Harnessing Creativity Research in Education:
From Theory to Practice

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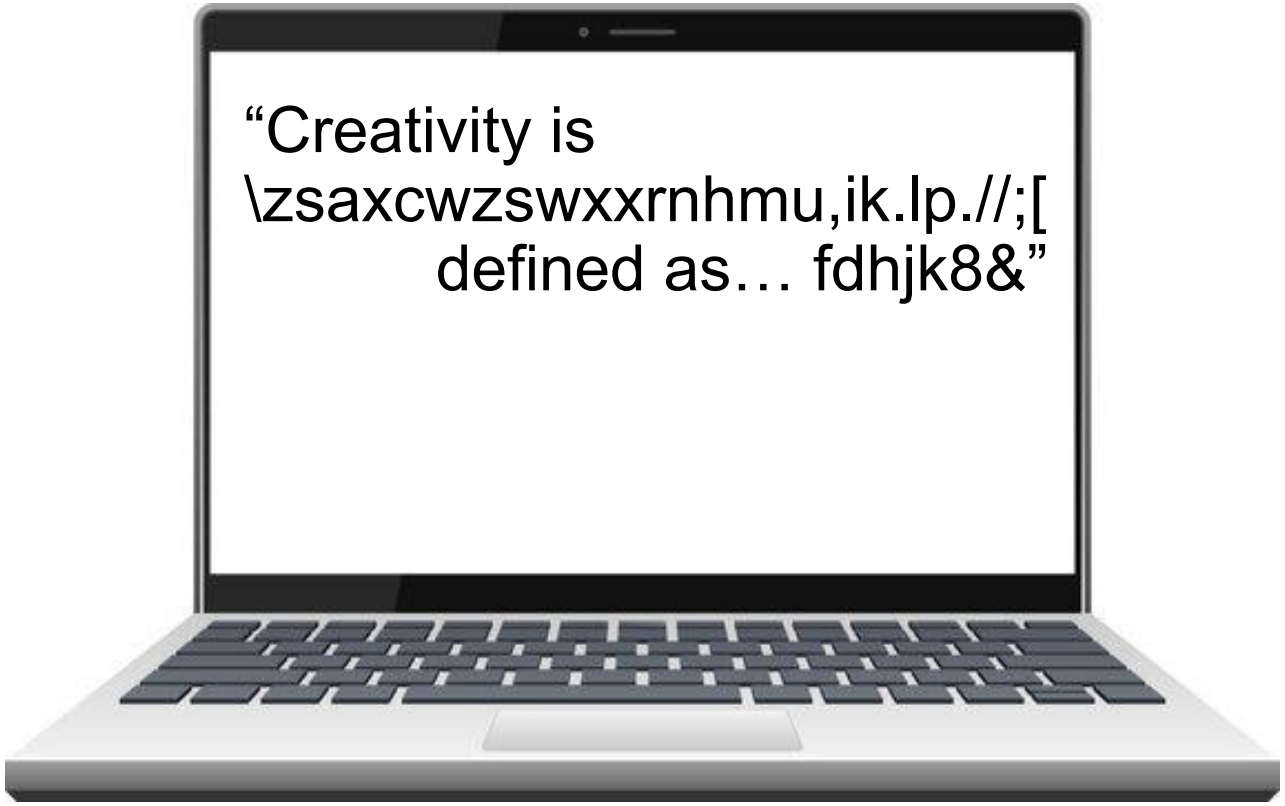
A Creativity Primer

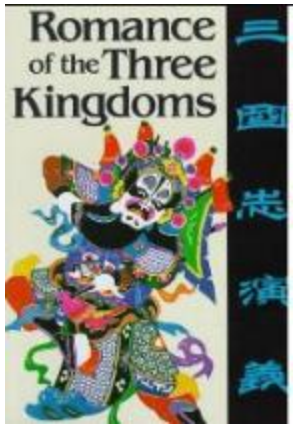
Meet Teddy, my Faithful Assistant!



Creative ideas are original **and effective**

(Runco and Jaegar, 2012)

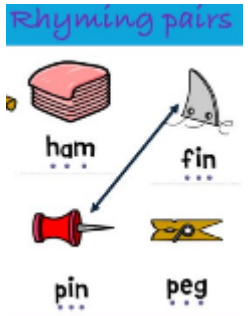
Development of creativity: 4 C's Model



BIG-C (Historic Creativity)

Pro-C

Little-c



mini-c (personal creativity)

Time

Apprenticeship Deliberate Practice

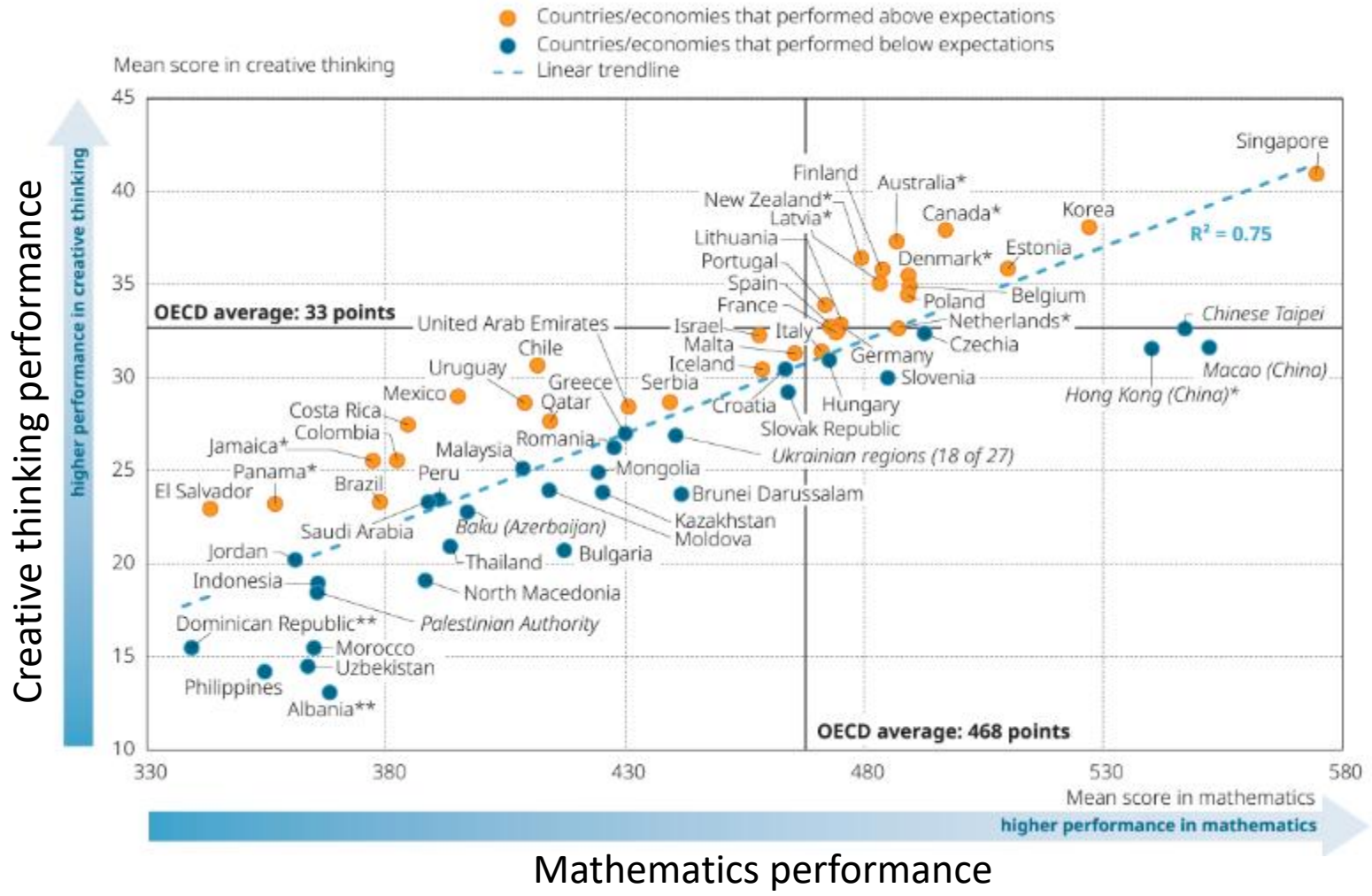
Tinkering Feedback

Kaufman & Beghetto, 2009;
Adapted from Beghetto & Kaufman, 2014

Creativity in Schools: Why?

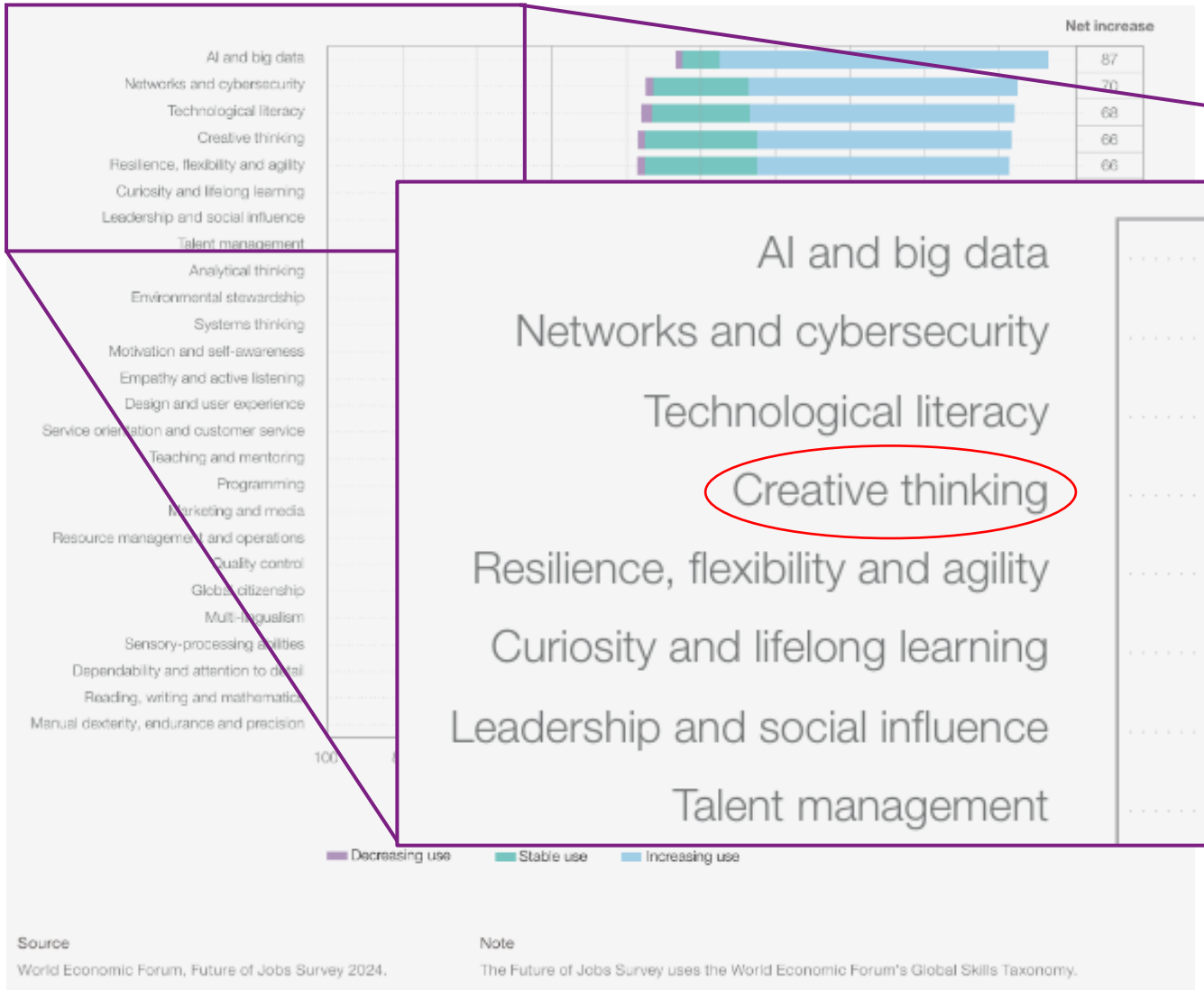
Four reasons

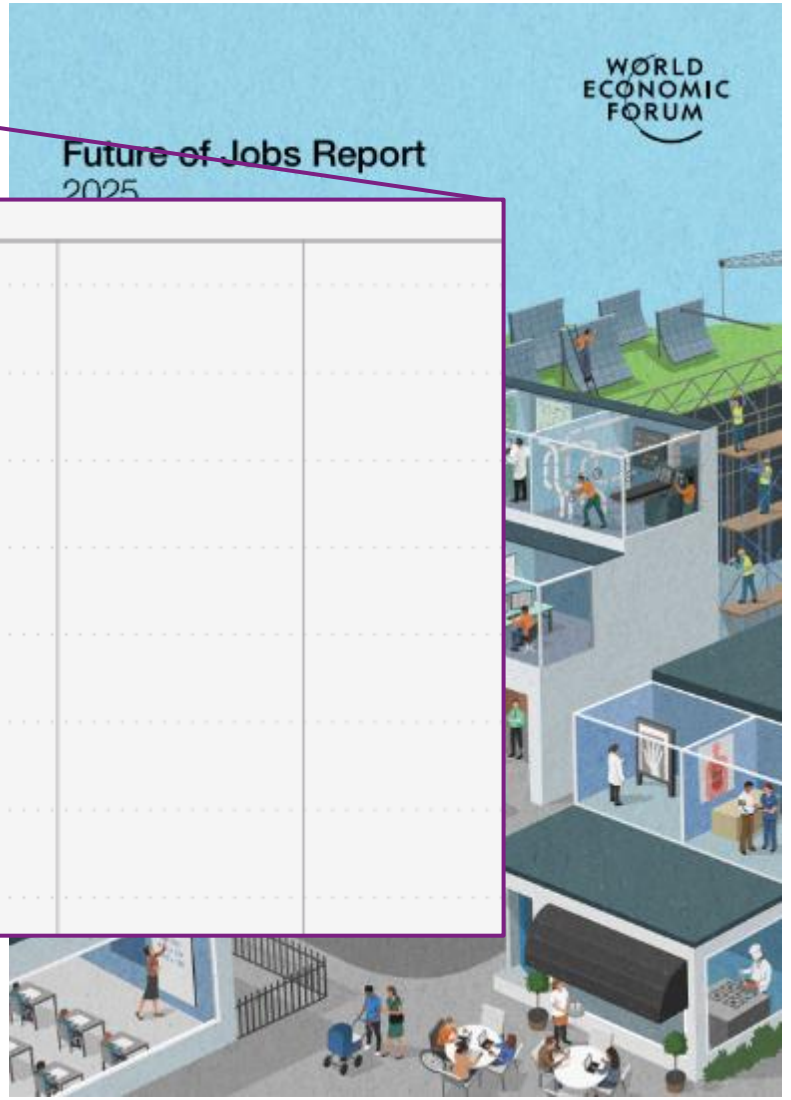
1. Creative Thinking and Academic Performance Are Related



OECD PISA 2022 Creative Thinking & Mathematics Score by Country

2. Creative Thinking is in Demand from Employers

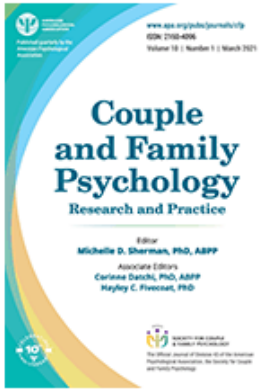




3. Creativity Supports Wellbeing

- Mental health of emerging adults has been declining globally over the last two decades (McGorry *et al*. 2024)

- Parental creativity was protective against stress during COVID lockdowns (Aznar, Sowden et al., 2021)



Journal Information

APA PsycArticles: Journal Article

Home-schooling during COVID-19 lockdown: Effects of coping style, home space, and everyday creativity on stress and home-schooling outcomes.

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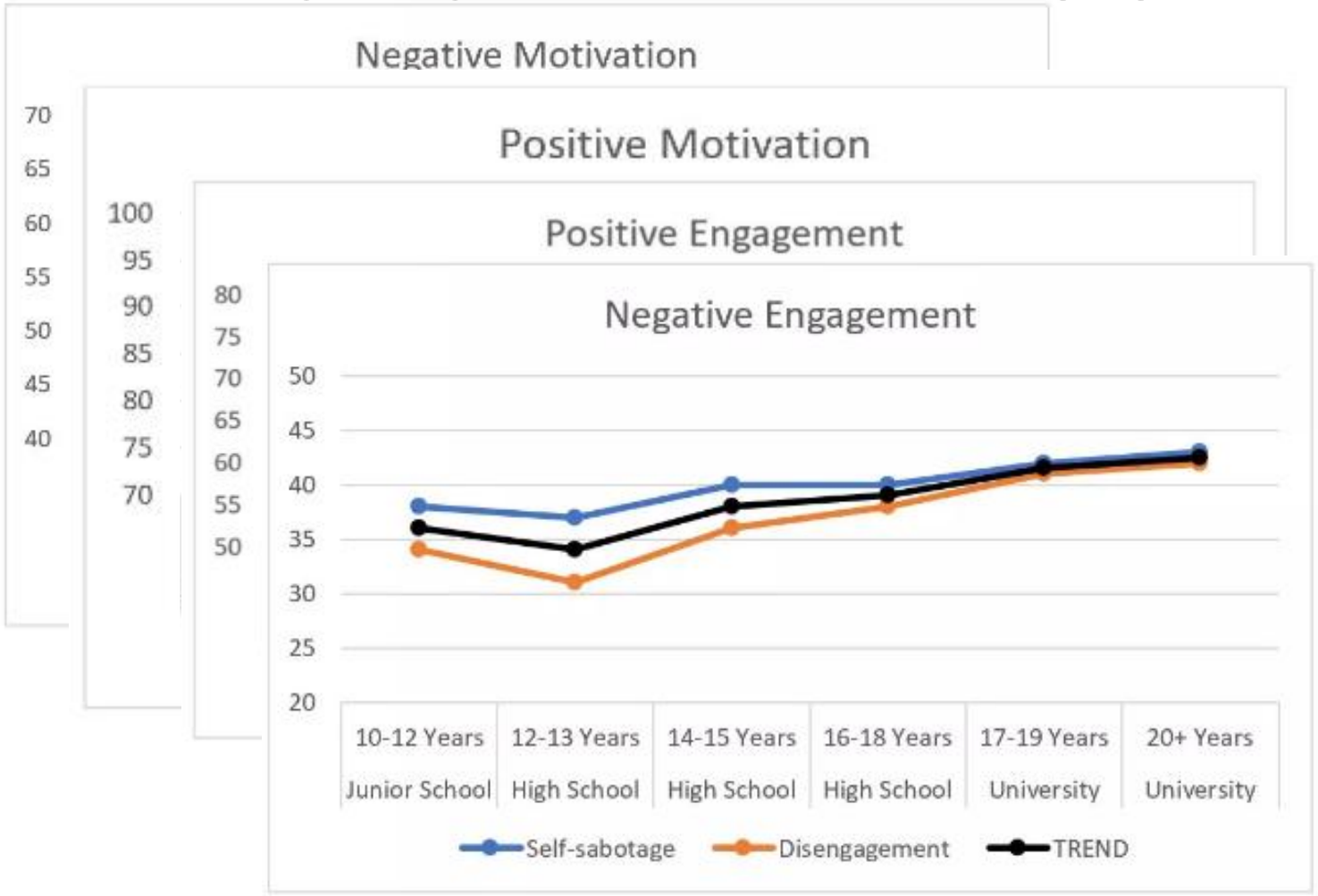
Aznar, A., Sowden, P., Bayless, S., Ross, K., Warhurst, A., & Pachi, D. (2021). H
during COVID-19 lockdown: Effects of coping style, home space, and everyday
and home-schooling outcomes. *Couple and Family Psychology: Research and*
294–312. https://doi.org/10.1037/cfp0000182

4. Creativity May Support Pupil Engagement



Andrew Martin (2023)
https://educationhq.com/news/does-age-matter-in-student-motivation-and-engagement-151240/

The Creativity Collaboratives

CREATIVITY COLLABORATIVES

Supported using public funding by ARTS COUNCIL ENGLAND

Freelands Foundation

- Eight Creativity Collaboratives formed across England
- 3 year pilot + 2 year legacy funding
- University of Winchester Academy Trust (UWINAT) Creativity Collaborative (CC), UK
- Currently,10 primary schools (age 4-11)

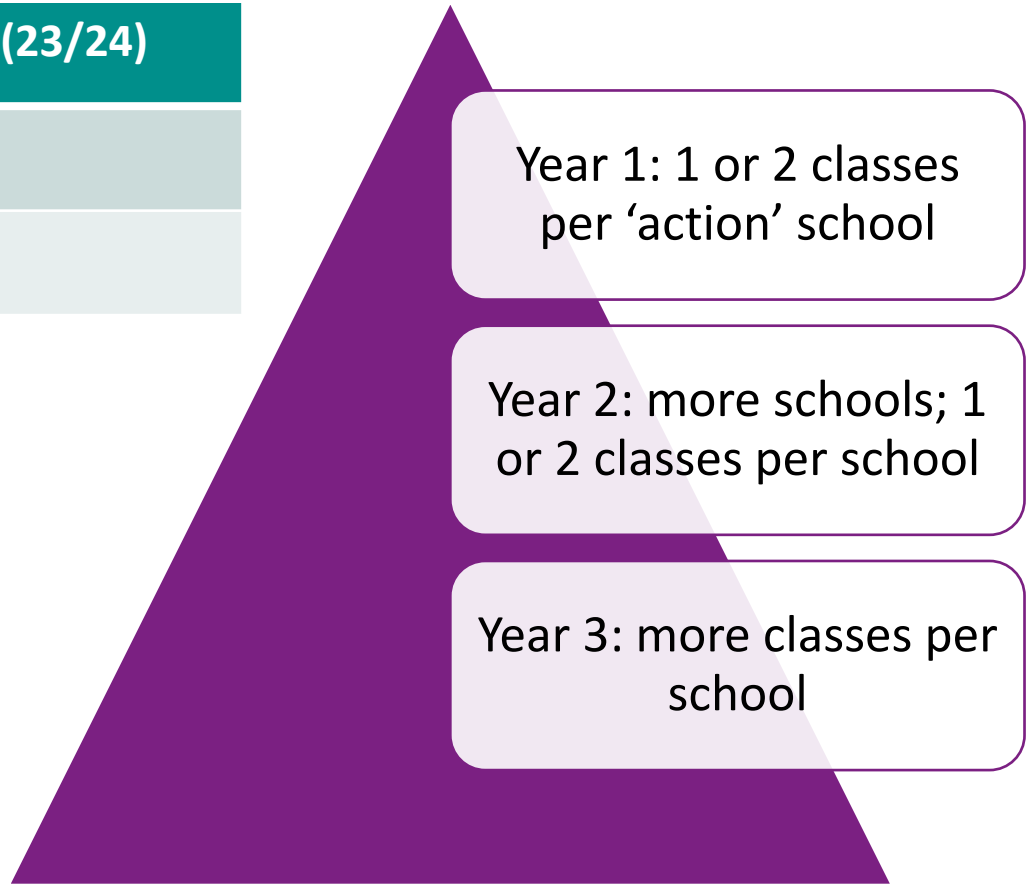
About the fund

This programme will build networks of schools to test innovative practices in teaching for creativity, sharing learnings to facilitate system-wide change. Working alongside existing school structures, teachers and educators will co-develop creative strategy and pedagogy, test out approaches to teaching and learning, and evaluate their impact on pupils, schools and communities.

Number of Participating UWINAT CC Schools by Pilot Phase Year

	Year 1 (21/22)	Year 2 (22/23)	Year 3 (23/24)
Action	8 (-1)	13 (+4)	10 (-3)
Control	4 (-2)	0	0

- Some schools dropped out
  - Competing priorities
  - Resourcing
- Mixed-methods quasi-experimental design
  - Action vs control school (year 1)
  - Between class (years 1-3)
  - Over time by school and class (years 1-3)



Five Project Workstreams

Context, Leadership, Knowledge, Agency and Pedagogies for creativity.

Context for creativity focuses on identifying barriers and enablers of learning and teaching for creativity in our participating schools and their interaction with inequality & disadvantage.

Leadership for creativity focuses on effective leadership, governance, and collaboration strategies to grow a climate for creativity and sustainable change.

Knowledge for creativity focuses on building learners', teachers' and leaders' knowledge and understanding of creativity.

Agency for creativity focuses on supporting learners and teachers to develop their creative confidence.

Pedagogies for creativity focuses on developing evidence-based pedagogies to foster creativity, working with teachers, and pre-service teachers undergoing initial teacher education.

Knowledge (and agency) for Creativity

Teachers' Knowledge of Creativity

- Interview data suggested that **collectively** our teachers started out with a range of relevant knowledge about creativity and teaching for creativity
  - **Character strengths**: open, resilient, courageous, collaborative, flexible…
  - **Process variables**: exploring & investigating, divergent thinking, making connections, imagination, reflection…
- But, **individually** teachers did not articulate a coherent account of a creative process
- Struggled to give examples of how they had embedded teaching for creativity in specific subject areas

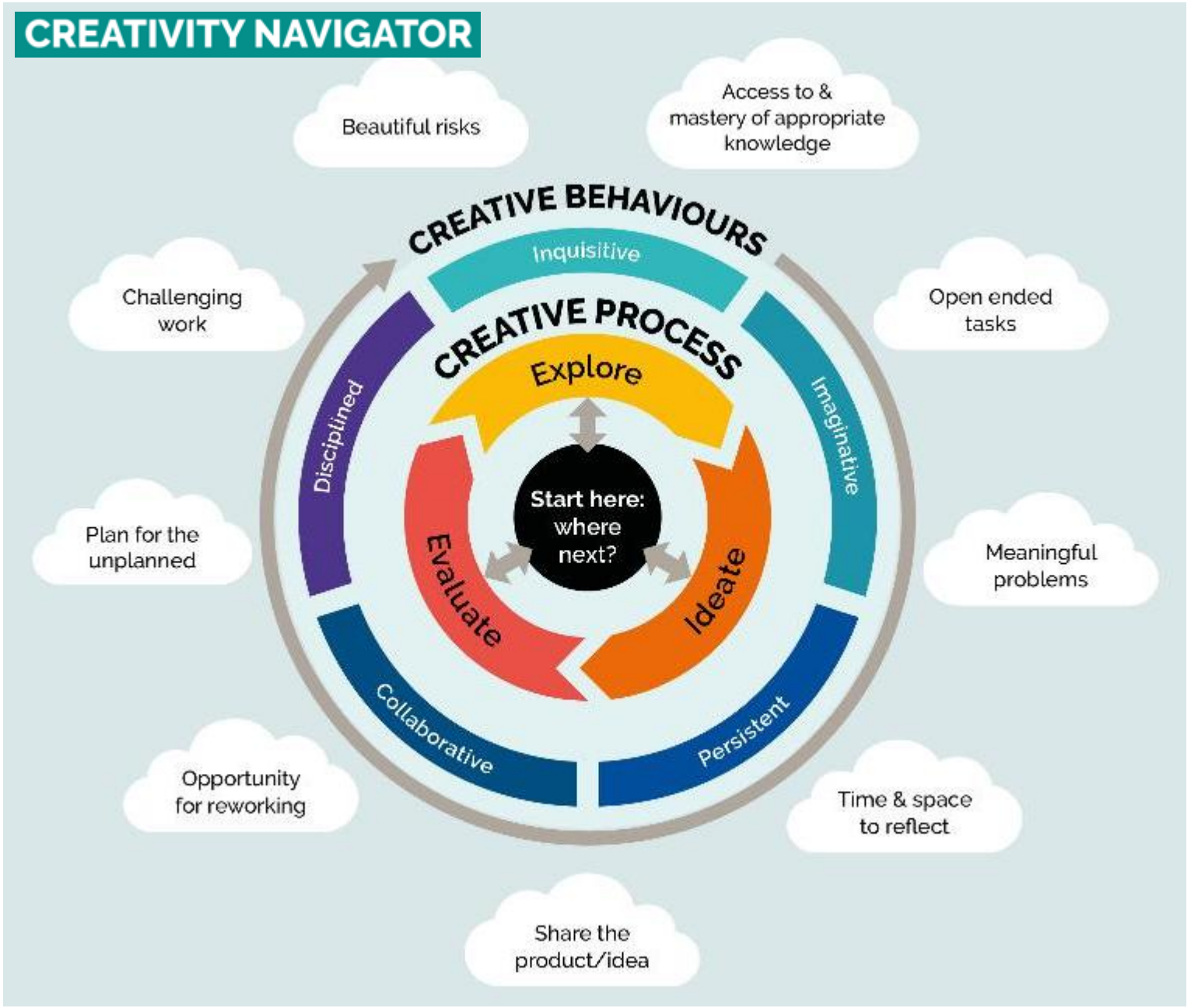
"my initial gut instinct to think arty or crafty. But actually, you can be creative in any area of life and when I think about it more deeply I think we have to be creative in how we speak to people, how we plan things, how we deliver things, so it's a much wider thing as well"

"allowing children to have a say in their own learning and then explore it their own way"

Teacher Research Group

Different Lenses to View Creativity

1. Climate and context for creativity
2. Creative cognition and process
3. Creative dispositions and behaviours



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Sowden *et al*. 2025

Teacher Outcome Measures Summary

Pilot phase (2021-2024) outcome data

Measure	Project teacher mean (SD)	Non-project teacher mean (SD)	*z*	*p*	*d*
Metacognitive knowledge (factor score)	2.2 (2.5)	-0.8 (2.8)	-2.49	.007	.94
Creative pedagogy frequency (factor score)	1.5 (5.8)	-0.6 (6.3)	-0.97	.17	.33
Creative pedagogy confidence (factor score)	2.2 (3.2)	-1.1 (3.6)	-2.56	.006	.99
Creative climate confidence (factor score)	2.1 (1.4)	-0.8 (2.4)	-3.16	.001	1.30
Growth mindset for creativity	4.4 (0.5)	3.9 (0.8)	-1.88	.03	0.68
Everyday creativity (K-DOCS)	4.2 (0.5)	3.4 (0.4)	-3.11	.001	1.23
Teaching for creativity confidence	8.9 (1.0)	6.6 (1.8)	-3.35	<.001	1.40
Teacher self-efficacy: instructional strategies	4.7 (0.4)	4.2 (0.4)	-2.88	.002	1.13
Teacher self-efficacy: student engagement	4.4 (0.5)	4.0 (0.5)	-1.68	.047	0.59

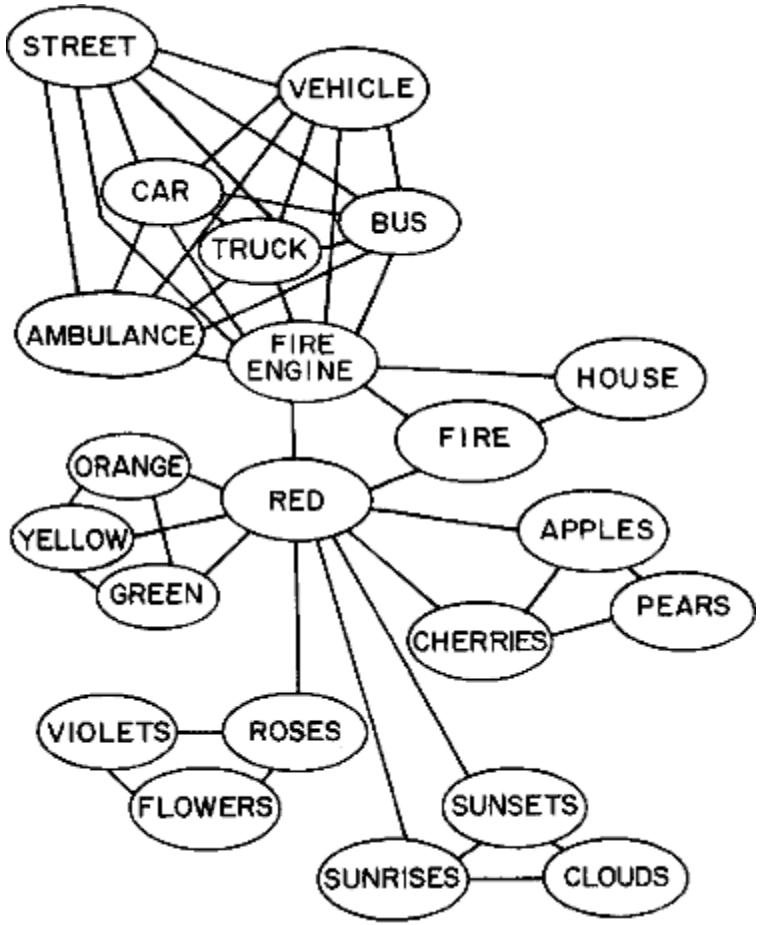
Mann Whitney U tests

Sowden *et al*. (2025)

Creative Cognition

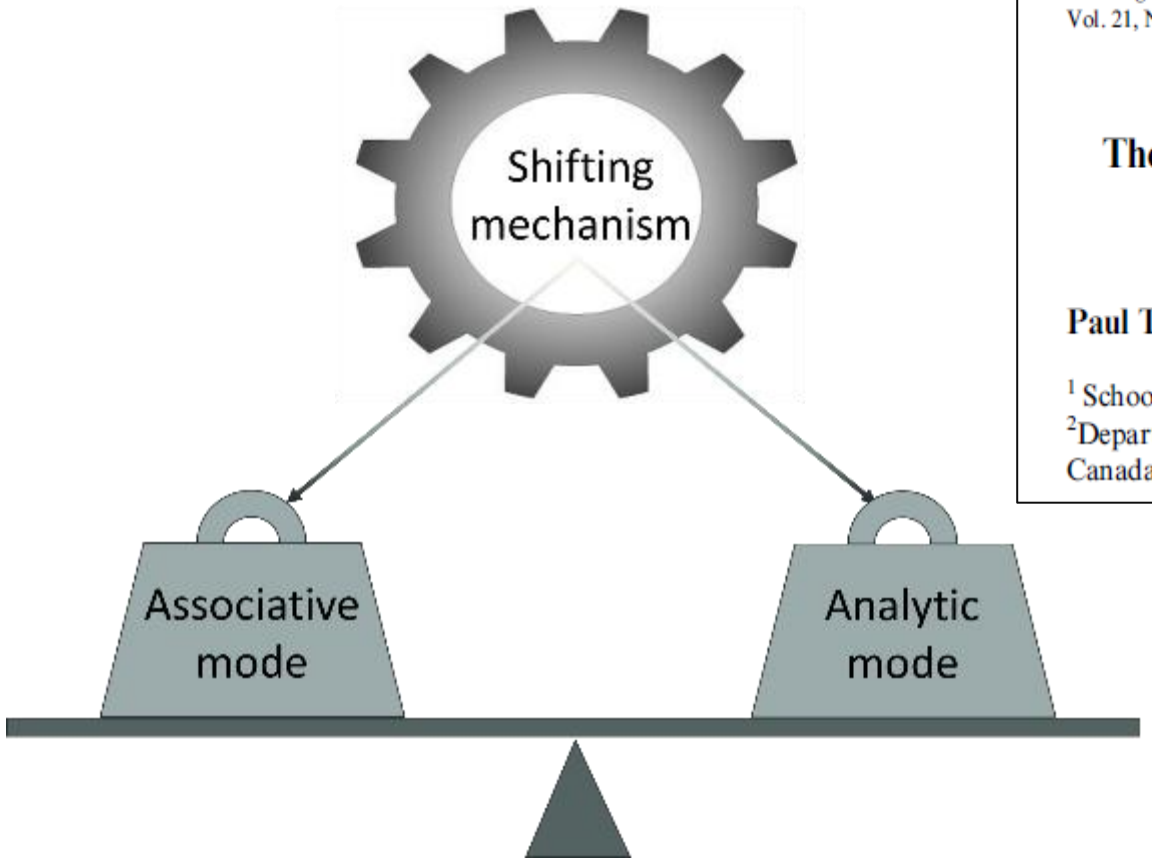
Spreading activation and semantic networks

- A wide variety of data indicate semantic memory is organised in conceptual clusters
- Spreading activation between related concepts varies as a function of factors such as
  - Association frequency
  - Typicality
- Creativity is facilitated through moving beyond pre-potent associations



Collins & Loftus (1975)

Creative thinking as a dual process: associative & analytic thinking



Thinking & Reasoning, 2015
Vol. 21, No. 1, 40–60, http://dx.doi.org/10.1080/13546783.2014.885464

Routledge
Taylor & Francis Group

The shifting sands of creative thinking: Connections to dual-process theory

Paul T. Sowden[1], Andrew Pringle[1], and Liane Gabora[2]

[1] School of Psychology, University of Surrey, Guildford, UK
[2]Department of Psych
Canada

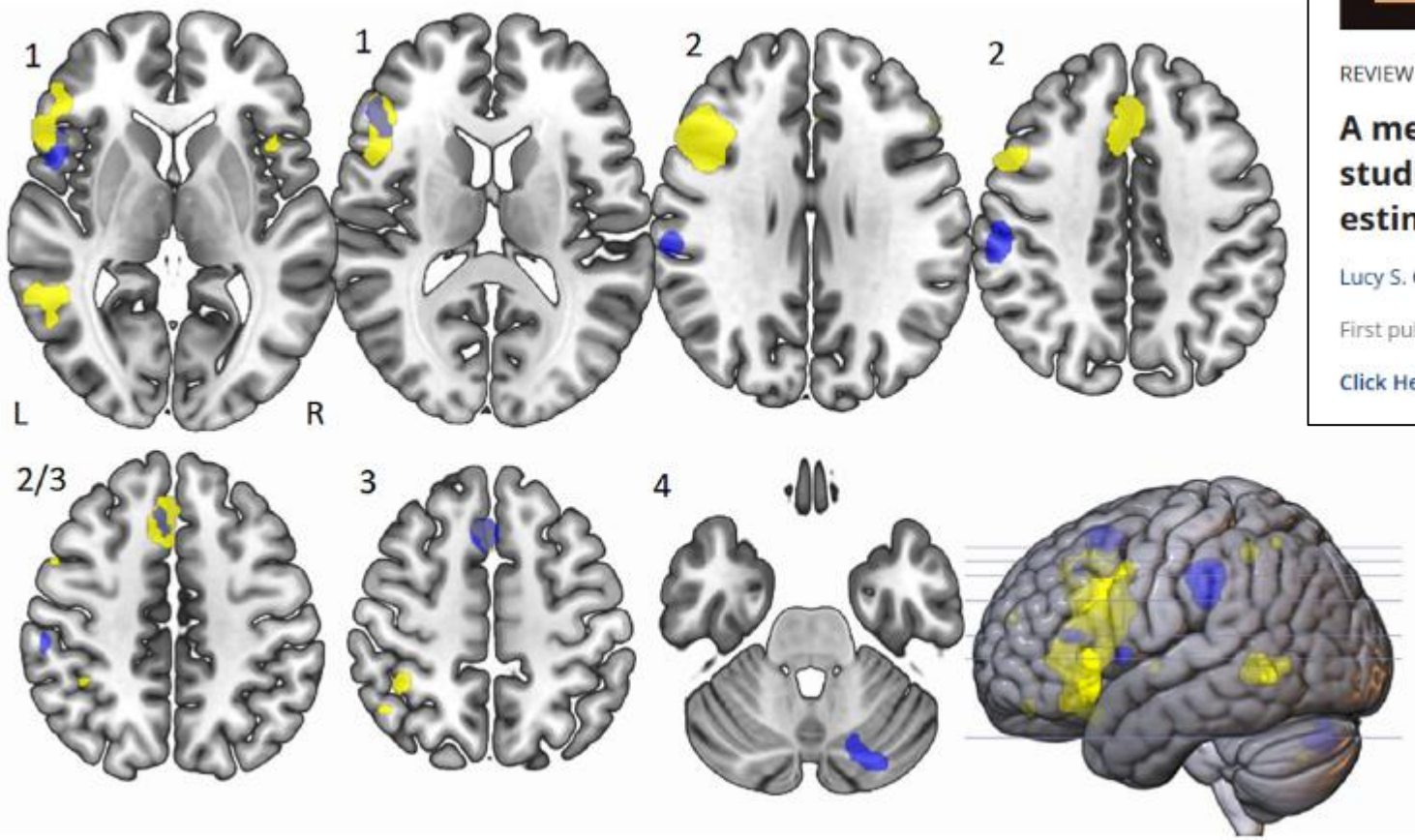
ELSEVIER

Thinking Skills and Creativity
Volume 23, March 2017, Pages 17-28

The Mode Shifting Index (MSI): A new measure of the creative thinking skill of shifting between associative and analytic thinking

Andrew Pringle, Paul T. Sowden

Semantic control and divergent thinking



HUMAN BRAIN MAPPING

Influence Series

REVIEW ARTICLE | Open Access

A meta-analysis of functional magnetic resonance imaging studies of divergent thinking using activation likelihood estimation

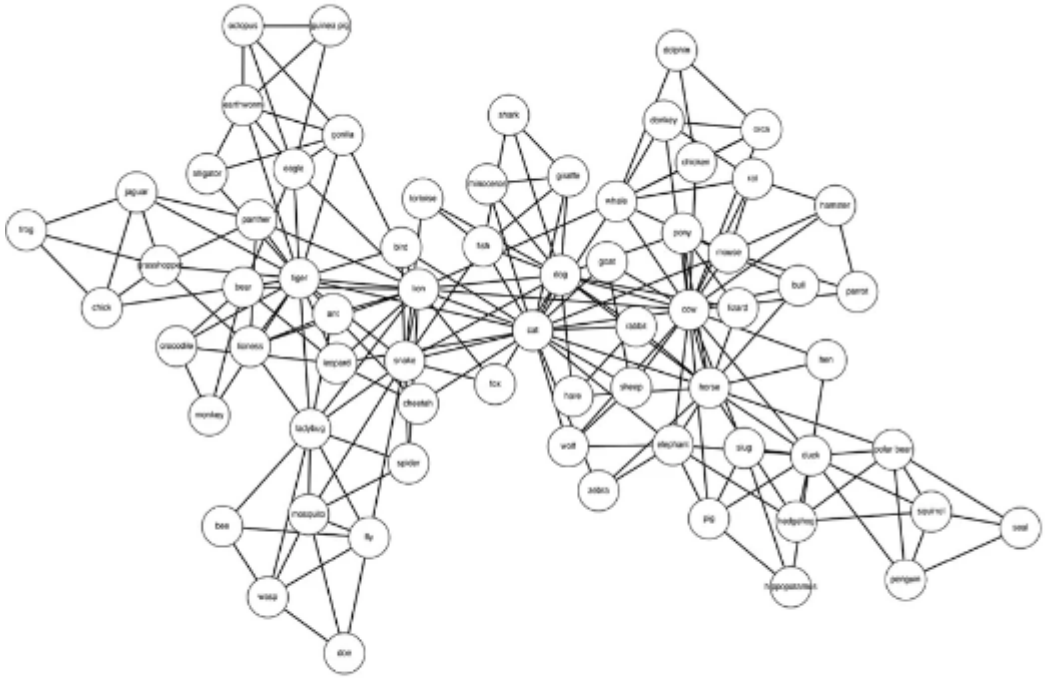
Lucy S. Cogdell-Brooke, Paul T. Sowden, Inês R. Violante, Hannah E. Thompson

First published: 26 August 2020 | https://doi.org/10.1002/hbm.25170 | Citations: 19

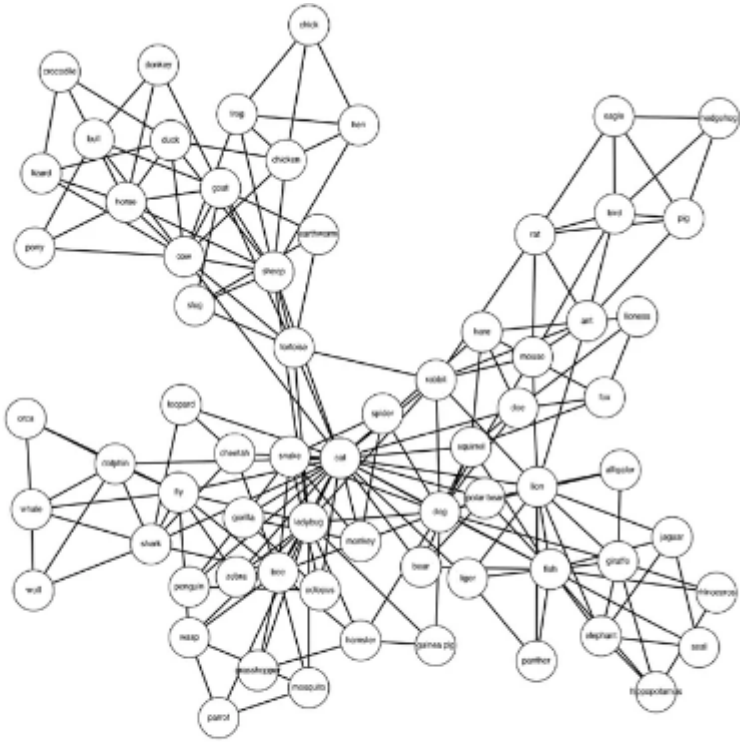
Click Here

Blue = Divergent thinking ALE map
Yellow = Semantic Control Network mask (Noonan *et al*., 2013)

Education & Semantic Networks



Montessori



Traditional

From Denervaud, Christensen, Kenett & Beaty, 2021

Pedagogies for Creativity: A Case Example

Roaming Rovers

Gemma Williams, Year 1 Teacher

Year 1

Spring 2 2023

5 Week Project

DT - ENGLISH - SCIENCE

Hook

The children's learning was interrupted by a news broadcast explaining that a new planet called Vortex has been discovered. The children learn that NASA are very excited and have rockets at the ready to visit the planet, however… they have no Rovers to explore the planet.

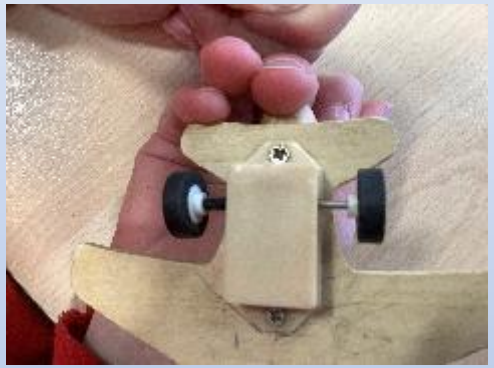
Teacher Commentary

"*After our hook, I decided that I would not show the children what a rover looks like but instead explained that it is a vehicle that can be used to explore planets. I covered up any pictures of rovers in our project books and this meant that the children didn't have any preconceived ideas about what a rover looked like. It was all left to their imagination*."

- Avoiding fixation

Explore

Ask



Learn

Look

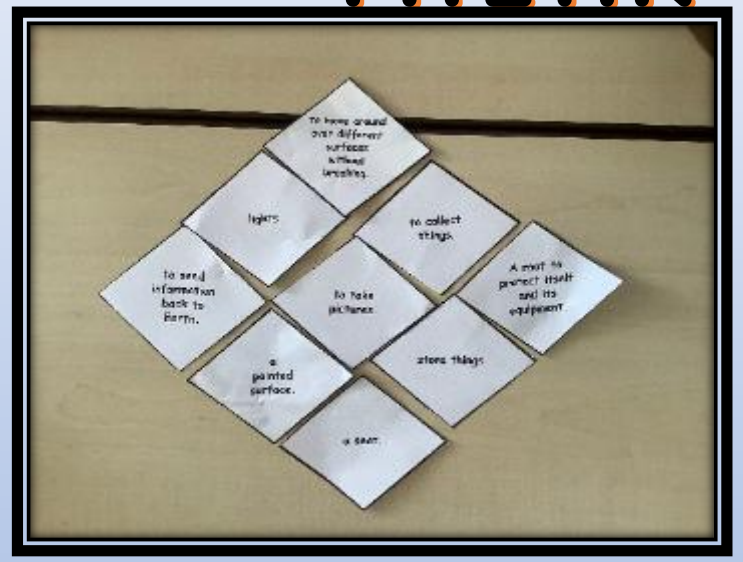
Play

- Inquisitive
- Disciplined
- Imaginative
- Persistent
- Collaborative

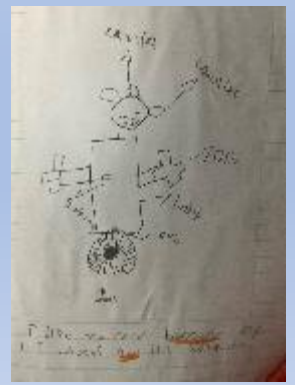
Ideate

- Inquisitive
- Disciplined
- Imaginative
- Persistent
- Collaborative

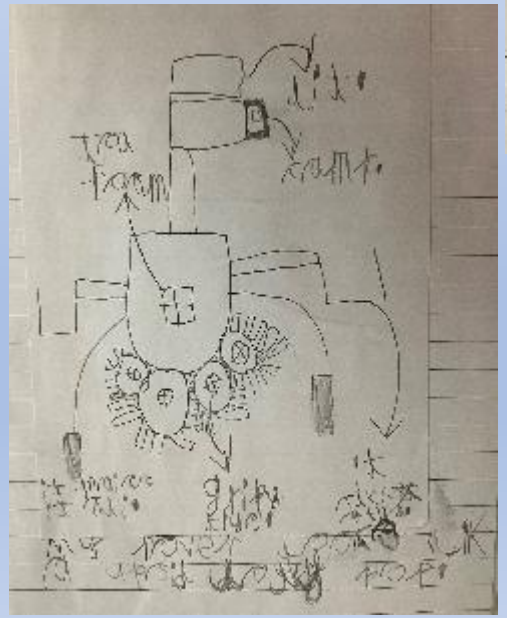
Think

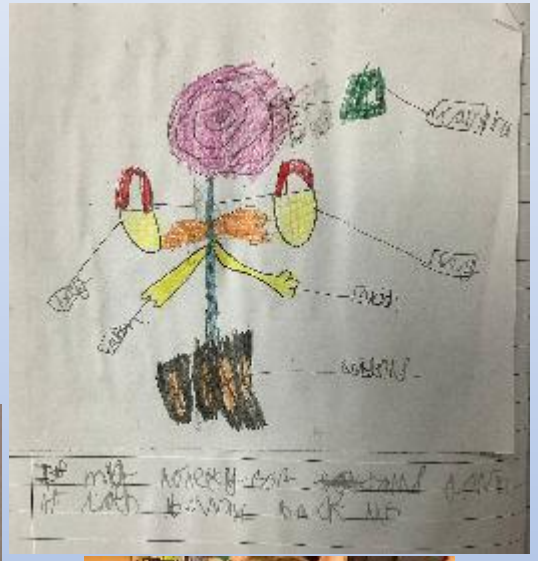


They created a diamond 9 to decide the success criteria for their rovers.

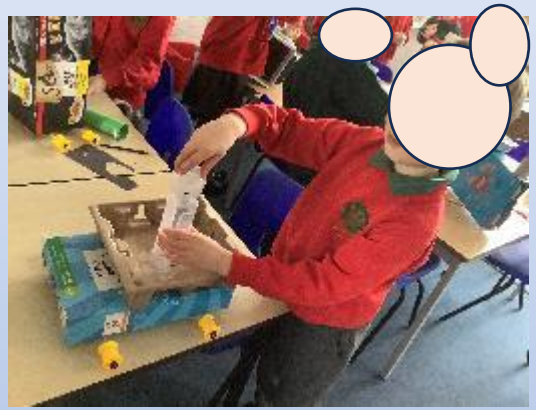


Fuse





Make



Evaluate

Choose

It can take photos and send information back to Earth.	
It can collect samples.	
It can store samples.	
It can move without breaking.	
This is how I feel about my rover:	

Evaluate

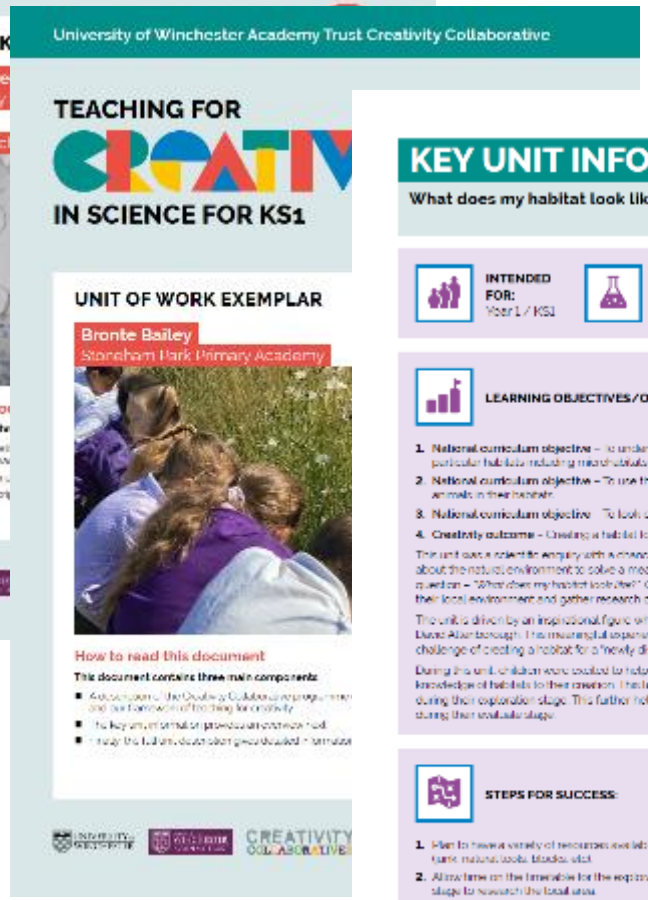
Outcome

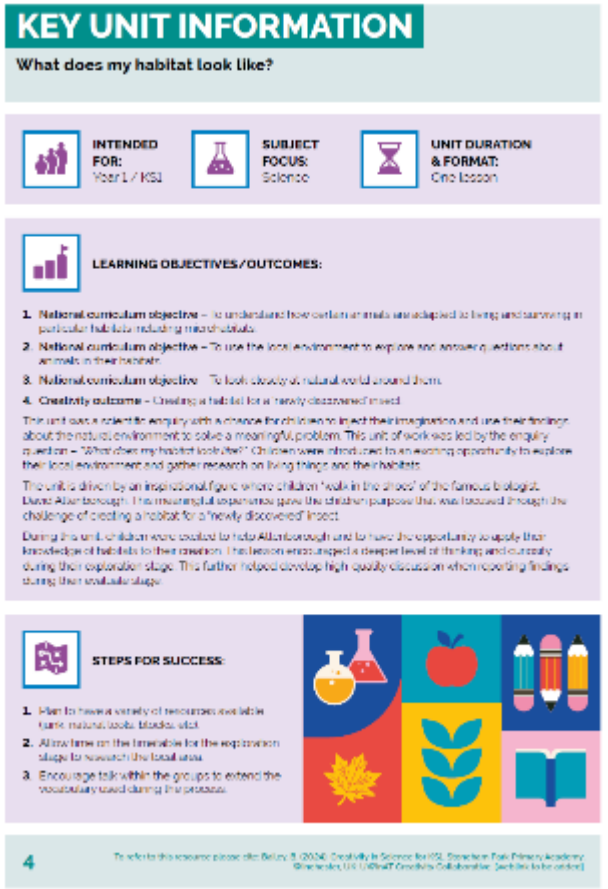
Each class got to show their products to their grown-ups at a 'Roaming Rover Reveal' held in the hall.

This involved the children demonstrating their rovers on various simulated terrains, teaching their grown-ups how to make an axle and a display of all their home learning.

Our designs were actually hand delivered to NASA by a student who went to NASA during the holidays!

Creativity in history





Pupil Outcomes

Creativity Talk

- Teacher: Now. Were we **ideating** at that point?
- Pupil: No, we were being **inquisitive**.
- Teacher: We had to **ask** lots of **questions** [pupils join] didn't we?
- Teacher: So that we could create the best vehicle or transport
- Pupil: that goes on land and sea.

Creativity Talk

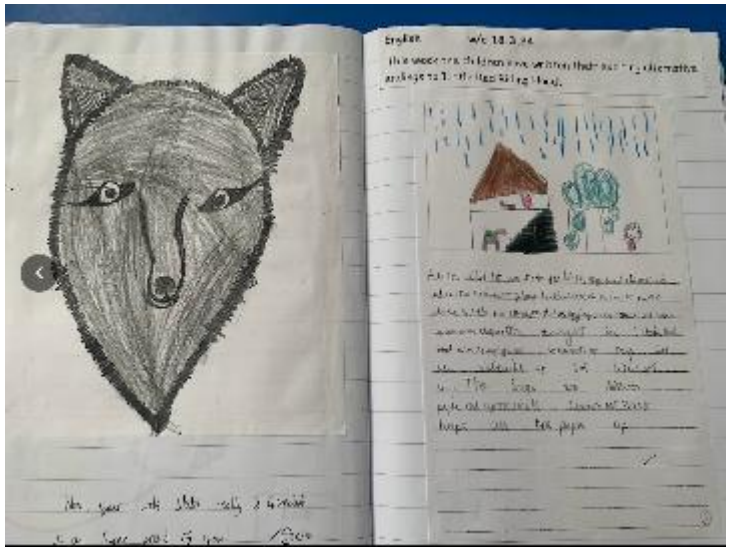
- Teacher: oh great job. So you were being?
- Pupil: **Persistent**
- Teacher: **Persistent**
- Pupil: and we were being **disciplined**.
- Teacher: Because you had to change things to make it work. Great job. Thank you.
- Pupil: They all looked **different** because we all had **different ideas** and we don't all have the same thing

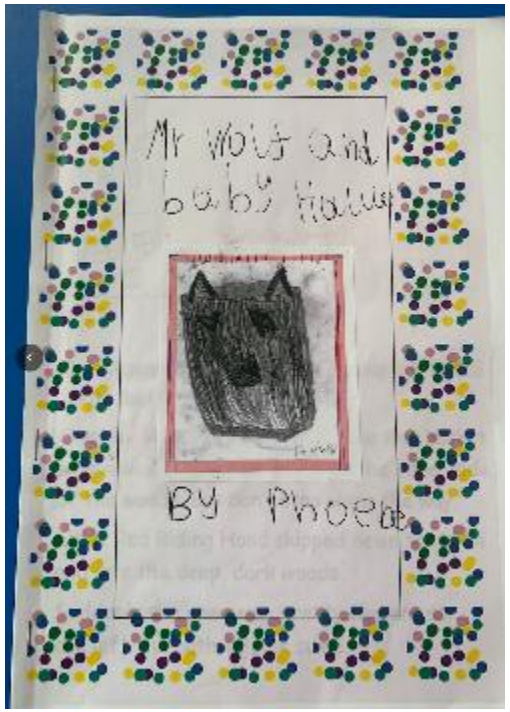
Creativity of Outcomes

Wolves!

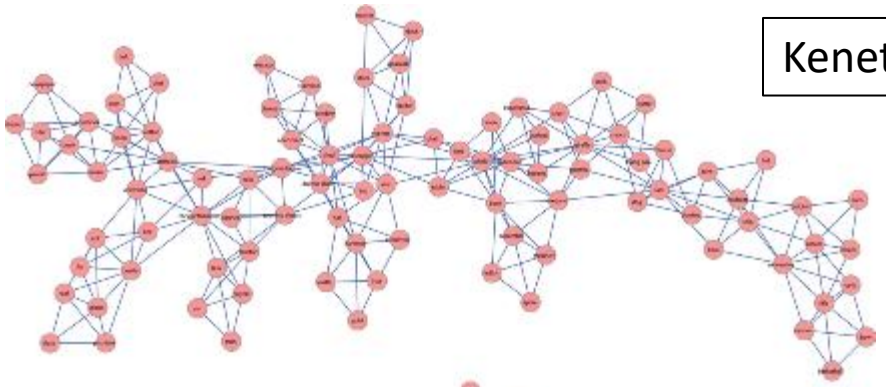
Measure	Intervention Grp mean (SD)	Control Grp mean (SD)	*z*	*p*	*d*
Story Originality	3.29 (0.71)	2.89 (0.79)	-1.98	.031	0.48
Story Quality	3.04 (0.69)	2.71 (0.66)	-1.74	.041	0.43
Story Effectiveness	3.25 (0.59)	3.57 (0.57)	-2.10	.98	--
Story Creativity	3.25 (0.59)	2.82 (0.55)	-2.67	.004	0.64
Sketch Originality	3.46 (0.58)	2.86 (0.80)	-2.92	.002	0.77
Sketch Quality	3.36 (0.68)	2.89 (0.74)	-2.34	.01	0.61
Sketch Effectiveness	3.43 (0.69)	3.50 (0.64)	-0.35	.37	
Sketch Creativity	3.36 (0.68)	2.96 (0.64)	-2.21	.014	0.083

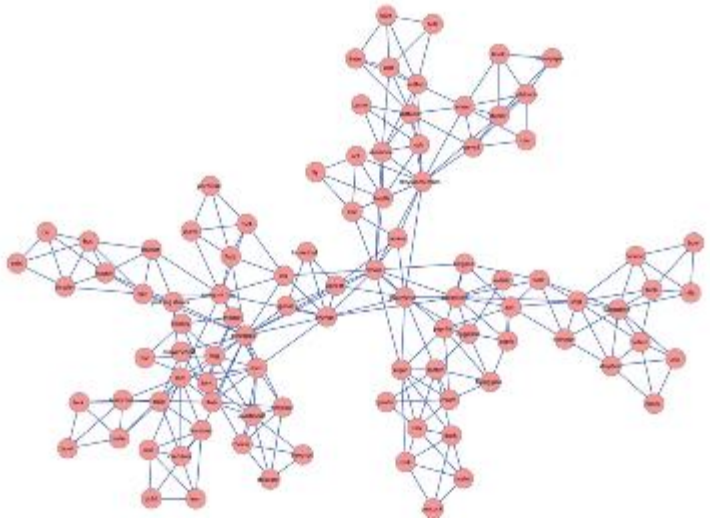
Sowden et al. (2024; in prep)



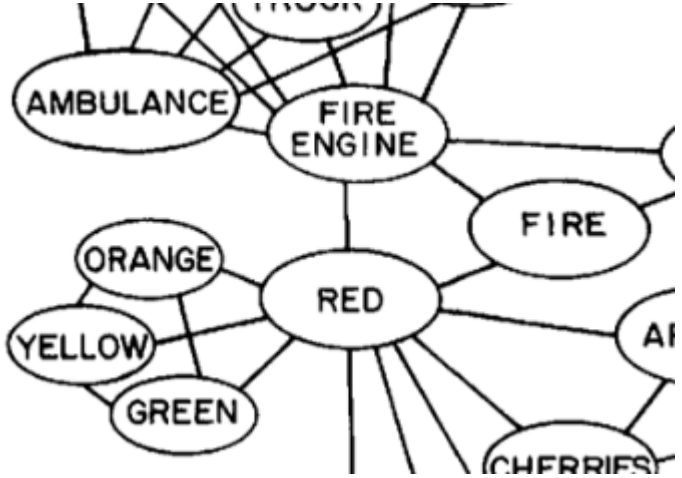


Mapping semantic networks

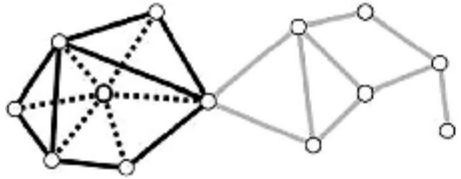




Kenett, Anaki & Faust, 2014

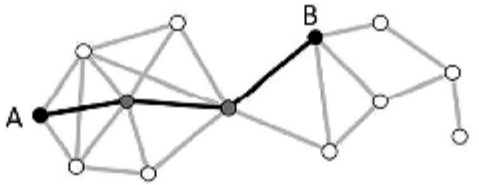


Connectivity



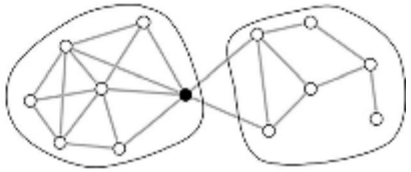
CC – Clustering Coefficient

Distances



ASPL – Average Shortest Path Length

Communities



Q – Modularity

Kenett & Faust, 2019

Network structure pre vs. post intervention

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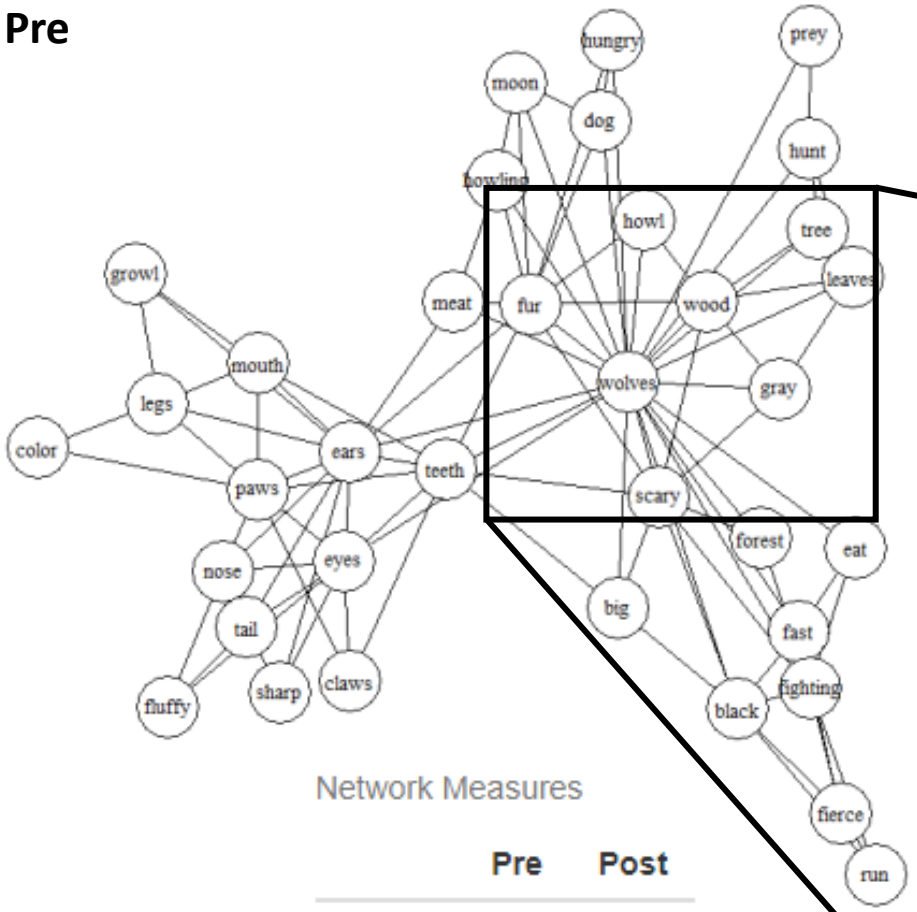
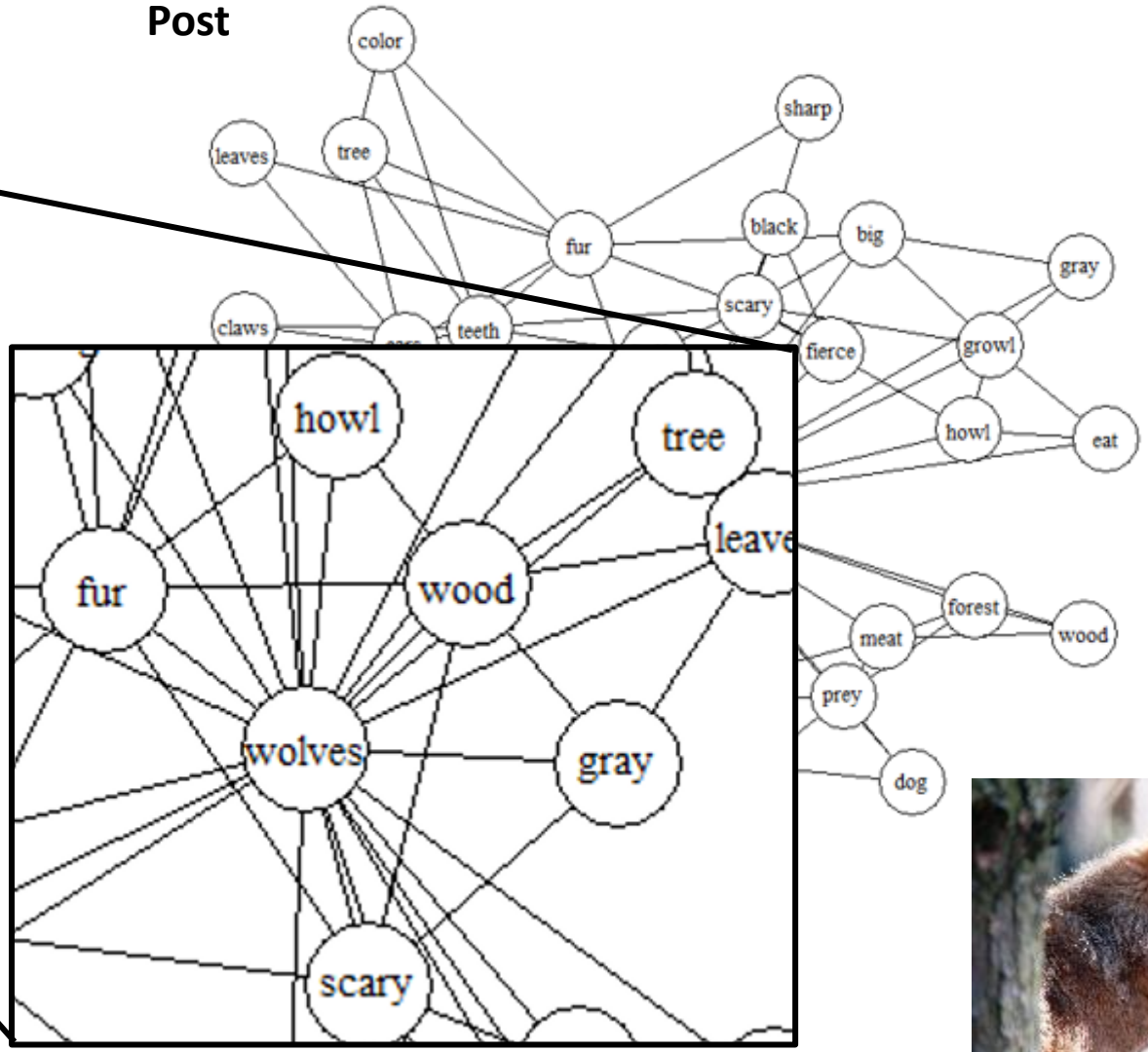
Pre



Post



Network Measures

	Pre	Post
ASPL	2.28	2.08
CC	0.73	0.74
Q	0.47	0.42

General Pupil Impacts: Themes

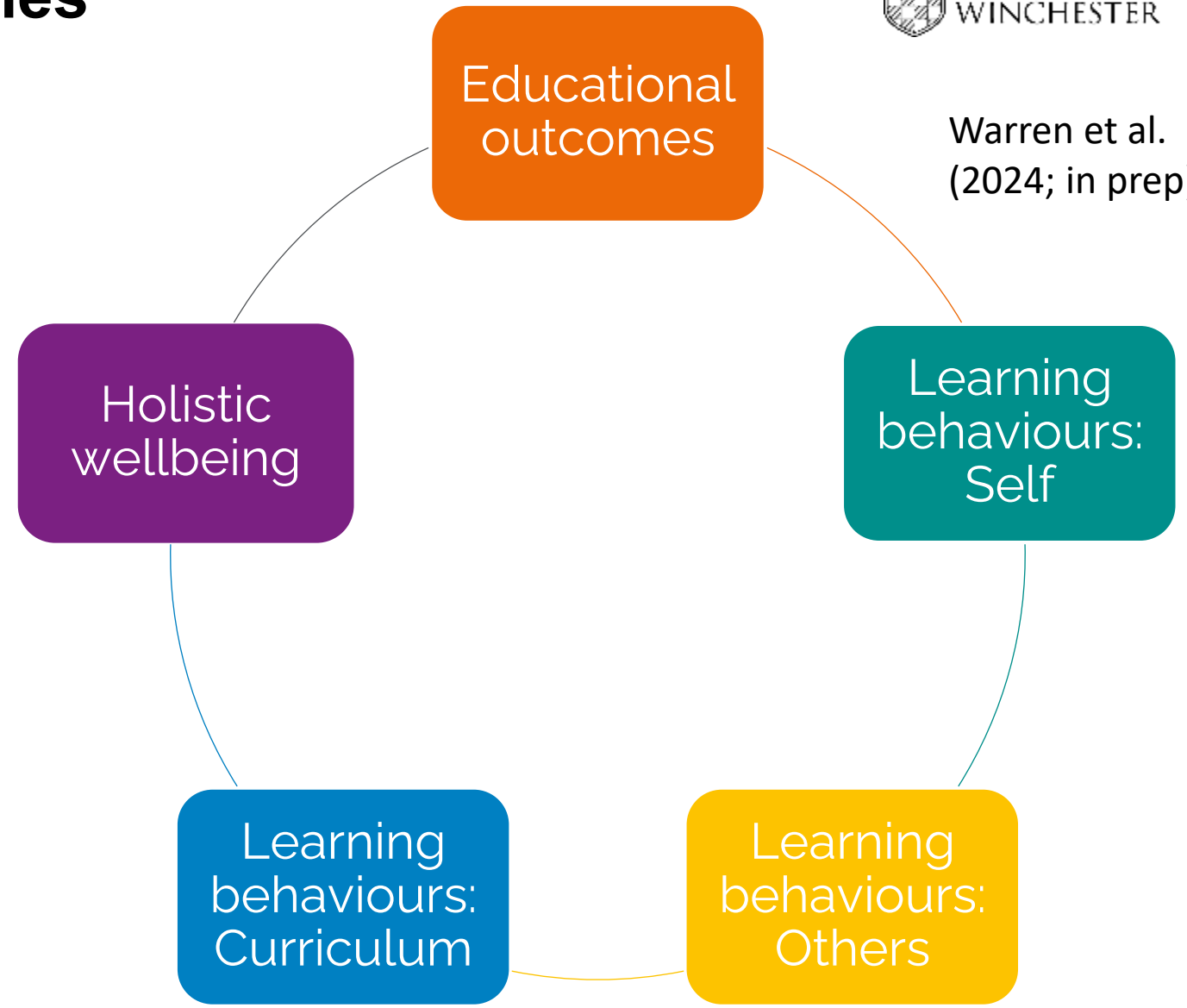
Educational Outcomes - deeper learning & attainment, greater diversity of ideas, able to show learning in different ways.

Holistic wellbeing - positive changes in pupils' wider personal development, general wellbeing, & overall happiness.

Learning behaviours: curriculum - positive impact on pupils' strategies, processes, and learning dispositions.

Learning behaviours: others - positive influence on the way pupils work with others in their learning environment.

Learning behaviours: self - positive impact on how pupils see themselves as learners, having more confidence, resilience, and ownership of their learning, and higher levels of engagement and enjoyment.



Warren et al. (2024; in prep)

Understanding SEND Impact: In the Words of Project Teachers

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Final Thoughts

Turning Creativity Research into Education Practice

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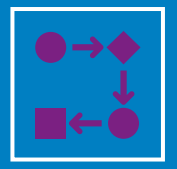
Our teachers found guiding principles, a co-created framework, and supported, reflective practice opportunities empowered their development of teaching for creativity



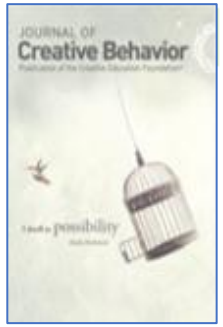
Changes to practice that are co-created and integrated with the local context are more likely to take root, grow and flourish

Change needs to be systemic and multi-level

Turning Creativity Research into Education Practice

UNIVERSITY OF WINCHESTER

The Journal of Creative Behavior



BRIEF REPORT OPEN ACCESS

A Creativity Navigator to Guide Teaching for Creativity: Implementation and Teacher Impacts in a Creativity Collaborative of Schools

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TEACHING FOR CREATIVITY

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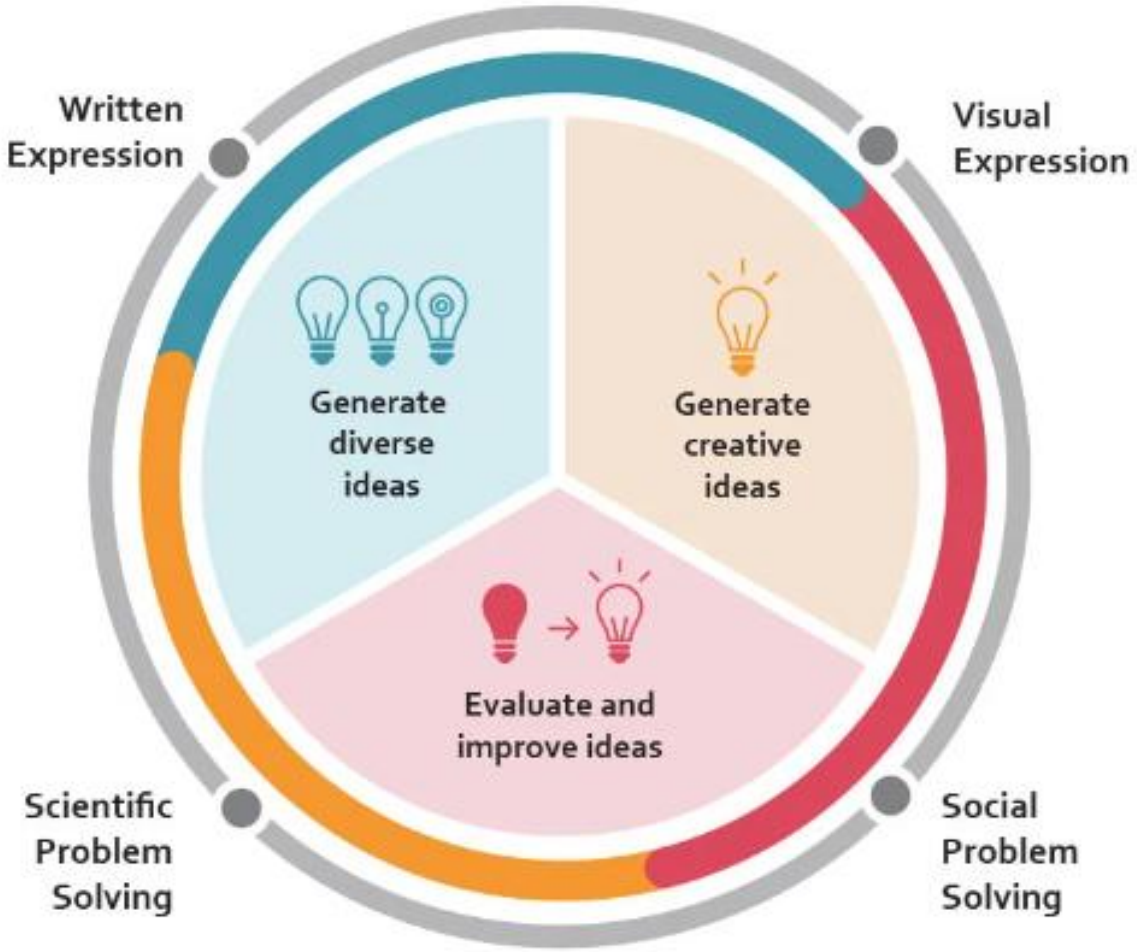
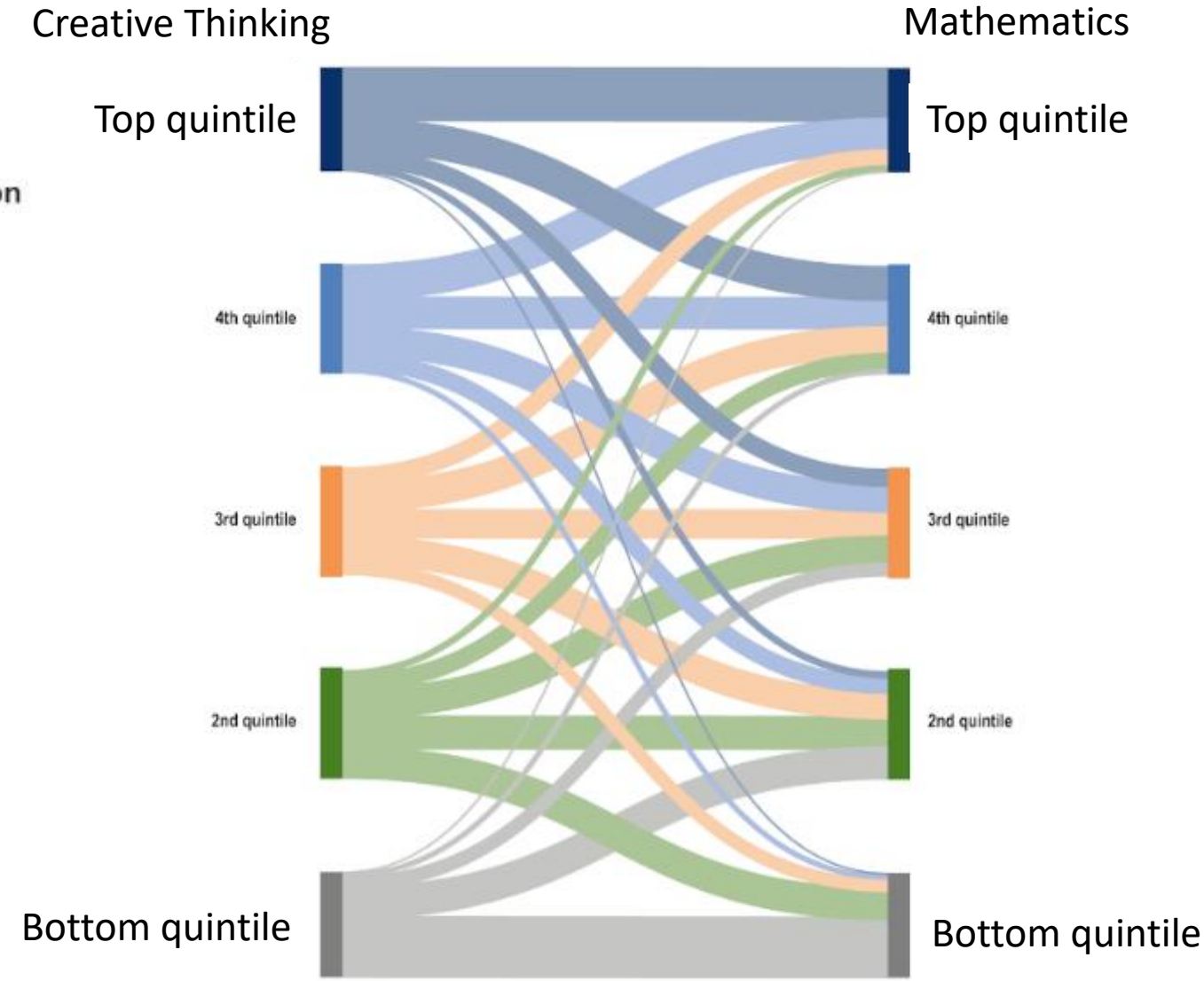
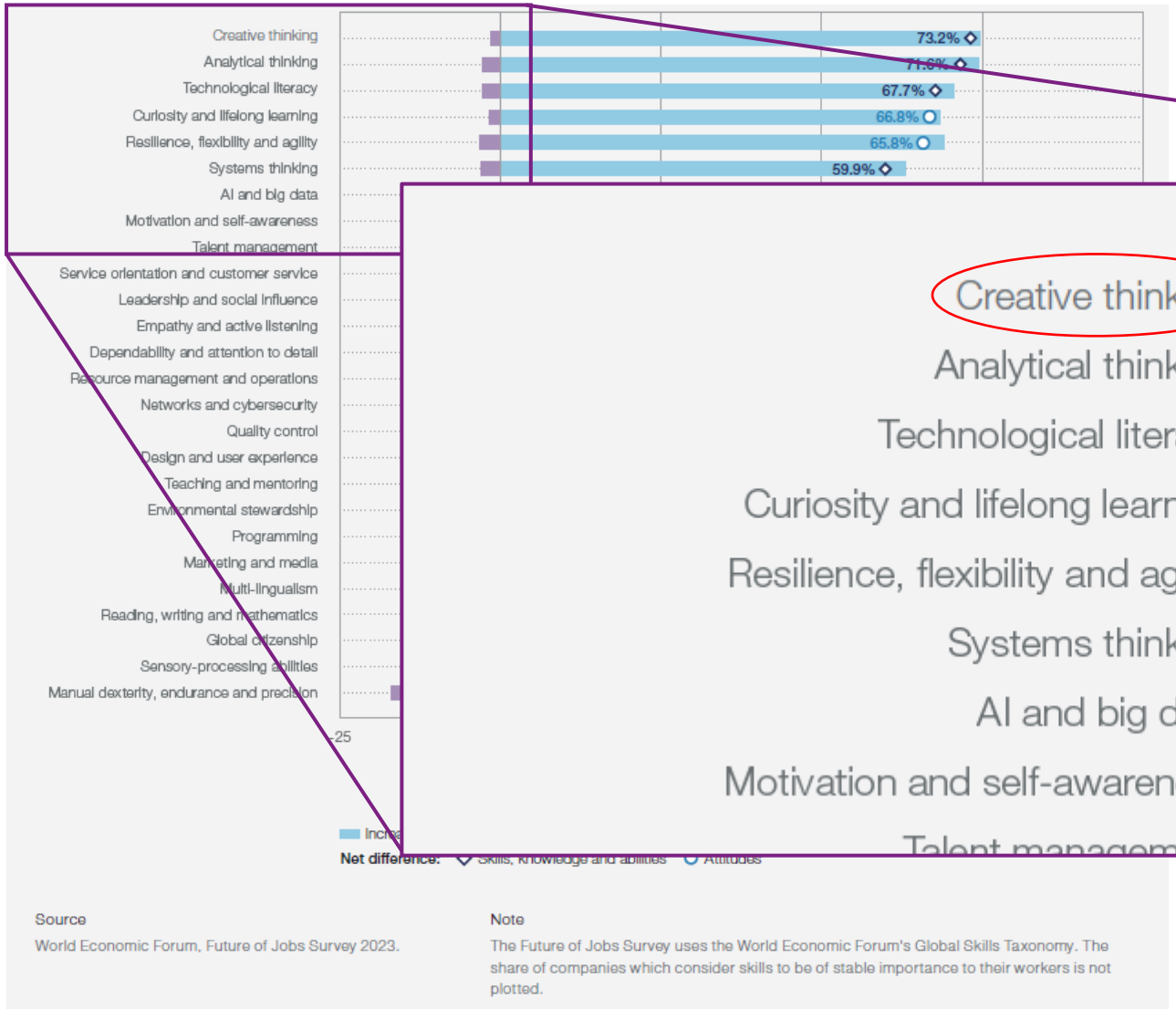
Spare slides for Q&A

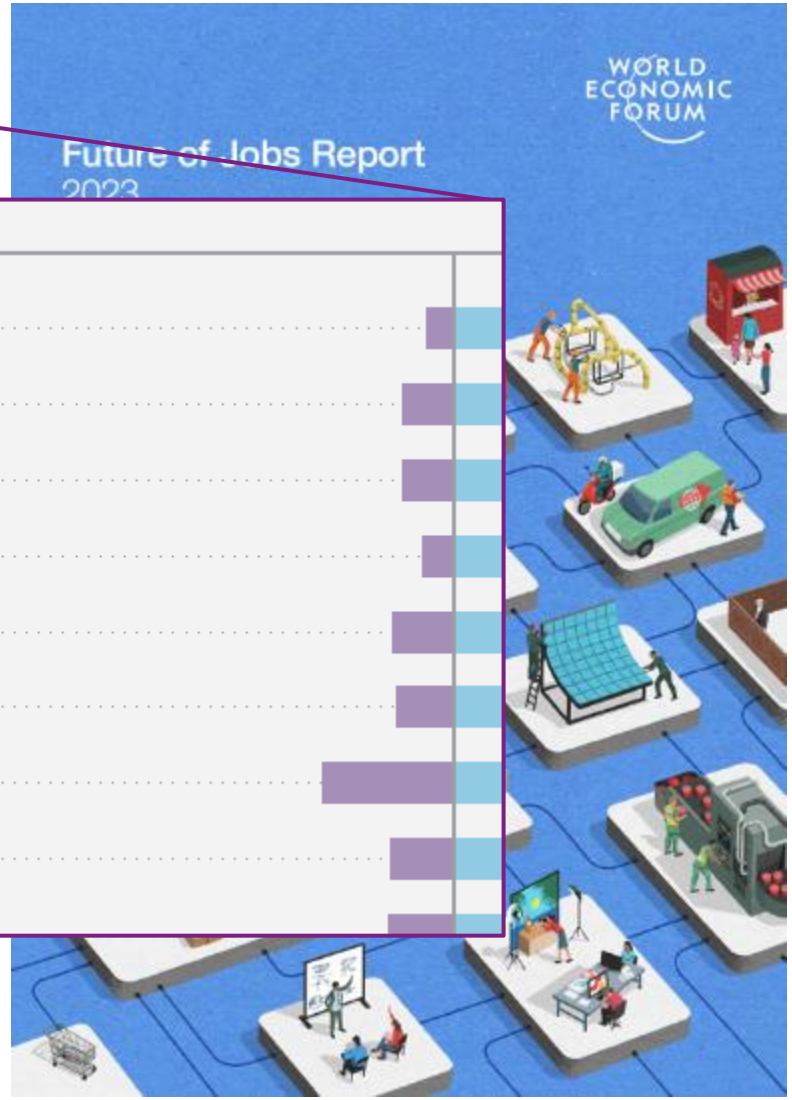
OECD PISA 2022 Creative Thinking





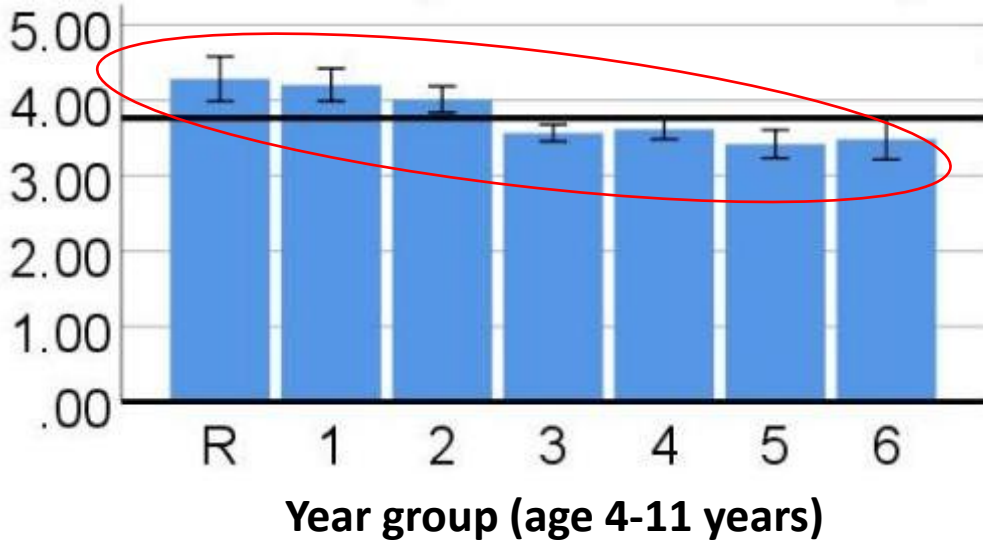
2. Creative Thinking is in Demand from Employers





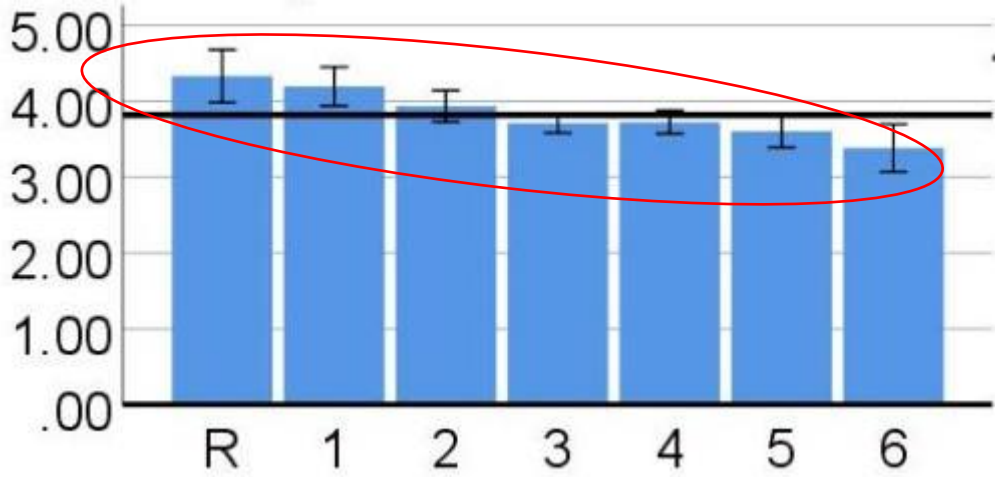
Wellbeing & School Satisfaction Decline

Wellbeing



Year group (age 4-11 years)

School Satisfaction



Year group (age 4-11 years)

Data from Sowden et al. (2023) - 12 primary schools Approx. 1,500 pupils

Example statements

- **Wellbeing** (Liddle & Carter, 2015) – "I think there are many things I can be proud of."
- **School Satisfaction** (Huebner, 2001) – "I look forward to going to school."

- See also - McGorry, Patrick D et al. (2024). The Lancet Psychiatry Commission on youth mental health. *The Lancet Psychiatry*, *11*, 731 - 774

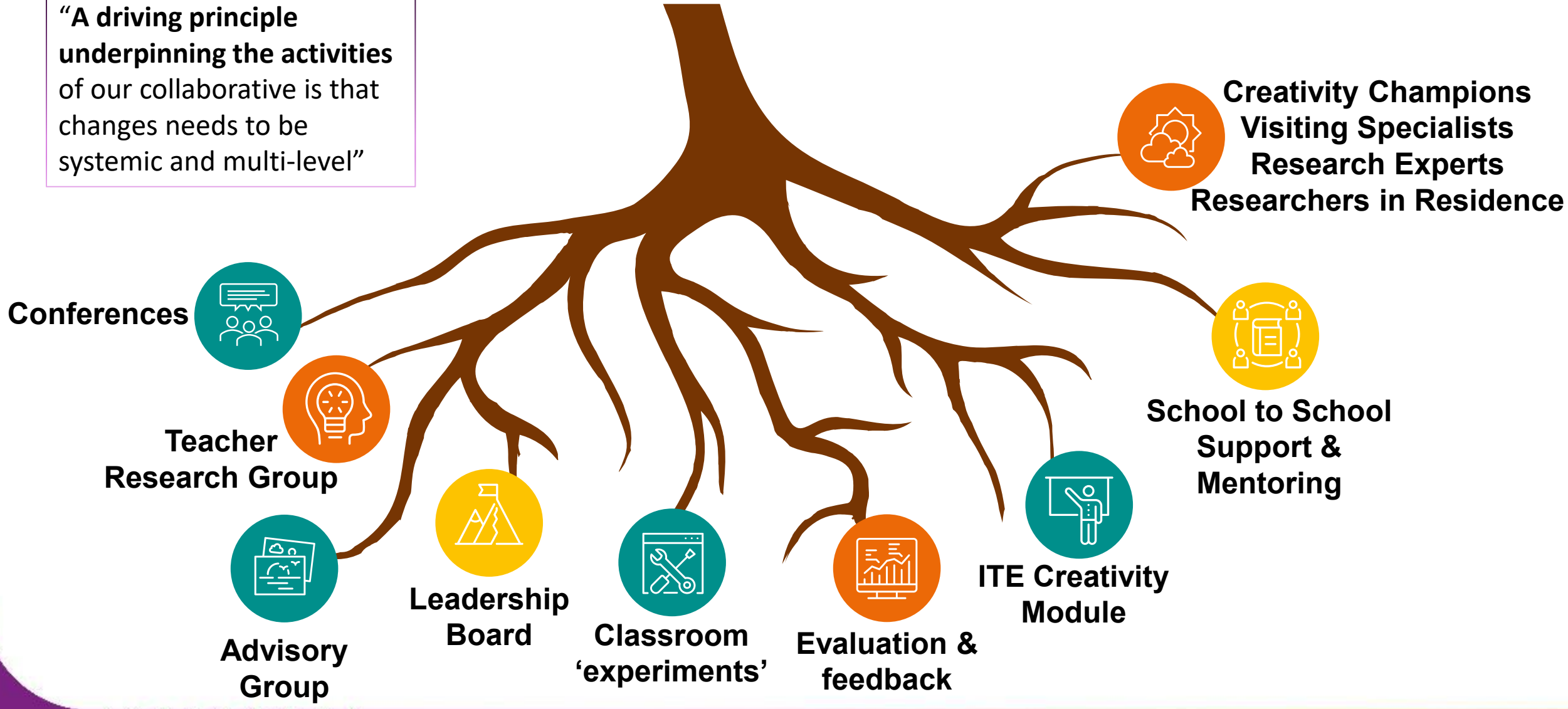
Number of Participants

(after data cleaning)

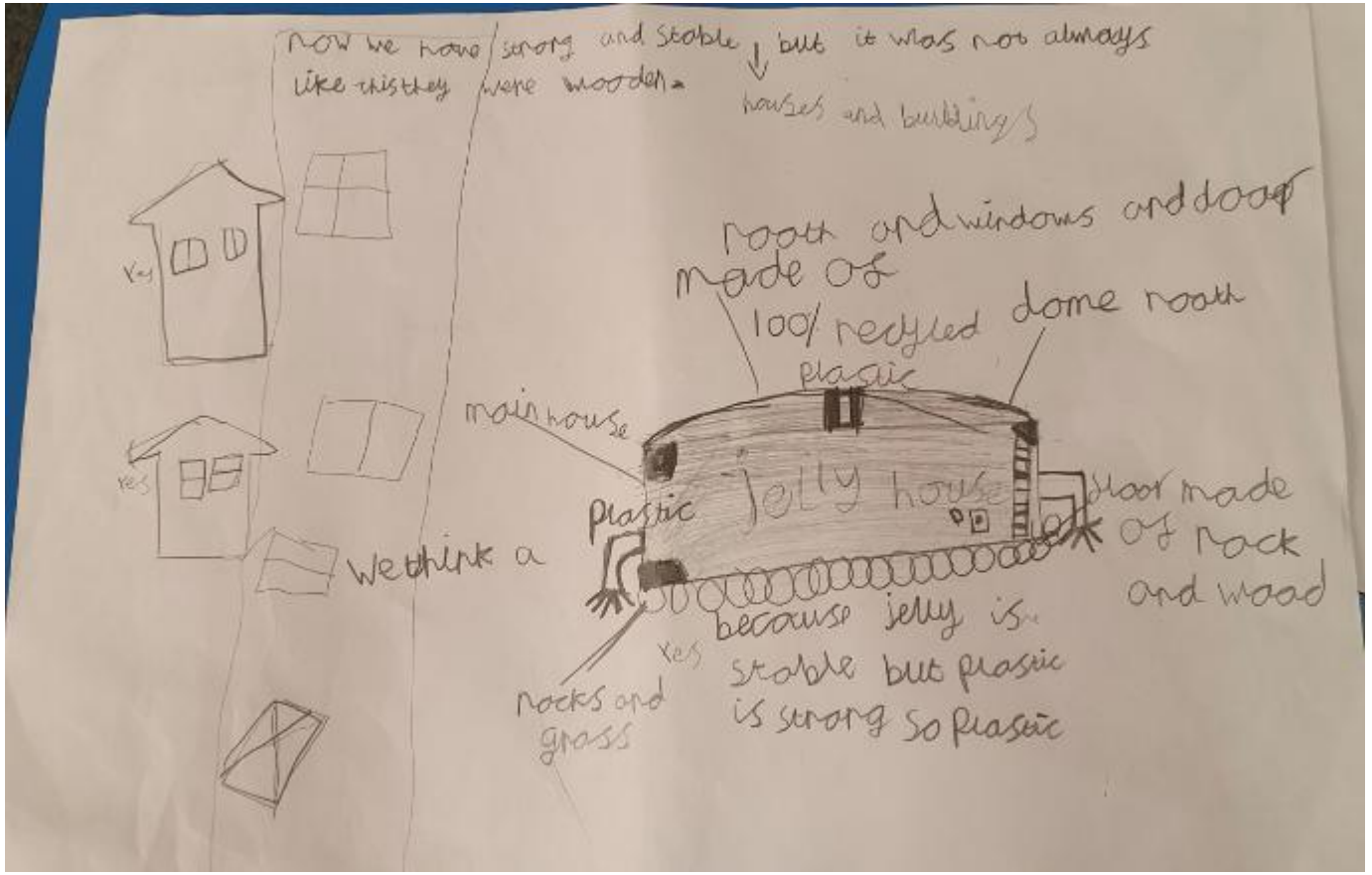
	Key Stage 1 Pupils (age 4-7)	Key Stage 2 Pupil (age 7-11)	Teachers	Leaders
Surveys 2022	442	1040	71	
Surveys 2023	425	1280	100	
Surveys 2024	488	848	37	
Interviews			24 (baseline) + 11 (mid-point) + 15 (exit)	8 (end Yr. 1) + 7 (exit)
Focus Groups (*n* = 3 to 5 per group)	24 (baseline) + 11 (mid-point) + 14 (exit)			
End of Unit Interviews	78		44	

Collaborative Structures and Roles – the 'inputs'

"**A driving principle underpinning the activities** of our collaborative is that changes needs to be systemic and multi-level"

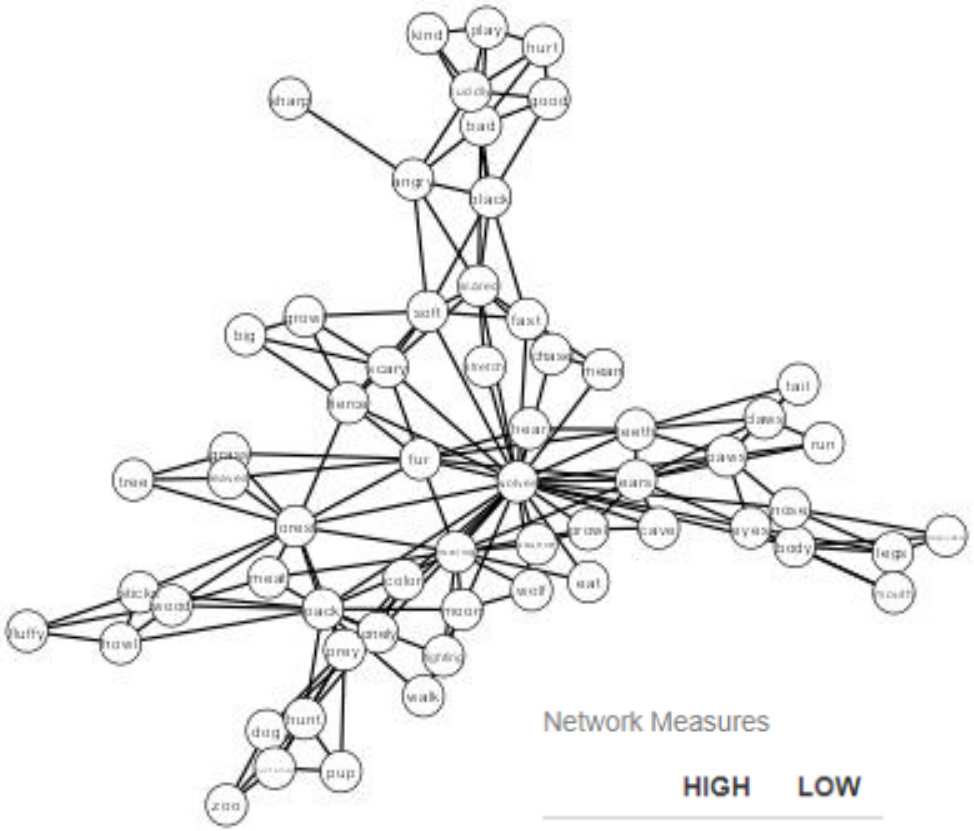


Associative thinking: earthquakes and jelly houses, a year 3 example

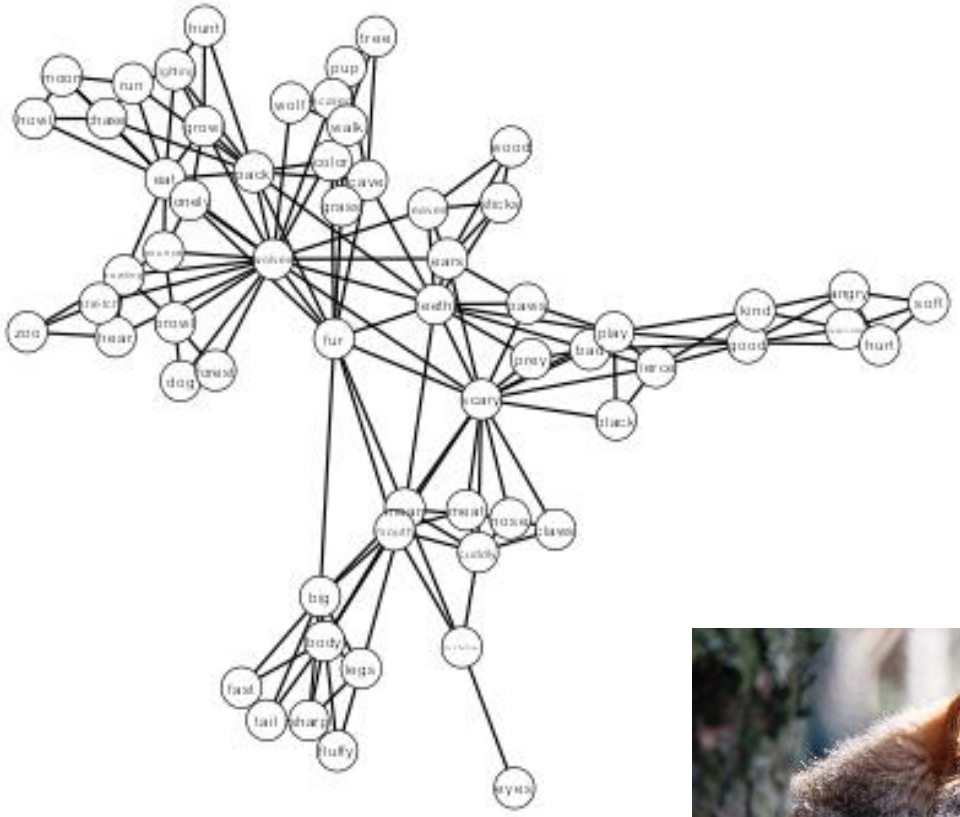


Median split: creativity score

HIGH



LOW



Network Measures

	HIGH	LOW
ASPL	2.87	3.06
CC	0.71	0.71
Q	0.55	0.60