assessment. The assessment was based on the provided Progression Framework (Appendix 1), where for each of the dimensions and strands there was a description of key indicators at the following levels: Starting point, Emerging, Developing, and Deepening.

All teachers were asked to note on the spreadsheet where each pupil was at the beginning of the study, and then again at the end of the study. At the end of the study, teachers submitted their averaged intervention scores for each pupil.

Figure 6 presents aggregated results showing how teachers rated their pupils using the Creative Thinking Progression Framework before and after the intervention.

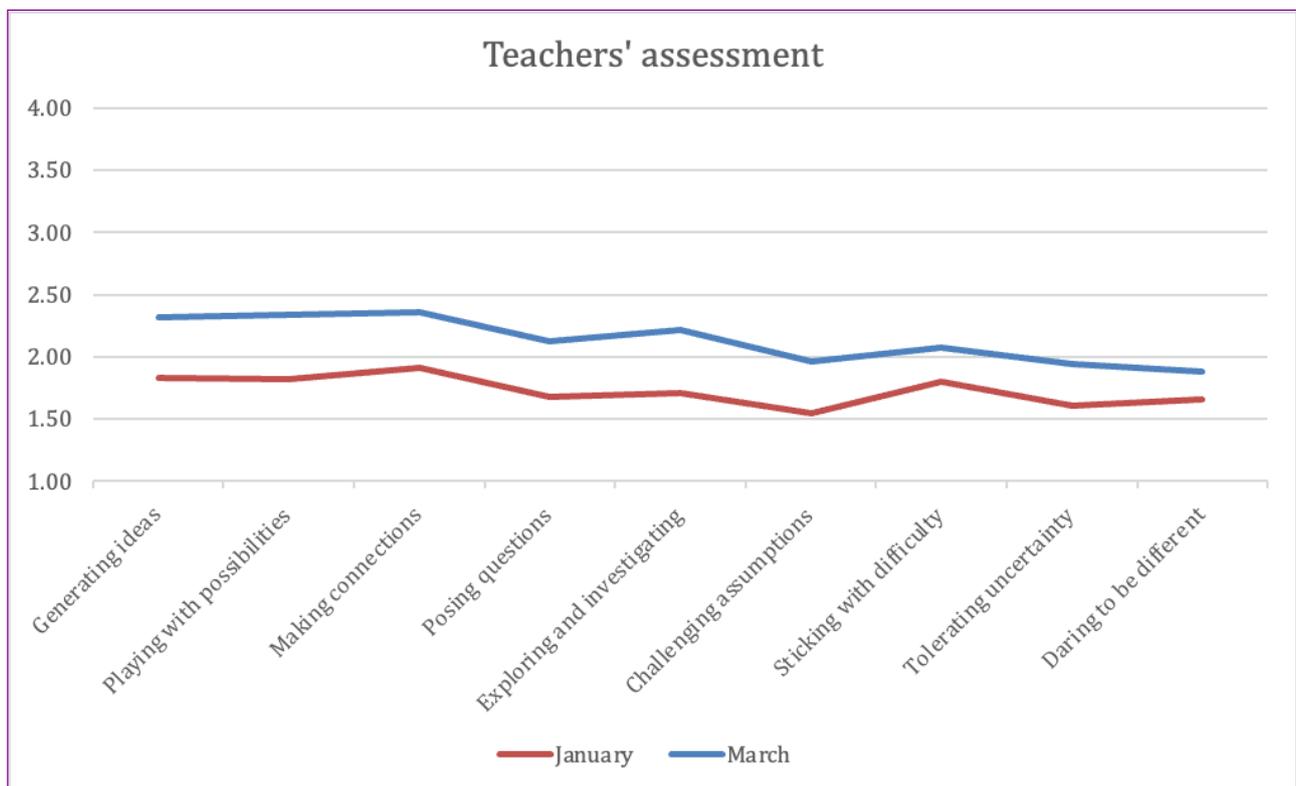


Figure 6. Teachers' assessment of pupils

Figure 6 shows aggregated results. The results show that following the intervention, there was a small increase in how much teachers thought their pupils were evidencing imaginative, inquisitive, and persistent attributes.

As anticipated, considering these were completely new progressions, not all teachers found them easy to use. Several teachers commented that they needed more instruction on how the progression can cover differences between KS2 and KS3 pupils, and pupils within the same year. The majority of respondents also expressed that they would like to see some practical examples and illustrations of statements to help them better use this method. However, despite this being a new assessment tool nearly half reported it to be easy to use and that it made sense to them and their pupils. A similar percentage (47%) reported it as useful for assessing creative thinking.

3. Portfolios

The third assessment method used in this study was portfolios. Teachers were encouraged to use any format of portfolio that they preferred. For example, digital or paper based. At the end of the study, teachers were asked to complete a form explaining what they did and to provide their views of the value of using portfolios as an assessment method.

Pupils' enjoyment and engagement were highlighted in several school comments. The general motivational impact of using technology was cited, as well as the specific enjoyment of taking photographs of peers and of the end product. Displaying and annotating their work was also a positive focus for pupils in one school.

The process of creating a portfolio involved self-reflection, as pupils were encouraged to think critically about their own learning and select evidence that demonstrated their growth and accomplishments. This self-assessment can help pupils develop metacognitive skills and become more independent learners (Silver et al, 2013).

In three schools, portfolios were seen as contributing to the quality of children's reflections, giving rise to 'authentic, in the moment reflection, as well as some deeper metacognitive comments.' When using shared floor books, pupils had 'rich discussions about their own creativity whilst commenting on the creativity of others.'

One school acknowledged variation in pupils' responses to portfolios, with some, but not all, becoming more able to 'understand the expectation and requirements towards the end'.

In the survey, portfolios were by far the most popular method of assessment in terms of them making sense to teachers (72%), being easy to use (67%), and being a useful method of assessing creative thinking (67%). Teachers reported enjoying creating portfolios as well as already being more familiar with this type of assessment method.

In conclusion, surveyed teachers overall found the assessment methods to be helpful, with portfolios being the most popular assessment method trialled. Teacher assessments were the least popular, with teachers requesting more support in using the progression framework effectively, and more time and effort was required to complete them. Several teachers added that having some examples of progression would have helped them in making better use of teacher assessments.

The extent to which creative thinking can be embedded in schools in England

This study has highlighted some of the main barriers and enablers that schools and teachers face when integrating new skill areas into their existing curriculum programme. Resource constraints, such as time, financial limitations and insufficient training opportunities for teachers were highlighted as some of the barriers.

For example, the study took place over one term, and it was felt that there was limited time available for teachers to develop creative thinking activities, embed them into their teaching and learning practice, and fully monitor and evaluate. As some teachers stated:

"[what is challenging is] capturing evidence of process when teaching. Product is easier because you have a tangible result, however, I think some of the most important evidence happens in the moment and this is difficult to capture when you are actively teaching."

"We need time with our staff to reflect/discuss ... CPD over a series of months to discuss teaching strategies and how to embed them in our teaching and learning."

Nonetheless, there was an agreement amongst the respondents that there is value in creative thinking being part of teaching and learning practice, as one teacher commented:

“Thinking skills and creative approaches to learning are what help all learners flourish – they help build appreciation for different learning ... develop the idea that its ok to be stuck and nurture the joy in not knowing – and then figuring out how to find out.”

In England, teachers are used to standardised testing, but several teachers emphasised a need for a more holistic approach to pupils’ development:

“It is not only part of developing independent learners who are connected with their learning but also shifts the onus away from testing and grading to understanding how pupils grow, develop and evidence these key skills. I think it is a big mind shift for educationalists to switch their practice and move into a way of teaching and assessing that is a little less clear than a grade or percentage.”

“In today’s world knowledge is at our fingertips. Children need to be taught creative thinking skills so that they can effectively use this easily acquired knowledge to solve problems we don’t even know exist yet.”

Finally, several teachers mentioned the need for a cultural shift where skills such as creative thinking are valued alongside academic achievement. To illustrate:

“Because it is a skill that is essential for all pupils to develop and learn during their education... [it] possibly has wider impact post-school than subject knowledge.”

“Children cannot be treated as empty vessels that we continually fill with knowledge. They need to know what to do with this knowledge and use this in creative ways.”

Teachers were asked about what would enable them to better integrate creative thinking into their teaching. The most common enablers mentioned was more time, provision of resources such as the ones used in this study, and more training opportunities for their staff. For example,

“... it should be built into curriculum planning.”

“More time to actually teach it and focus on it rather than having to race through exam specification and schemes of work.”

“Further staff training or implementation strategies and awareness of benefits of outcomes for teachers.”

The teachers who took part in this study suggested that there is a need for policy makers to recognise their desire to integrate creative thinking into the curriculum, and to align policies to support that integration. This study has trialled some useful resources which enabled participating teachers to do that, and these resources could inspire similar approaches in the future. Tools such as:

- A clear model of creative thinking
- Guidance materials that align creative thinking against each subject discipline
- Progressions mapped from Key Stage 1 through to the end of formal schooling

- CPDL training sessions for teachers, including pedagogies, assessment and moderation guidance
- Training in multi-modal assessment methods.

Redesigning aspects of the curriculum to include interdisciplinary and project-based learning could encourage more teachers to incorporate activities that promote creative thinking into their regular teaching and learning programmes. In parallel, it is important to provide training opportunities and support to teachers, with resources to support their classroom practice.

Limitations of the study

This was a small-scale exploratory study with limited additional resources available for its implementation. Resources only enabled ACER UK to interview teachers from 9 schools, and there were no school visits to witness creative thinking interventions in action.

Despite having a reasonable number of participants overall, the number of classes in each sub-strand of subjects (e.g., KS3 history) was small, meaning there were no expectations of significant statistical comparisons between groups. Rather the focus was on understanding how creative thinking could be embedded in different subjects.

While the choice of different assessment tools was very well received by participating teachers, and the detailed feedback on them can be used to improve them in the future, the data they provided (e.g. Pupil self-reports) were inevitably only partially reliable due to the length of the intervention making it unlikely that there would have been significant attitudinal change.

As is often the case in busy schools, some teachers struggled to find as much time to dedicate to this study as they would have liked to. Consequently, not all teachers managed to adhere to the deadlines, and not all of them were able to collect and submit their data. Nevertheless, we did receive high quality feedback from those who did participate, thereby gaining valuable insights for future implementation.

Conclusions

This study shows that it is possible to support, foster and evidence the development of creative thinking skills of pupils in five different subject disciplines across Key Stages 2 and 3 (even within a National Curriculum where mention of creativity is largely absent) when there is active support from school leaders and where teachers believe that it is in the best interests of their pupils.

Overall, there was strong support from participating teachers on the importance of embedding and evidencing creative thinking, with a majority reporting several benefits to pupils, their own teaching, and their own professional development. Benefits for pupils included increased engagement in subjects, more teamwork and collaboration in the classroom, and a noticeable increase in some pupils' self-esteem and confidence.

There were also reported benefits for participating teachers - this study was perceived as a positive professional experience that they shared with others in their schools, and it encouraged them to continue developing their own creative growth. Moreover, some reported that participating in this study enhanced their relationships with their pupils.

In addition, schools strongly endorsed the model of creative thinking and found that its clarity enabled them to develop an accessible common language across their schools, as well as being better able to integrate creative thinking within the programmes of study of their chosen subjects.

In terms of assessment methods, teachers liked the idea of using portfolios of evidence and were able to encourage pupils to gather these. Unsurprisingly, teachers found the process of evaluating their pupils' progress against the progression framework challenging (not having had any previous experience of this) and the organisation of teacher moderation sessions inevitably took considerable amounts of time and planning.

The feedback received from teachers about the experience of making creative thinking a central aspect of their teaching was strongly positive. But they were also realistic about the challenges. Further improved materials, more training, time to plan, train and moderate, and the systems to embed this as standard practice in schools were mentioned. There was a recognition that by making time for these developments, pupils and teachers could be empowered to be more confident, engaged, innovative, and adaptable individuals who are better prepared for the future.

Appendix 1

Creative Thinking Progression Framework

	Starting point	Emerging	Developing	Deepening	Key indicators
1. Imaginative					
1.1 Generating ideas	Learners provide one or two simple/obvious ideas with strong support	Learners provide a small number of relatively obvious ideas with some support	Learners provide many ideas, some well-developed, largely working on their own	Learners generate a large number of ideas, relevant to the context and working independently	Number/agency
1.2 Playing with possibilities	Learners provide a very limited range of ideas all focusing on the same theme	Learners' ideas represent a small range of themes and show some exploration of the theme	Learners provide a range of ideas that are distinct from one another and which show genuine exploration of the theme	Learners generate a wide range of alternative ideas and solutions, sometimes adapting existing ideas, sometimes integrating other perspectives	Range/complexity
1.3 Making connections	Learners present ideas that are very obvious or conventional only containing concepts with which they are already familiar	Learners present ideas that are mostly obvious or conventional containing a few concepts with which they are not already familiar	Learners present ideas which show some flexibility and willingness to go beyond their existing experiences, combining elements of a task to explore new combinations of ideas	Learners present ideas which show that they can think flexibly going beyond their existing experience or social context, combining elements of a task to allow for novel combinations of ideas	Novel connections

	Starting point	Emerging	Developing	Deepening	Key indicators
2. Inquisitive					
2.1 Posing questions	Learners use a very narrow range of questions focusing mainly on basic understanding	Learners use a growing range of questions to suit circumstances and go beyond basic understanding	Learners use a range of questions to suit circumstances increasingly being able to explore, challenge and consider possibilities beyond the relatively obvious	Learners use a wide range of questions to suit circumstances and intentions and are able to clarify, probe, explore, infer, deduce, challenge and consider hypothetical situations	Range of questioning techniques
2.2 Exploring and investigating	Learners view the task through a single perspective without consideration of what task elements can be changed	Learners mainly view the task through a single perspective with little consideration of what task elements can be changed, or which alternative perspectives or pathways can be considered	Learners can shift perspective, thinking about the task/problem in a different way, considering the task/problem from a range of perspectives and being willing to test out alternative pathways	Learners are able to see more than one side of an argument, experimenting beyond conventional perspectives, questioning the boundaries of the task to navigate around possible constraints and testing out multiple pathways, even those that seem unlikely	Range of perspectives adopted
2.3 Challenging assumptions	Learners' explorations of the task elements are very limited and they do not challenge others' opinions	Learners' explorations are mainly routine, limiting exploration to obvious elements of the task, and revisiting the same ideas, rather than generating new ones, only occasionally challenging others' views	Learners demonstrate some evidence of experimentation, developing some of the task elements, or synthesising existing ideas, increasingly able to avoid jumping to conclusions and offer opinions which differ from others'	Learners think flexibly to develop elements of the task, effectively combining elements of a task to allow new possibilities, noticing the unusual, avoiding jumping to conclusions, recognising others' feelings and clearly articulating their own ideas	Willingness to question status quo

	Starting point	Emerging	Developing	Deepening	Key indicators
3. Persistent					
3.1 Sticking with difficulty	Learners develop their ideas in a limited way without elaboration, typically seeing mistakes as failure	Learners elaborate their ideas, but without an evaluation of effectiveness, or justification in relation to fitness for purpose but beginning to see the value of producing different versions of their work	Learners elaborate their ideas to evaluate their effectiveness, and/or justify fitness for purpose, increasingly seeing mistakes as opportunities, beginning to produce several versions of their work and inviting feedback on these	Learners think flexibly to manipulate elements of the task, effectively combine elements of a task to allow new possibilities, see mistakes as opportunities, enjoy producing several versions of their work and can act on feedback to improve their thinking	Degree of elaboration
3.2 Tolerating uncertainty	Learners are easily confused when faced with multiple perspectives and seek one right answer	Learners are prepared to consider alternative perspectives when considering a problem and are able to come up with more than one possible solution	Learners embrace multiple perspectives when considering a problem, are willing to use their intuition to explore challenges and are not put off by questions which do not have one right answer	Learners actively embrace multiple perspectives when considering a problem, find 'not knowing' an interesting place to be, enjoy using their intuition and relish questions which do not have one right answer	Willingness to see multiple perspectives
3.3 Daring to be different	Learners prefer safe solutions and are unwilling to take risks or disagree with others	Learners are prepared to take limited risks, try out alternative positions and offer their opinions to others	Learners are increasingly prepared to take risks, to adopt alternative positions, offer their opinions and disagree with others	Learners are prepared to take risks, to adopt alternative positions and to disagree with others as they develop their creative thinking, recognising that thinking creatively often requires disagreement along the way	Willingness to take risks in thinking

Appendix 2

Pupil Self-report Questionnaire

Creative Thinking Questionnaire			
Pupil name:		Date:	

Imaginative				
	Not at all like me	A little like me	Quite a bit like me	Very much like me
1 I enjoy seeing connections between different ideas/things				
2 I find it's helpful to play with different ideas before deciding what to do				
3 I find it helpful to go with my gutfeeling about what I am working on				

Inquisitive				
	Not at all like me	A little like me	Quite a bit like me	Very much like me
4 I am not afraid to challenge other people's thinking				
5 I enjoy exploring things I have not learned before				
6 When I am learning something new, I can normally come up with good questions				

Persistent				
	Not at all like me	A little like me	Quite a bit like me	Very much like me
7 I am able to share views which are clearly different from other people's				
8 I don't mind dealing with issues where there is no one right answer				
9 I can stick with things even when they are difficult				

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