



COMINO
FOUNDATION



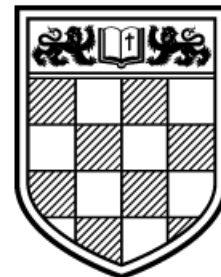
RETHINKING
ASSESSMENT

Rethinking intelligence,
learning and assessment,
in the age of AI

Professor Bill Lucas

@LucasLearn

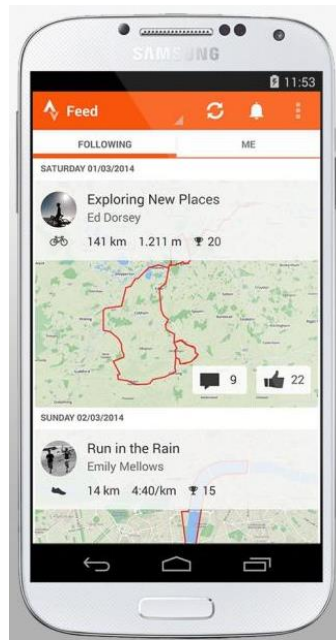
Centre for Real-World Learning



UNIVERSITY OF

WINCHESTER

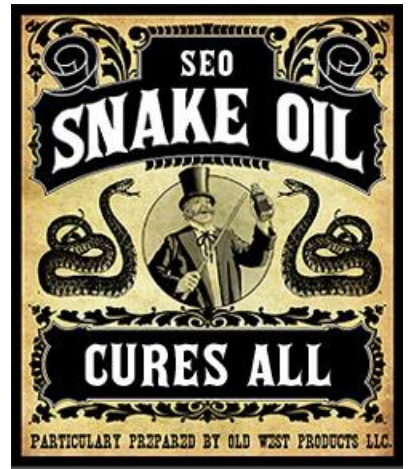
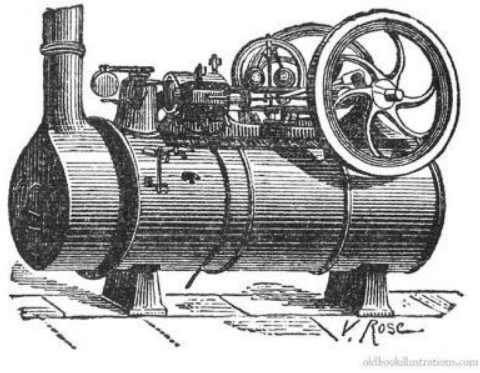
CENTRE FOR REAL-WORLD LEARNING

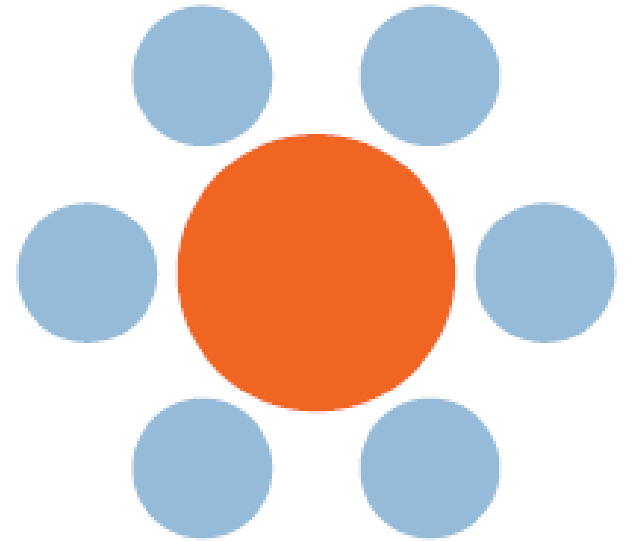
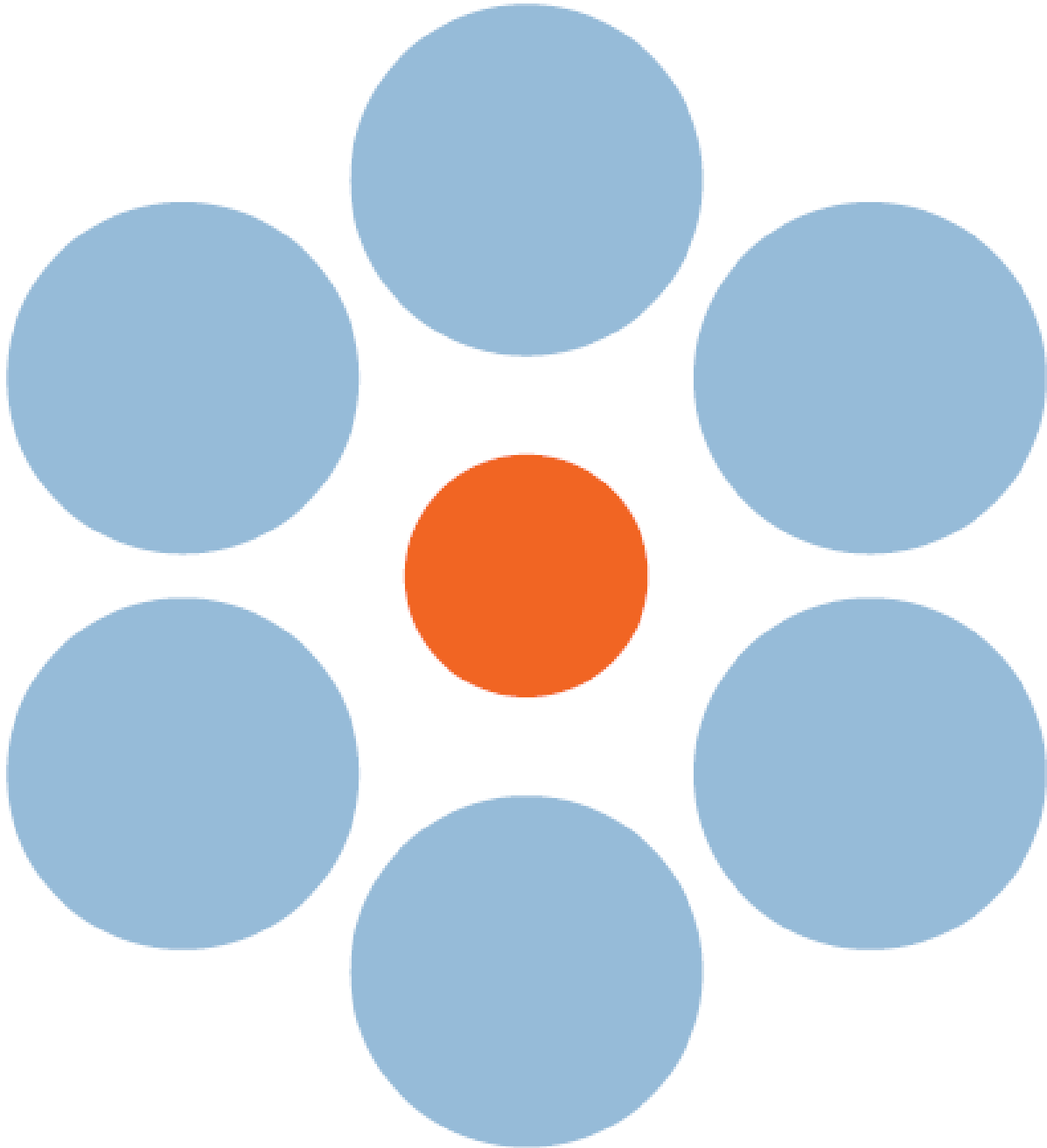


LinkedIn









Intelligence











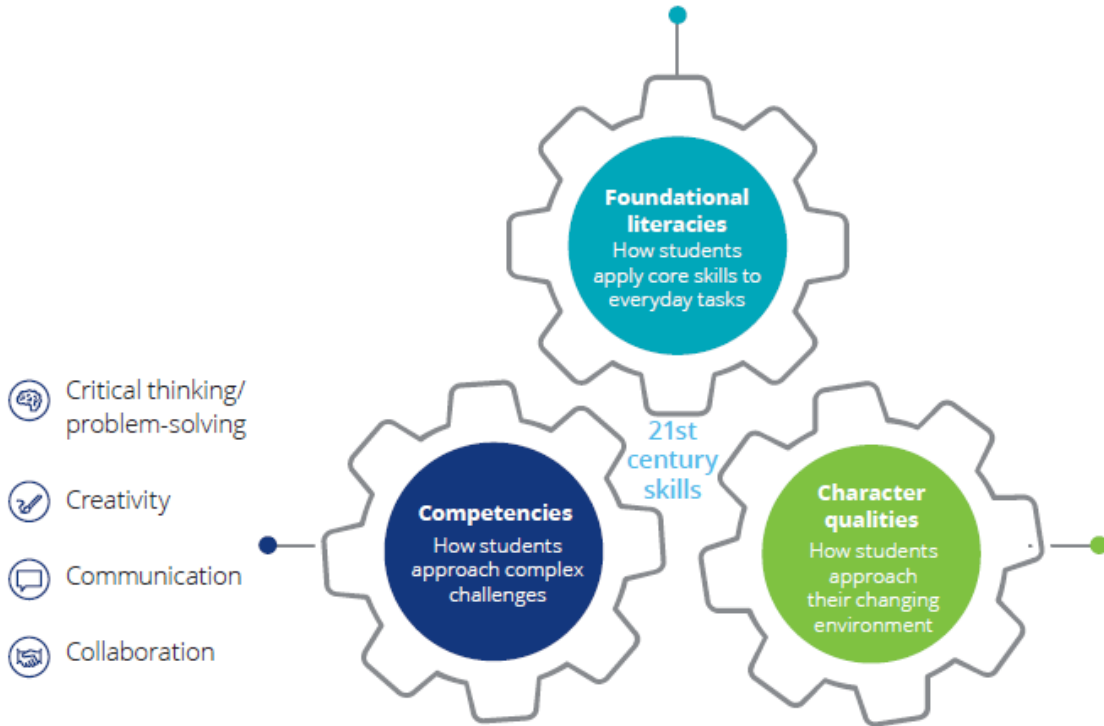
B B C

HUMAN INTELLIGENCE

4







World Economic Forum

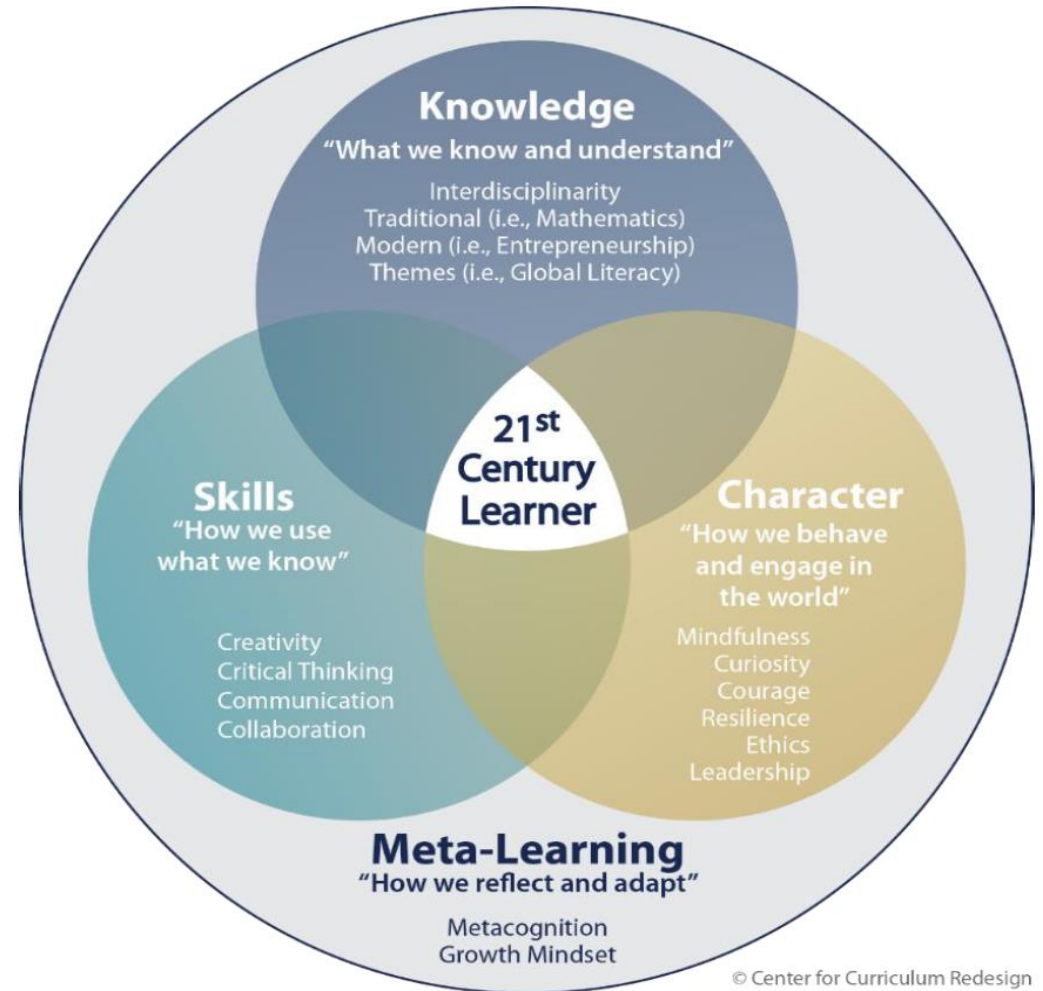
-  Literacy
-  ICT literacy
-  Numeracy
-  Financial literacy
-  Scientific literacy
-  Cultural and civic literacy



Source: World Economic Forum (2015)

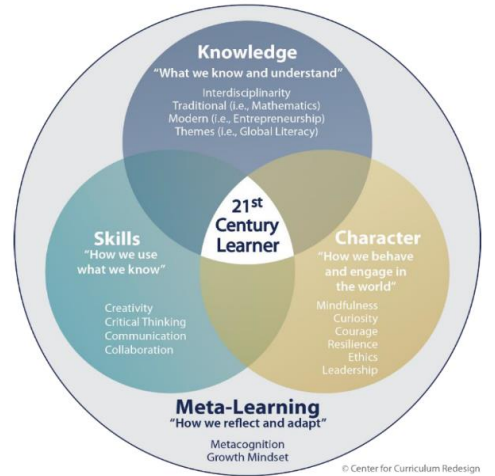
Center for Curriculum Redesign


-  Curiosity
-  Initiative
-  Persistence
-  Adaptability
-  Leadership
-  Social and emotional awareness




© Center for Curriculum Redesign

	Competency	Inclusion	Identification	Progression	Pedagogy	Assessment
Skills	Creativity	21	12	5	0	0
	Critical thinking	21	11	6	0	0
	Communication	22	11	5	0	0
	Collaboration	21	10	6	0	0
Character	Mindfulness	17	10	5	0	0
	Curiosity	17	7	3	0	0
	Courage	9	5	5	0	0
	Resilience	15	8	6	0	0
	Ethics	18	10	4	0	0
	Leadership	10	7	4	0	0
Meta-learning	Metacognition	14	7	5	0	0
	Growth mindset	14	6	5	0	0



 CENTER FOR CURRICULUM REDESIGN

 BROOKINGS

Competencies for the 21st century

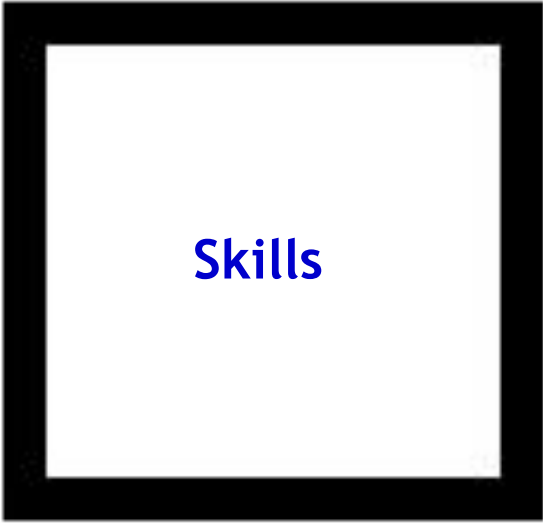
Jurisdictional progress

Robert Taylor
Charles Fadel
Helyn Kim
Esther Care

BRIEF October 2020



Know what



Know how

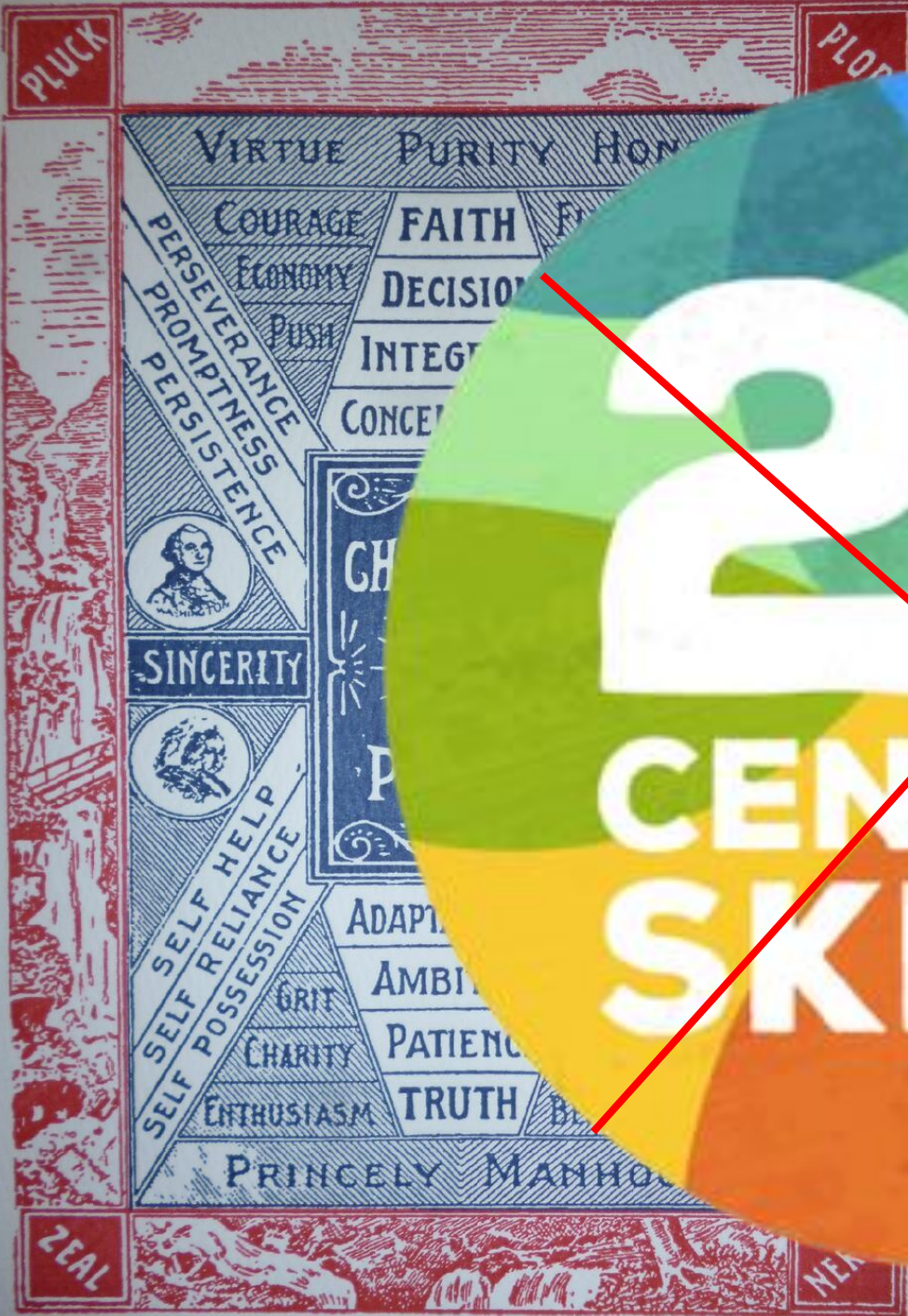


Know what +
how + be
able to do it



Know what +
how + why +
when +
routinely do it
without
thinking





need to stop
but twenty-first

European Parliament 2007, Key Competences for Lifelong Learning	Pellegrino and Hilton 2012	Gutman and Schoon 2013	Heckman and Kautz 2013	Lamb et al 2017
<ul style="list-style-type: none"> ▪ Communication in mother tongue ▪ Communication in foreign languages ▪ Digital competence ▪ Learning to learn ▪ Social and civic competencies ▪ Sense of initiative and entrepreneurship ▪ Cultural awareness and expression 	<ul style="list-style-type: none"> ▪ Critical thinking ▪ Information literacy ▪ Reasoning ▪ Innovation ▪ Intellectual openness ▪ Work ethic ▪ Conscientiousness ▪ Positivity ▪ Communication ▪ Collaboration ▪ Responsibility ▪ Conflict resolution 	<ul style="list-style-type: none"> ▪ Motivation ▪ Perseverance ▪ Self-control ▪ Metacognitive strategies ▪ Social competencies ▪ Resilience and coping ▪ Creativity 	<ul style="list-style-type: none"> ▪ Perseverance ▪ Self-control ▪ Trust ▪ Attentiveness ▪ Self-esteem and self-efficacy ▪ Resilience to adversity ▪ Openness to experience ▪ Empathy ▪ Humility ▪ Tolerance of diverse opinions ▪ Engaging productively in society 	<ul style="list-style-type: none"> ▪ Critical thinking ▪ Creativity ▪ Metacognition ▪ Problem solving ▪ Collaboration ▪ Motivation ▪ Self-efficacy ▪ Conscientiousness ▪ Perseverance

Guy Claxton
Bill Lucas

with forewords by Professor Tanya Byron and Octavius Black

Educating Ruby



what our children really need to learn

confidence, curiosity, collaboration, communication, creativity, commitment and craftsmanship



Why we need to stop talking about twenty-first century skills

Bill Lucas

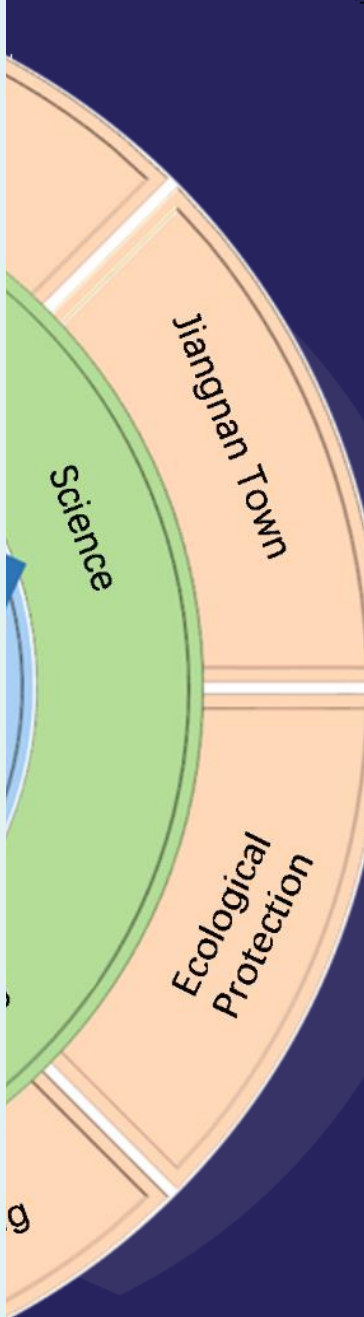
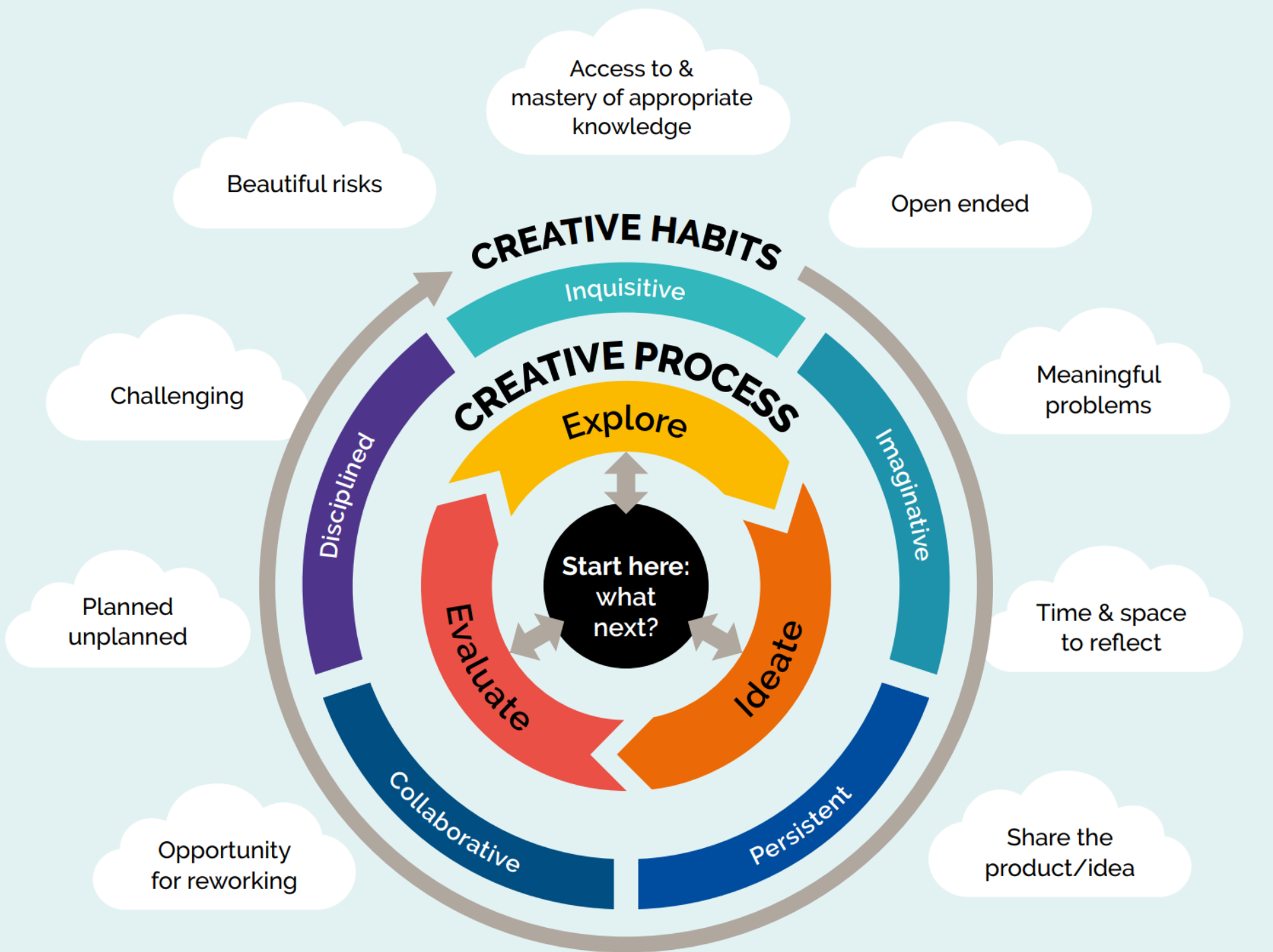
MELBOURNE ASSESSMENT SUITE OF
**COMPLEX
 COMPETENCIES**



BEING A PRODUCER	ACTING CREATIVELY	BEING OPEN TO THE NEW	SEEKING DEPTH IN KNOWING AND KNOWING HOW	USING FEEDBACK	ACTING INDEPENDENTLY
ACTING WITH COURAGE	ACTING WITH INTEGRITY	BEING PERSISTENT	BEING RESPONSIBLE	BEING SYSTEMATIC	BEING RESPECTFUL
BUILDING SOCIAL ALLIANCES	CONDUCTING PERSONAL RELATIONSHIPS	BEING EMPATHETIC	BELONGING TO COMMUNITY AND CULTURE	TAKING RESPONSIBILITY FOR OTHERS	MANAGING AMBIGUITY OR UNCERTAINTY
BEING REFLECTIVE	REASONING	ACTING WITH JUDGEMENT	CAPITALISING ON OPPORTUNITY	PURSUING GOALS	USING TOOLS
ENGAGING IN DIALOGUE	PRESENTING AND PERSUADING	COMPREHENDING	EXHIBITING KINESTHETIC APTITUDE	NAVIGATING DIVERSE INTERESTS	

The Elements (the 'building blocks' of competence)







FORM.
building a state of creativity






A field guide to assessing
**creative thinking
in schools**

Bill Lucas

RA RETHINKING
ASSESSMENT

**creative
schools**

Snapshots of progress

				
The status of creative thinking <i>Creative thinking is increasingly valued in school systems across the world.</i> <i>There is a growing consensus on some robust definitions and a small number of practical models in use across the world.</i>	Curricula <i>Creative thinking is increasingly specified in curricula across the world.</i> <i>A small but growing number of educational jurisdictions are providing strategic leadership, clear guidance and programmes of support to embed creative thinking in every subject of the curriculum.</i> <i>Still only a minority of jurisdictions prioritise creative thinking in schools.</i>	Culture, curriculum design and pedagogies <i>There is a growing consensus on the school cultures needed to embed creative thinking.</i> <i>There is a recognition that schools may need to re-design aspect of their timetable to create longer blocks of time with opportunities for interdisciplinary learning.</i> <i>There is an emerging understanding of a range of pedagogies for creative thinking that can work in every subject of the curriculum.</i> <i>Many schools find that accountability pressures can be counter-productive in enabling creative thinking to flourish.</i>	Assessment <i>Significant progress has been made in the last decade in understanding how to evidence the development of creative thinking with clear learning continua being developed and new methods used.</i> <i>The PISA 2022 Creative Thinking Test creates an impetus for increased use of many methods of assessment from 2024 onwards when its results are announced, encouraging teachers to use a range of formative approaches in the classroom.</i>	Professional learning <i>There is a growing recognition of the complexity and scale of changes needed at system and school level.</i> <i>We are only now beginning to understand the nature of the professional development and professional learning communities needed by school leaders and teachers to make significant progress in embedding creative thinking.</i> <i>Currently there is a huge unmet need for high-quality pre- and in-service training for teachers.</i>

Creative thinking in schools across the world

A snapshot of progress in 2022

BILL LUCAS



Learning



Bad news, there's
something called
'Lifelong learning'

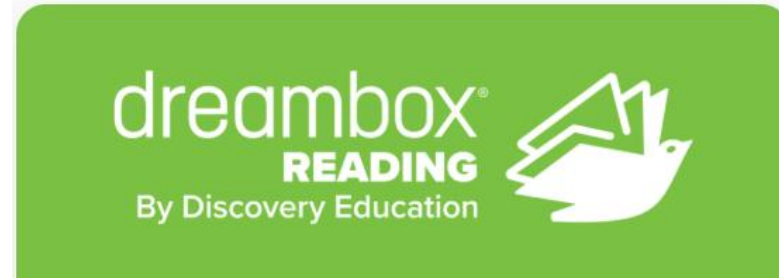




Personalisation



duolingo



KNEWTON

Learner-supporting AI

- Adaptive learning tools
- Tools that measure attention, empathy, and emotion
- Virtual coach chatbots
- Tools for automatically evaluating writing
- Voice to text and text to voice tools
- Self-organising tools
- Quiz generators
- Personalised content curation platforms
- And more

Teacher-supporting AI

- Web-scraping tools
- Intelligent scheduling and course planning
- Automatic assignment grading
- Curriculum design tools
- Presentation-designing tools
- Plagiarising tools
- Student progress analytics
- And more

School-supporting AI

- Emotional support chatbots
- Resource planning systems
- Curriculum design tools
- Profiling systems
- Drafting EHCP plans
- Progress forecasting and managing tools
- And more

Collaboration

Who is in the team?

	(1) Establishing and maintaining shared understanding	(2) Taking appropriate action to solve the problem	(3) Establishing and maintaining team organisation
(A) Exploring and Understanding	(A1) Discovering perspectives and abilities of team members	(A2) Discovering the type of collaborative interaction to solve the problem, along with goals	(A3) Understanding roles to solve problem
(B) Representing and Formulating	(B1) Building a shared representation and negotiating the meaning of the problem (common ground)	(B2) Identifying and describing tasks to be completed	(B3) Describe roles and team organisation (communication protocol/rules of engagement)
(C) Planning and Executing	(C1) Communicating with team members about the actions to be/ being performed	(C2) Enacting plans	(C3) Following rules of engagement, (e.g., prompting other team members to perform their tasks.)
(D) Monitoring and Reflecting	(D1) Monitoring and repairing the shared understanding	(D2) Monitoring results of actions and evaluating success in solving the problem	(D3) Monitoring, providing feedback and adapting the team organisation and roles

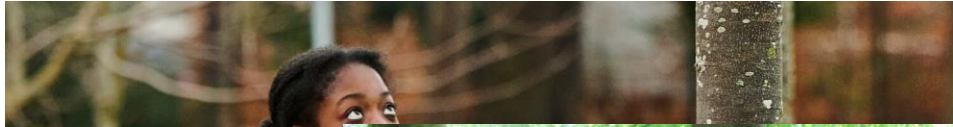


Collaborative problem solving

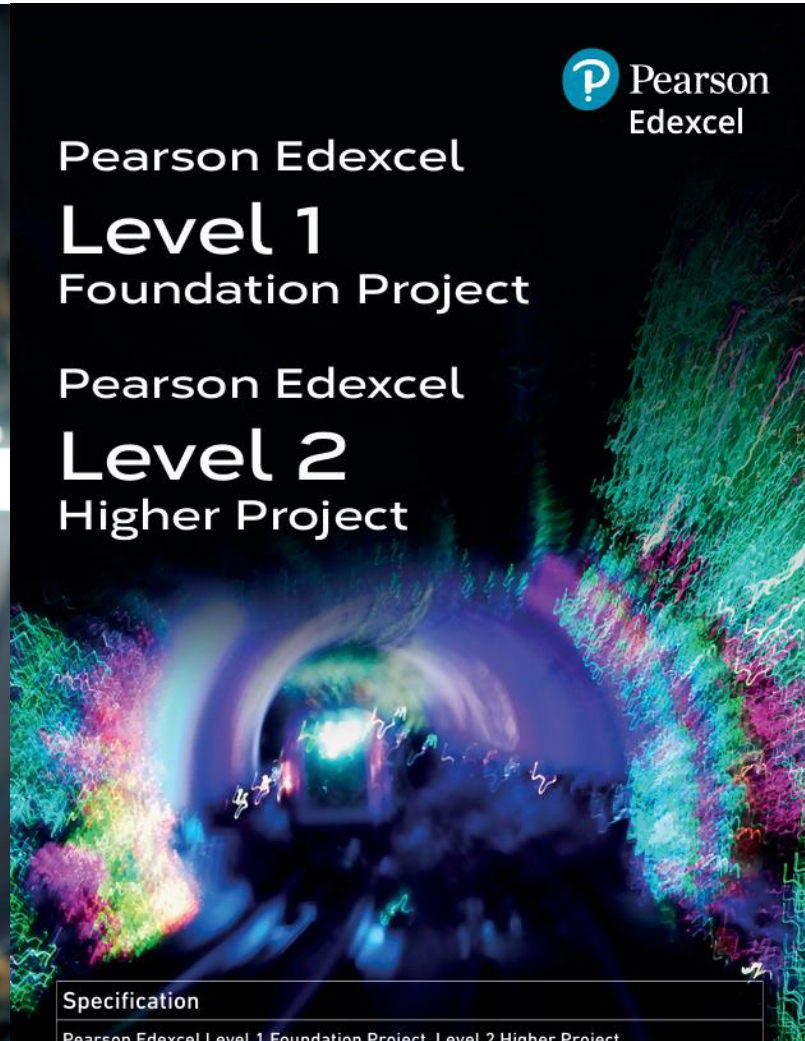
PISA
PISA in Focus #78

OECD
BETTER POLICIES FOR BETTER LIVES

Outdoor learning Away from the screen



Inquiry, problem, project-based and interdisciplinary





Assessment



Harriet Smith

I am a Year 13 student who has a passion for science and is looking to study engineering at university...



My Portfolio



My Interests

Science

Photography

Digital

Running

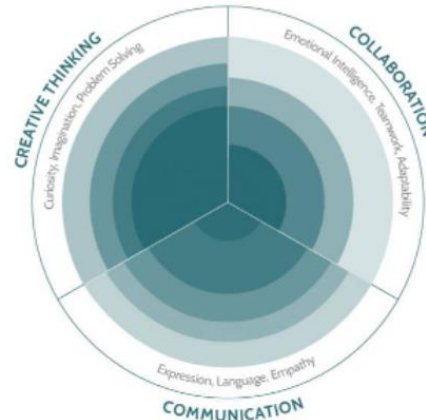
Psychology

Nature

Draft Rethinking Assessment Learner Profile



THE 3Cs OF SUCCESS



What are my strengths?

I like to play with things - to break them down and build them up. Whether that's ideas or physical things. So I like taking apart mobile phones and seeing how they work. I think my real strength is being able to see the detail and how it links to the big picture.

What do I need to work on?

I find it hard sometimes to work in a team. I am so keen to get on with things I get frustrated with those who want to slow things down. So I am working hard and making sure everyone including me has a defined role that they can get on with.

ME AS A LEARNER

What do I want to change about my community / the world?

Girls in my area have very little sport they can do. There are plenty of sports aimed at boys but far less for girls. In the last five months I have got together with my friends to campaign for change and to make the case to the local council.

What motivates me?

My younger brother has learning difficulties and from a young age I've supported him. I can see how he struggles and that he is not always understood. This has given me a passion for doing something meaningful in my life that helps others overcome difficulties.

BUILDING BLOCKS

Literacy

Numeracy

Digital Skills

Oracy

COURSES

MAJOR COURSES

- > Biology
- > Physics
- > Design

MINOR COURSES

- > French
- > Coding

APPLIED COURSES

- > Cooking
- > Football coaching
- > Real world project at advertising company

INTERDISCIPLINARY COURSES

- > Climate change
- > Migration

PERSONAL PROJECT

My Extended Project Qualification (EPQ) was to build a drone that could deliver medicines to those who need emergency supplies.

Read more



TESTIMONIALS

"Harriet did a real world learning placement with us for 6 months and showed what a great problem solver she is. She was so skilled at breaking down a project into the parts that really mattered and working systematically through them to achieve a high quality outcome."

Jenny Tibor, head of product development



MY BEAUTIFUL WORK



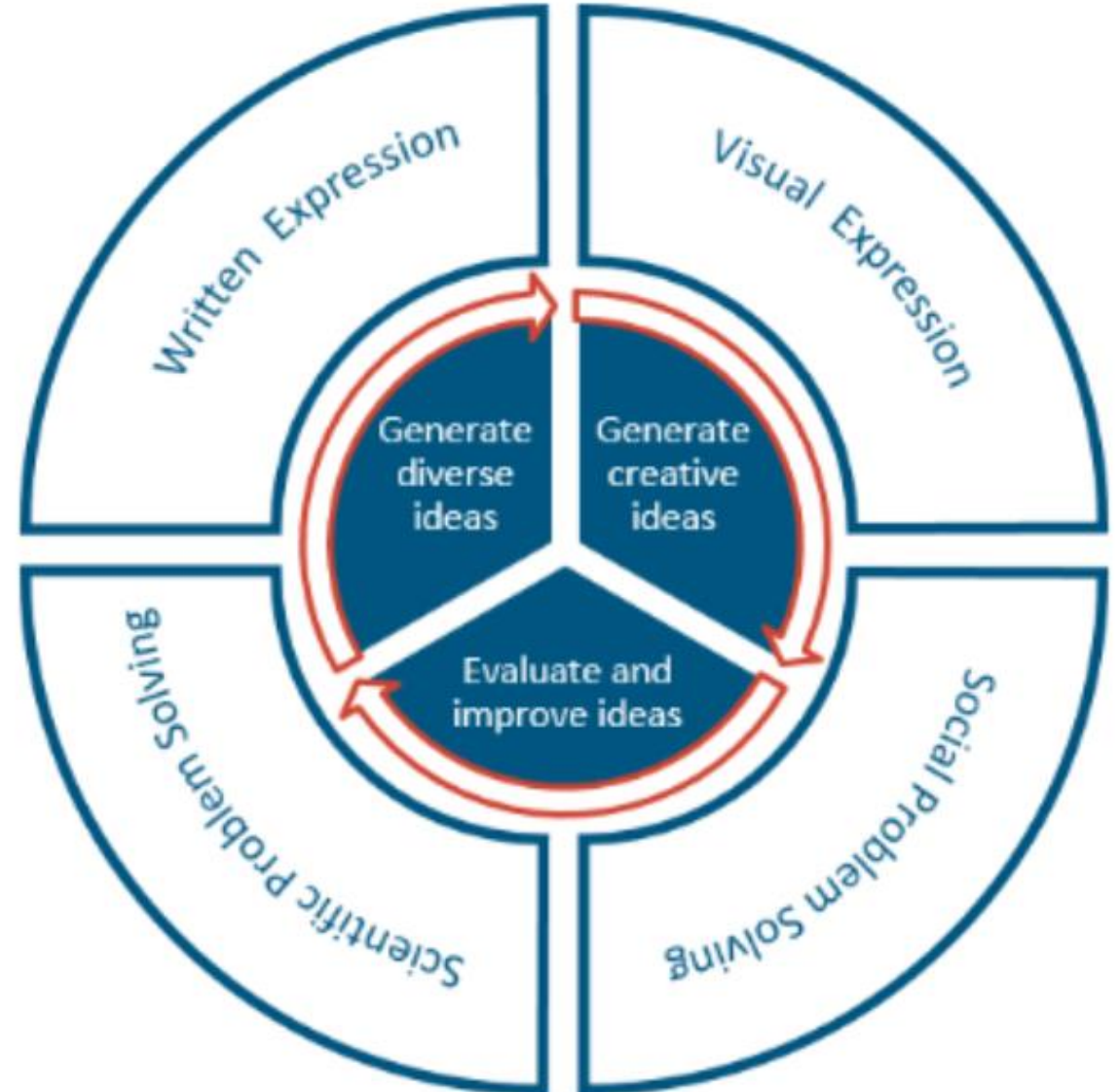
MY ACHIEVEMENTS

Duke of Edinburgh Bronze

Lamda Drama Award

Church Youth Leader

‘Creative Thinking in PISA 2022 is defined as 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.’





THE AGE

WORLD FIRST CREATIVE THINKING TESTS FOR VICTORIAN STUDENTS

\$4 FEBRUARY 3, 2018

S A T U R D A Y THE AGE

INDEPENDENT. ALWAYS.

IN A WORLD FIRST, VICTORIA IS TESTING STUDENTS WITH TOP-SECRET QUESTIONS TO SEE IF THEY HAVE THE SKILLS TO PREPARE THEM FOR LIFE.

NOW THAT'S CREATIVE THINKING

HENRIETTA COOK REPORTS NEWS



CAN YOUR CHILD ANSWER THIS CURLY QUESTION? TAKE THE TEST ON PAGE 10.



Photo: [unclear]

THINKING OUTSIDE THE BOX

The PISA 2022
Creative Thinking Assessment



Publication

PISA 2022 Results Creative Minds, Creative Schools

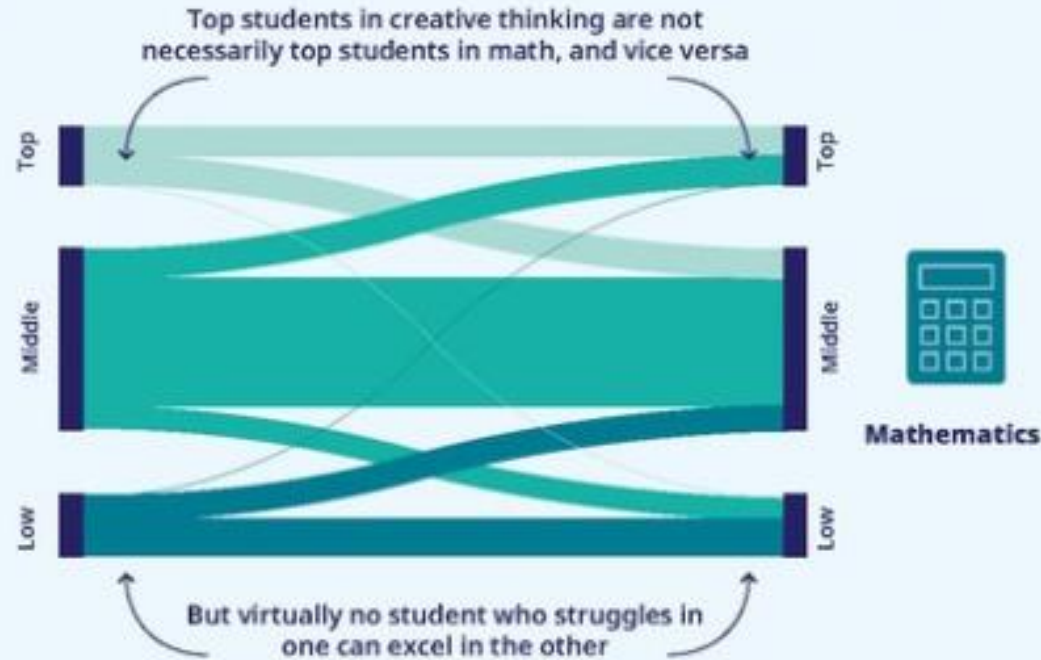
Volume III



All students have the potential to demonstrate creative thinking



Creative thinking

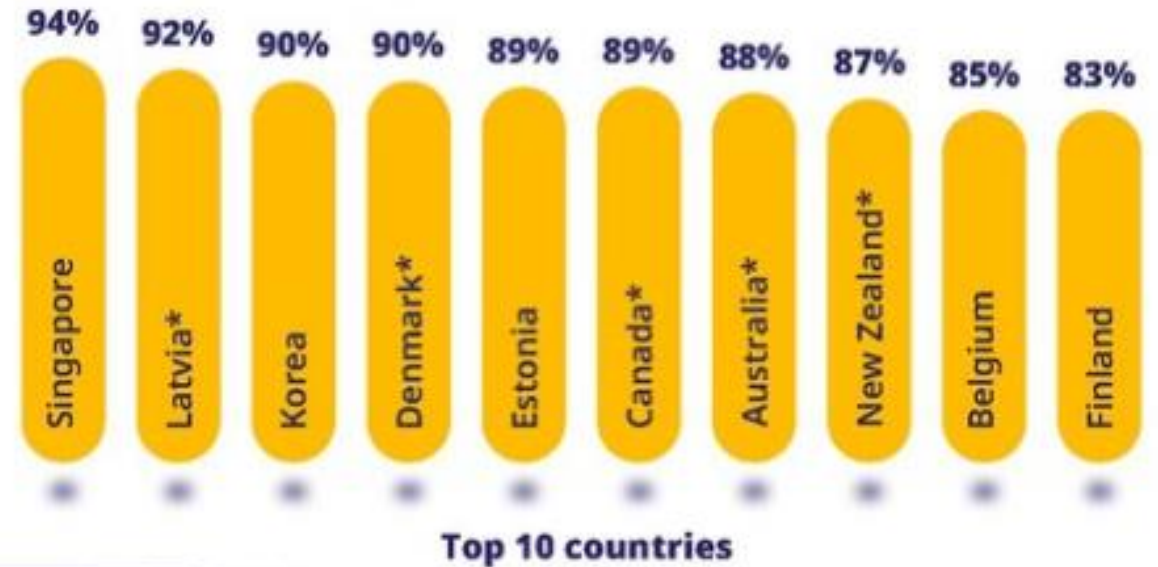


Academic excellence is **not a pre-requisite** but minimal proficiency helps



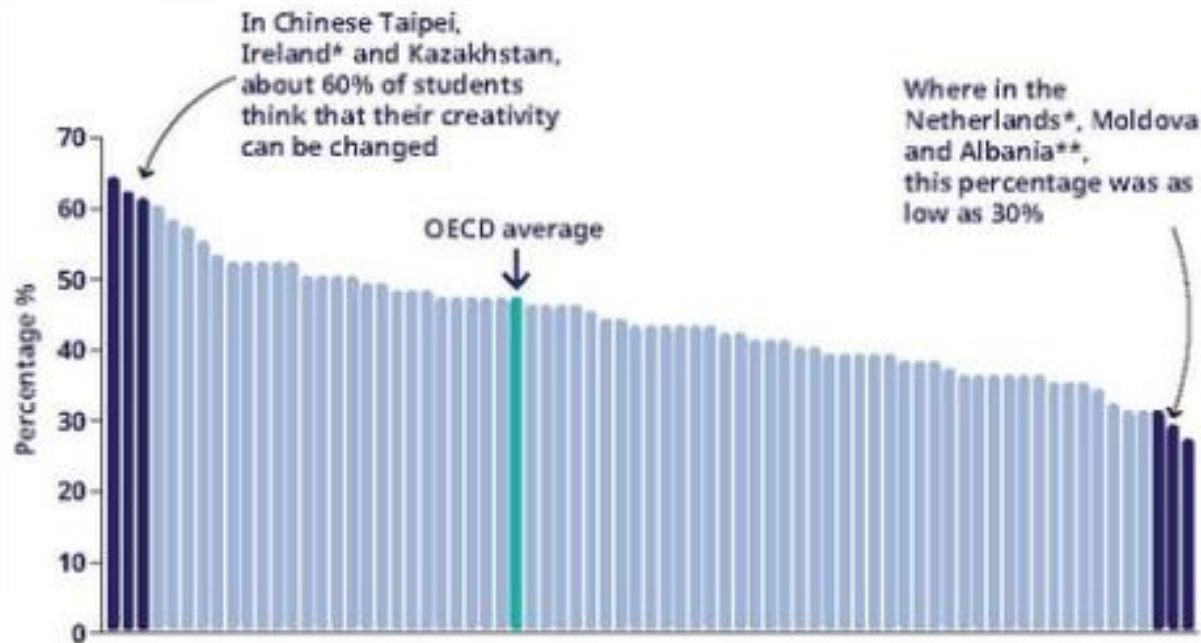
3 in 4 students across the OECD reach or exceed a **baseline level of creative thinking**

Percentage of students who can come up with appropriate and original ideas for a range of tasks and contexts



OECD average 78%

Students who think their **creativity** is something that they **can change** outscore those who don't

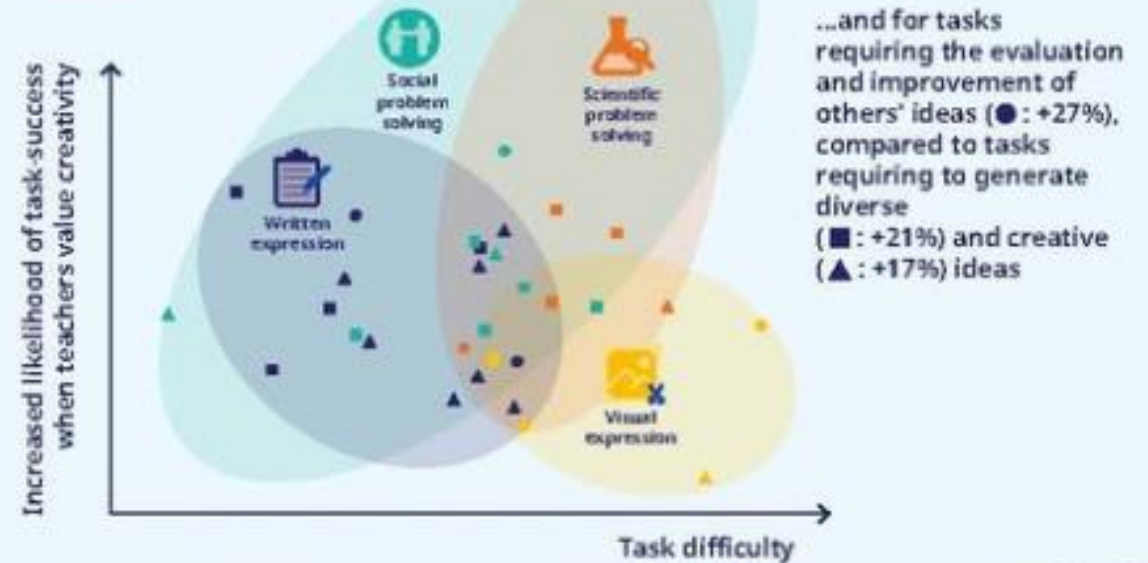


On average across the OECD only about **1 in 2 students** have a **growth mindset** regarding their **creativity**



Students whose **teachers value their creativity** are more likely to **succeed in creative thinking tasks**

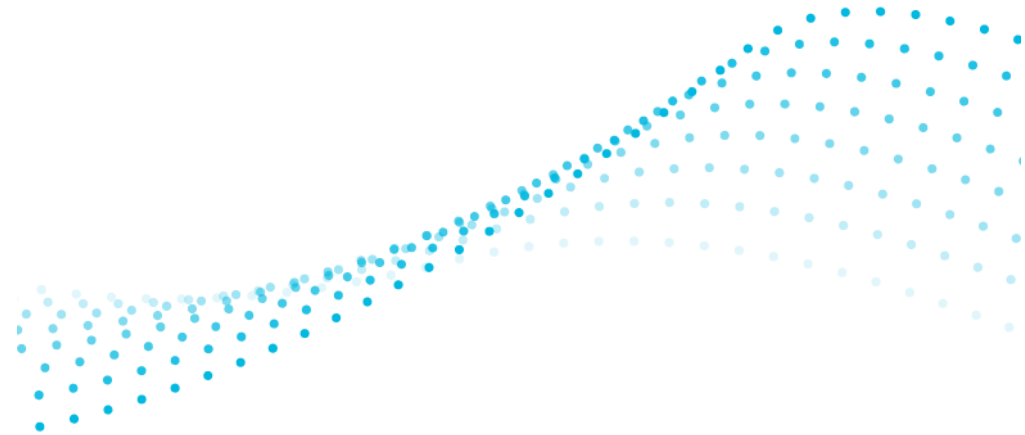
This is especially true for tasks that belong to the **scientific problem solving (+27%)** and **social problem solving (+24%)** domains...





Putting Creative Thinking at the Core of the English School Curriculum

An exploratory study



Creative Thinking progression

	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



Activities

Quizzes

Quick Question

Class Count

Engage your students as learning happens with your choice of activity type. Launch a quiz, receive exit tickets, or ask a quick question for instant student feedback.



Pricing

Community ▾

Resources ▾

About ▾

[Clear Directions](#)

Take a set of directions you've created and make them more concise and sequential so they're easier to understand for your students.

[Coach's Sports Practice Generator](#)

Generate a plan for practice for any sport that you're coaching!

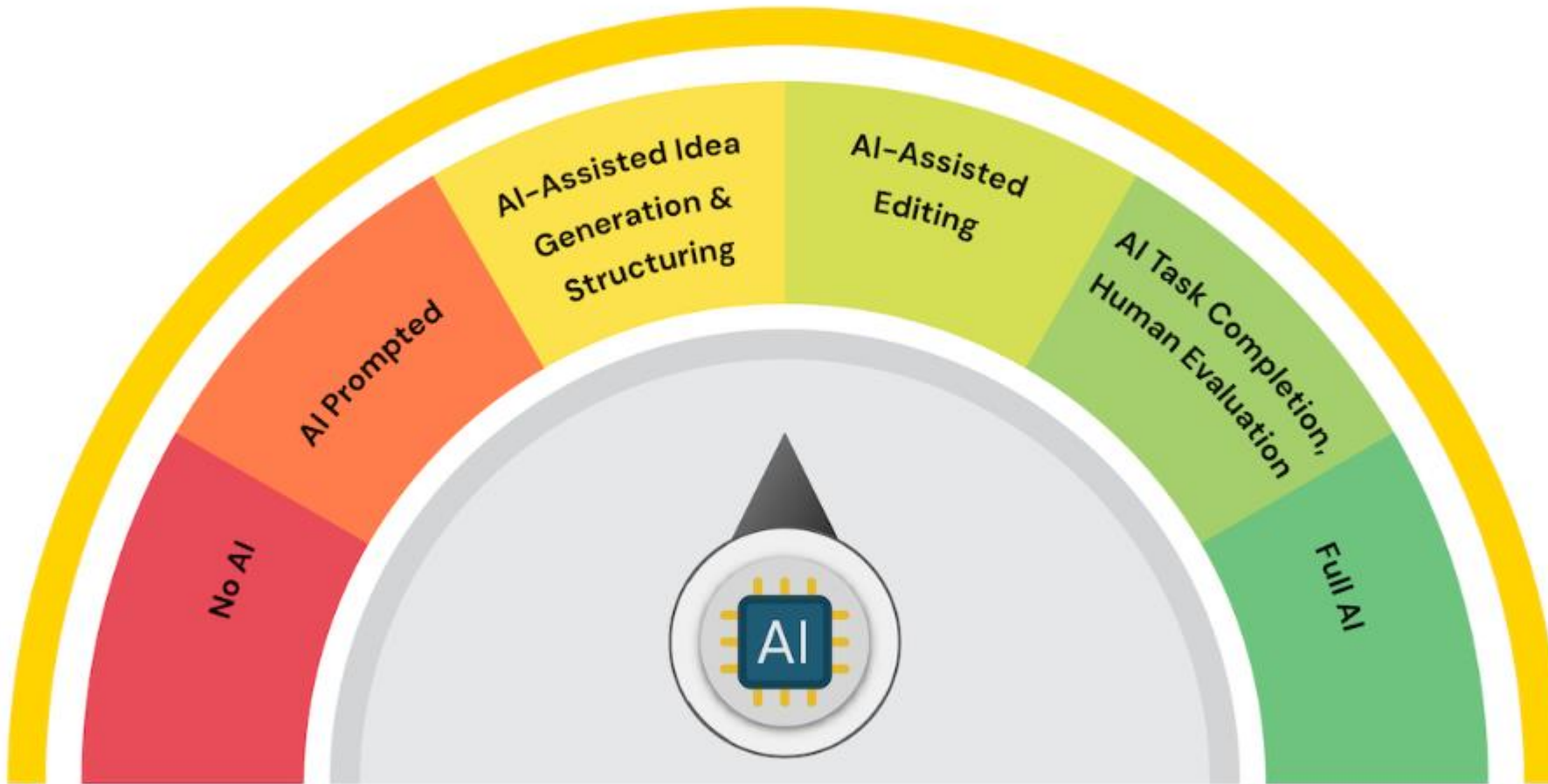
[Common Misconception Generator](#)

Generate the most common misconceptions on any topic you are teaching and get strategies to address them with your students.

[Conceptual Understanding Generator](#)

Generate ideas about how to help your students build conceptual understanding of a topic or standard you're teaching in class.

AI Assessment Scale



Adapted from the AI Assessment Scale Perkins, M., Furze, L., Roe, J., & MacVaugh, J. (2023). Navigating the generative AI era: Introducing the AI assessment scale for ethical GenAI assessment. arXiv preprint arXiv:2312.07086. <https://leonfurze.com/2023/12/18/the-ai-assessment-scale-version-2/>

AI ASSESSMENT SCALE (AIAS)



NO AI AI must not be used

The assessment is completed entirely without AI assistance. This level ensures that students rely solely on their knowledge, understanding, and skills.



AI AS A STUDY TOOL Use AI to Prepare, Review and Study

Use AI to learn skills and knowledge related to the course content and to prepare for course assessments.



IDEA GENERATION No AI content in submission

AI can be used to enhance brainstorming, structure creation, and idea generation to improve work.



AI-ASSISTED EDITING Include original work in appendix

AI can enhance student work for clarity and quality of final output, but cannot create new content



AI OUTPUT EVALUATED Use AI as instructed; cite AI-content

AI completes task parts; students must discuss and critically evaluate AI output.

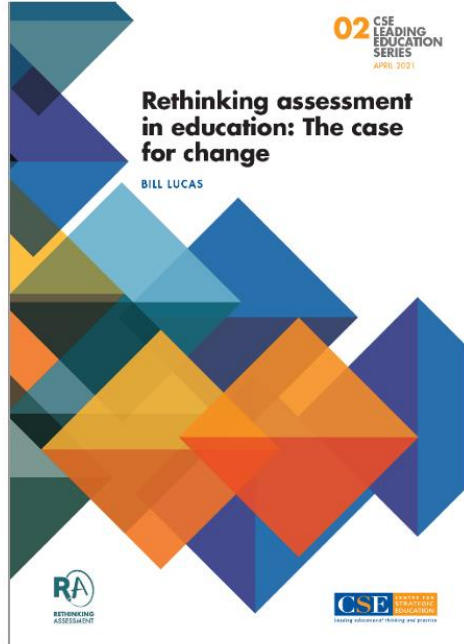
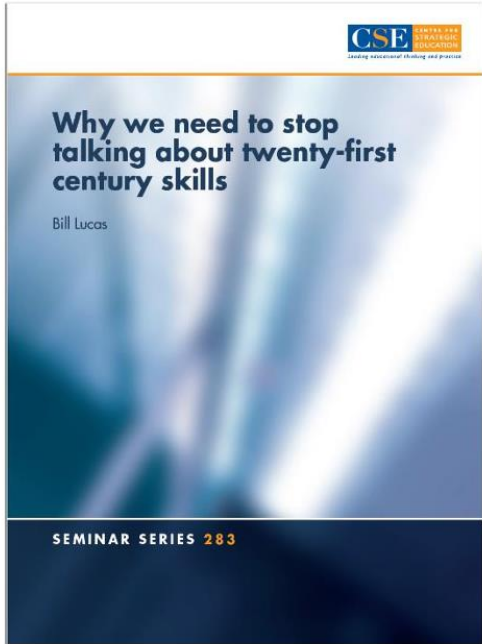


FULL AI Use AI fully in the assessment

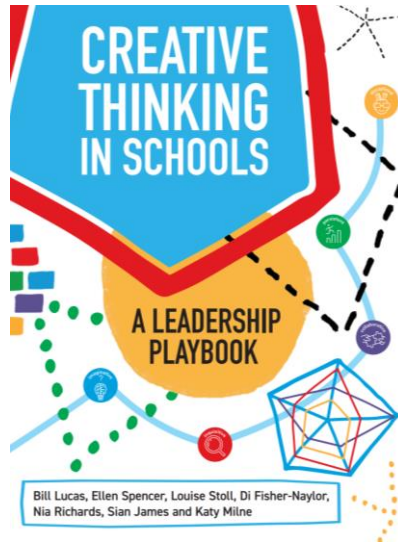
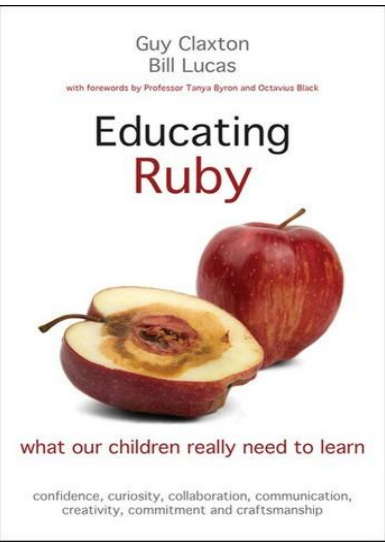
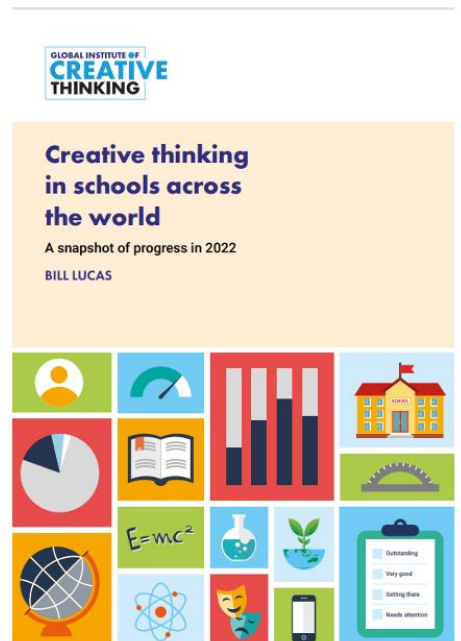
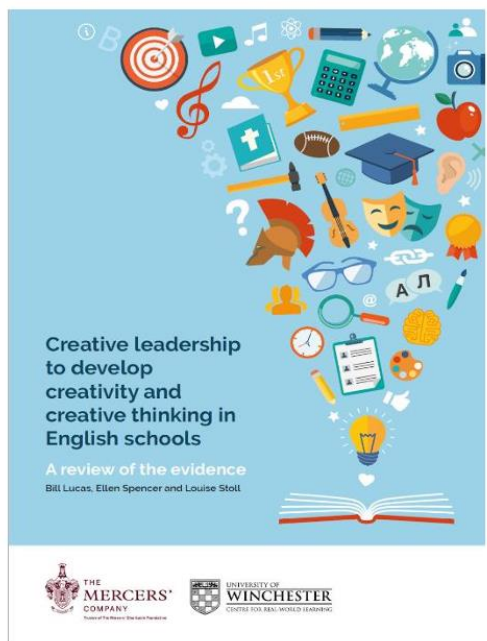
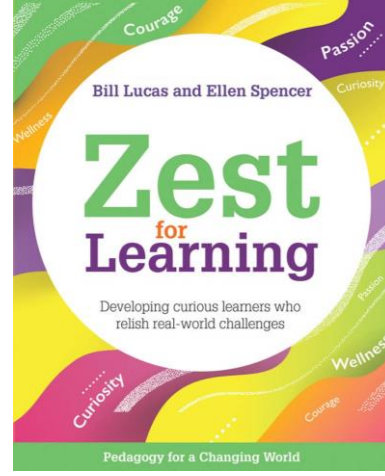
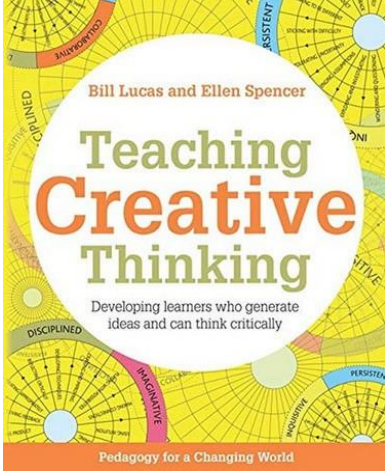
Use AI as a 'co-pilot' to enhance creativity and meet assessment requirements.

1. Shallow, narrow, solo	— 1. Nature of learning →	Deep, wide, collaborative
2. Dominated by head-work	— 2. Range of strengths →	Head, heart and hand
3. Number or grade	— 3. Style of credential →	Evidenced narrative
4. Single body	— 4. Source of credential →	Broad consortium
5. Predominantly summative	— 5. Focus of assessment →	Predominantly formative
6. High-stakes, standardised	— 6. Integration →	Ongoing, authentic
7. National/State norms	— 7. Personalisation →	Individual progression
8. Employers/HE/FE	— 8. Ownership →	For learners and for others
9. Largely for accountability	— 9. Strategic intent →	Mainly for improvement
10. Formulaic, mechanistic	— 10. Approach →	Carefully evidencing capability

Lucas, Bill (2021). *Rethinking assessment: The case for change*. Melbourne: CSE



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[@LucasLearn](#)

<https://rethinkingassessment.com>

<https://www.gioct.org>

<https://leadingforcreativethinking.org>



**RETHINKING
ASSESSMENT**



UNIVERSITY OF
WINCHESTER
CENTRE FOR REAL-WORLD LEARNING