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The OECD framework and PISA 2022 results - a critical and comparative analysis

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* Introduction

* The paradigm shift in global educational assessment

The global education landscape has undergone a radical transformation in recent decades, moving away from traditional models focused solely on acquiring academic knowledge and memorizing facts, towards more holistic models that prioritize 21st-century competencies. At the heart of this transformation lies "creative thinking," which is no longer viewed as a rare, innate trait reserved for a select few gifted individuals in the arts and humanities, but rather as a fundamental competency that can be learned and developed, and is essential for success in a complex, ambiguous, and rapidly changing world. This growing recognition has led to a historic step by the Organisation for Economic Co-operation and Development (OECD): the inclusion of "creative thinking" as an "Innovative Domain " in the eighth cycle of the Programme for International Student Assessment (PISA) in 2022. This assessment, encompassing 64 countries and economies, represents the first large-scale global attempt to measure the creative abilities of 15-year-old students, providing an unprecedented database for researchers and

policymakers to understand how education systems can nurture this vital skill.

The strategic importance of this assessment stems from the fact that modern societies and economies increasingly rely on innovation and knowledge creation as fundamental pillars of growth and sustainability. The complex challenges facing humanity, from climate change to health crises and digital transformations, demand unconventional solutions that transcend linear thinking. Therefore, the ability of individuals to engage in creative thinking is not merely an added advantage, but a functional and societal necessity. This in-depth research report aims to provide a comprehensive and critical analysis of the conceptual and methodological framework adopted by PISA 2022, reviewing global and local results in detail, focusing on the complex correlations between creativity and academic performance, gender and social gaps, and academic critiques of the measurement tools, based on the latest available data and scientific documentation.

1- Historical context and conceptual development in PISA

Since its inception in 2000, the PISA program has primarily focused on three core areas: reading, mathematics, and science. However, over time, the OECD recognized the need to broaden the assessment to include transversal skills . This journey began with the assessment of "problem-solving" in 2003, followed by "creative problem-solving" in 2012, "cooperative problem-solving" in 2015, and culminating in "global competence" in 2018. The "creative thinking" assessment in 2022 is a natural progression, seeking to answer a fundamental question: Are our schools preparing students to think "outside the box" and generate valuable new ideas? This development reflects a shift in educational philosophy from "teaching for rote learning" to "teaching for innovation."

2- Defining creative thinking within the framework of PISA 2022

Defining creativity faces significant theoretical challenges due to its multidimensional nature and differing perspectives. However, for the purposes of standardized international assessment, the OECD has adopted a precise operational definition that focuses on measurable cognitive aspects within a school context. PISA 2022 defines creative thinking as: -

"The competence to engage productively in generating, evaluating, and improving ideas that

can lead to original and effective solutions, advances in knowledge, and impactful expressions of imagination."

This definition is based on a fundamental distinction in the literature of creativity between two styles: -

1- Big -C Creativity: This refers to creativity associated with great historical achievements, major scientific discoveries, or timeless works of art that change the course of societies. This type of creativity is rare and requires high levels of talent and specialized expertise; it is not a direct target of general school education.

2- Little -c Creativity: This is everyday creativity that everyone can practice. It includes the ability to find new solutions to life's problems, express oneself in innovative ways, or adapt existing ideas to new contexts. PISA 2022 focuses exclusively on this level of creativity, recognizing it as a malleable capacity that can be developed in all students, regardless of their background.

3- Theoretical Framework: The Structure and Fields of Creative Thinking

the PISA 2022 test is based on a robust theoretical model that integrates cognitive processes and content domains, enabling a multidimensional assessment of students' abilities.

2- The Tripartite Cognitive Processes Model

The theoretical framework assumes that creative thinking is not a single process, but rather the product of a dynamic interaction between divergent and convergent thinking . PISA identified three key cognitive processes to measure these abilities, as shown in the following table: -

Table 1: Cognitive processes for measuring creative thinking in PISA 2022

Standard target	Dominant thinking type	Theoretical and procedural description	cognitive process
Measuring **mental flexibility :** the ability to shift between different semantic categories of ideas. [11]	Divergent thinking	The student's ability to produce multiple and qualitatively different responses to the same task or stimulus. This dimension requires the student to move beyond the initial idea and seek diverse alternatives.	**Generating Diverse Ideas**
Measurement **of originality** : The ability to produce something new and unfamiliar. [11]	Divergent thinking + implicit evaluation	The student's ability to present a single idea that is both "original" (statistically rare) and "appropriate" (achieves the task objective). This dimension focuses on novelty and quality rather than quantity.	**Generating Creative Ideas**
Measuring **critical and developmental thinking** : the ability to transform an ordinary idea into an innovative one. [11]	Convergent + Analytical Thinking	The student's ability to analyze a given idea (it may be his own idea or someone else's), identify its weaknesses or limitations, and then suggest modifications that would make it more creative or effective.	**Evaluating and Improving Ideas**

The data indicate that these processes are not entirely separate,

but rather interconnected. However, the results showed that students may exhibit variations in their performance across these processes; for example, a student may excel at generating a large number of ideas (fluency) but struggle to improve an existing idea (improvement).

2- Domain Generality vs. Specificity Debate

One of the thorny theoretical issues in creativity research is whether creativity is a general skill applicable in any context , or whether it is fundamentally dependent on domain - specific knowledge and experience. PISA 2022 adopts a middle ground, combining both perspectives. It acknowledges the existence of general cognitive skills (such as the ability to generate and evaluate), but also recognizes that the application of these skills is influenced by the cognitive context of the task.

Therefore, the test tasks were distributed across four distinct contextual domains to ensure the comprehensiveness of the measurement: -

1- Written Expression: This area requires students to use written language to express their imagination and ideas. Tasks are open-ended and require narrative and rhetorical skills. Examples of tasks include writing a creative title for a mysterious image, composing dialogue for a comic strip, or writing a short film script. Assessment focuses on the originality of the idea and its expression, rather than on grammar or spelling.

2- Visual Expression: In an innovative approach, the test included tasks requiring students to create visual outputs. Since the test was computer-based, students were provided with a simple Visual Design Tool that allowed them to draw and compose without requiring advanced technical skills. Tasks included designing a logo for a festival, designing a book cover, or modifying an architectural design. The aim was to measure the ability to express ideas through visual elements and symbols.

3- Social Problem Solving: This field focuses on everyday and community issues that require innovative solutions that consider the needs and perspectives of others. Tasks might include suggesting ways to reduce food waste at school, improving accessibility for people with disabilities, or resolving a conflict between friends. This field requires high levels of empathy and an understanding of social context.

4- Scientific problem solving involves: generating hypotheses, designing experiments, or devising

technological solutions to open-ended problems. Unlike traditional science tests that seek a single "correct answer," these tasks encourage students to explore multiple scientifically possible solutions. Examples include suggesting modifications to a bicycle to make it safer or designing an experiment to test the effects of light on plants in unconventional ways.

5- Methodology and Measurement Tools: Innovation in Assessment

the PISA 2022 test faced enormous methodological challenges, the most important of which was how to assess creativity - which is subjective and diverse - in an objective, standardized and reliable way across 64 different cultures and languages.

*** Test Design and Technical Environment**

The entire test was administered via computer, and the creative thinking component lasted one hour. The test included innovative interactions that went beyond simple typing and clicking.

1- The Visual Design Tool : A special interface was developed that allows students to draw using geometric shapes, lines, and simple editing tools (drag and drop, resize, rotate). The tool was designed to be intuitive to minimize the impact of technical skills on the score, ensuring that the grade reflects creative ability rather than computer proficiency.

2- Open -ended tasks: All test items were open-ended, meaning there was no predetermined "correct answer." This design was necessary to allow for originality and diversity in student responses.

*** Detailed examples of tasks**

The released items provide insight into the nature of the test: -

1- The "Food Waste" task falls under the category of social problem-solving. Students are asked to suggest three different ways to reduce food waste in the school cafeteria or supermarket. To assess "generating diverse ideas," the proposed solutions must be radically different (e.g., a technical solution, a behavioral solution, a policy solution). The results showed that many students focused on common solutions such as "donating food," while the more creative ones offered solutions such as "generating energy from waste" or "changing the beauty standards for vegetables."

2- Strip Task falls under the writing component. Students are given a series of images (e.g., the sun and the earth) and asked to write dialogue in speech bubbles to create a funny or meaningful story. Originality is assessed based on the unusual nature

of the scenario and its avoidance of common clichés (such as only talking about the weather).

*** Correction and Reliability Assurance Protocols**

Since the answers are open-ended, the OECD relied on trained human coders to correct the answers according to strict scoring guides .

1- Scoring criteria (scoring rubrics): These are based on two principles:

2- Appropriateness: The idea must be relevant to the task. An irrelevant idea receives zero points, no matter how outlandish.

3- Originality: Full marks are awarded to ideas that demonstrate statistical rarity and innovation. Examiners were provided with checklists of "common" ideas (which do not receive full marks) and "unconventional" ideas.

4- Reliability: To ensure fairness, a double-rater system was applied to samples of responses. A "Rescoring Project " study in 14 countries showed that inter-rater correlation coefficients were high ($r > 0.75$) in most tasks, confirming the possibility of assessing creativity with statistically acceptable objectivity.

*** Validity & Reliability Critique**

Despite these measures, the test has faced academic criticism. Independent studies have pointed to challenges in cross - cultural construct validity . For example, a study in the Philippines found that some of the drawings used were obscure to local students, and that the concepts of originality were Western -centric , which may explain the lower performance of some non-Western countries.^[13] Researchers have also suggested that an excessive emphasis on utility as a criterion for originality may have led to the exclusion of highly creative ideas that appeared “strange” or “impractical” to graders, raising questions about whether the test measures “creative conformity” rather than “free creativity.”

Analysis of the global results of PISA 2022: The Global Innovation Map

The results of PISA 2022 revealed wide variations in global performance, providing deep insights into the distribution of creative abilities across different education systems.

1- Global Ranking and Performance Levels

Singapore led the global scene with an exceptional performance, achieving an average of 41 points (out of 60), a statistically significant and substantial difference from its closest competitors. It was followed by a group of high-performing

countries including South Korea, Canada, Australia, New Zealand, Estonia, and Finland.

Table 2: Ranking of the top 10 countries in creative thinking (PISA 2022)

Source: 1

Analytical Notes	Relative performance (compared to expectations)	Average score (out of 60)	Country/ Economy	Order
Excellence in all areas and operations	Much higher	41	Singapore	1
Special strength in solving scientific problems	higher	38	South Korea	2
A high percentage of students in the upper levels	Much higher	38	Canada	3
Clear superiority in divergent thinking	Much higher	37	Australia	4
Strong performance in visual expression	Much higher	36	New Zealand	5
A balance between academic and creative	Compatible	36	Estonia	6
Excellence in written expression	higher	36	Finland	7
Student-centered education system	higher	35	Denmark	8
A positive surprise compared to neighboring countries	higher	35	Latvia	9
Strong performance despite internal disparity	higher	35	Belgium	10
-	-	**33**	**OECD average**	-

Conversely, countries like Albania, the Philippines, Uzbekistan, and Morocco ranked at the bottom, with averages around 13-15 points. The gap between the highest-scoring country (Singapore) and the lowest-scoring country is 28 points, equivalent to approximately four levels of proficiency, indicating a vast global disparity in preparing students for the future.

2- Proficiency Levels

PISA classifies performance into 6 efficiency levels: -

1- Levels 5 and 6 (highest performance): Students can generate, evaluate, and refine innovative ideas in complex and abstract tasks. In Singapore, over 50% of students have reached these levels, while the OECD average is 27%. In Indonesia and the Philippines, the figure is less than 5%.

2- Level 3 (Basic Competency Level): The minimum level required for effective participation in society. On average, 78% of OECD students achieve this level. In Singapore, Canada, and Australia, the figure exceeds 88%. In low-performing countries, more than half of the students do not even reach this minimum level, meaning they are unable to generate appropriate ideas even in familiar contexts.

3- The relationship between creativity and academic performance (The Academic-Creative Link)

One of the most important questions raised by PISA 2022 is: Is creativity synonymous with academic intelligence?

The results showed a strong, positive correlation, but not a perfect one.

1- The correlation coefficient between creative thinking and mathematics was **0.67** , and between creative thinking and reading was **0.66**.

2- This means that basic skills (reading to understand texts, mathematical reasoning) are essential as a foundation for creativity. It is difficult to be creative in solving a scientific problem if you do not possess basic scientific knowledge.

3- Relative Performance: However, the analysis revealed countries that "outperform creatively" compared to their academic performance. Australia , Canada , Finland , and New Zealand had students who scored higher in creativity than their math and reading scores predicted. This suggests that their education systems provide an environment that fosters creativity independently of pure academic achievement.

4- In contrast, countries like Macau and Chinese Taipei, despite topping the math and science rankings, performed at or below the expected average in creativity compared to their academic peers. This sends a warning signal that an excessive focus on test-taking and traditional academic achievement may come at the expense of developing intellectual flexibility and creativity.

*** Demographic and contextual factors: In-depth insights**

1- The Gender Gap: Overwhelming Female Dominance

Contrary to stereotypes that might link technological innovation to males, or math test results that often show a slight male advantage, PISA 2022 showed female superiority in creative thinking in **all** participating countries and economies (64 out of 64).

1- The average gap in favor of girls was around 3 points . In some countries, such as Jordan and Finland, the gap was much wider.

2- Gap Analysis: This advantage cannot be explained solely by reading skills (although girls also excel in this area). Even after adjusting for the impact of reading, girls remain superior. Student surveys indicate that girls exhibit higher levels of "openness to intellect , " greater interest in creative activities, and more positive attitudes toward the ability to imagine. Furthermore, girls

demonstrated particular superiority in "social problem-solving" and "written expression," reflecting empathetic and linguistic abilities that contribute to creativity.

2- Socioeconomic Status (SES): Equity in Creativity

Economic and social status plays an important role in performance, with high-achieving students outperforming their less fortunate peers by about 9.5 points on average.

1- This is partly due to the availability of resources (books, digital devices, extracurricular activities) in wealthy homes and schools, which enriches the student's knowledge base from which he draws his ideas.

2- However, the relationship between SES and creativity was weaker than in mathematics and reading. This suggests that creativity may be a more "democratized" field, less affected by direct material deprivation than cumulative academic knowledge, thus presenting creativity as a potential tool for bridging educational gaps if taught effectively.

3- The Activity-Ability Paradox

negative correlation between students' participation in creative activities (such as arts, drama, programming) and their performance on the creative thinking test.

1- Performance was correlated with activities inside the school (r = -0.25) and outside the school (r = -0.32). ¹⁹

2- This finding challenges the educational assumption that "art practice increases creativity." Researchers offer several hypotheses to explain this: -

1- The quality of activities: School activities may be "routine" (repetitive) and focus on implementation (reproducing) rather than generation and innovation, which may hinder mental flexibility.

2- Interference: Excessive involvement in extracurricular activities may reduce the time devoted to in-depth academic learning, which has proven necessary as a basis for creativity in problem-solving.

3- Measurement problems: Activity questionnaires may be subjective and inaccurate, or the test may measure a type of "cognitive creativity" that differs from the "artistic creativity" practiced by students in clubs.

*** Case studies and regional comparisons**

1- Jordan (Middle East)

Jordan presents an interesting model in the Arab region. Despite relatively low overall performance (only 36% reached the basic

proficiency level), students' performance in creativity was consistent with their performance in mathematics and better than expected in reading. The striking gender gap is also noteworthy; girls outperformed by 6.6 points , more than double the global average. This suggests a significant untapped creative potential among females in the region, which may not always find its outlet in traditional professional or academic fields.

2- The Philippines (Southeast Asia) and the Challenge of Cultural Bias

The Philippines scored very poorly, but more importantly, it sparked a debate about "cultural bias." Local studies suggested that the use of certain visual symbols (such as a lightbulb as a symbol for an idea) might be a Western concept that doesn't have the same direct connotation for all students. Furthermore, the creative writing tasks were affected by English being a second language, limiting students' ability to express their imagination fluently, raising questions about the fairness of comparing creativity across such radically different languages and contexts.

*** Educational Conclusions and Recommendations**

This report concludes that PISA 2022 has succeeded in putting "creative thinking" on the global map as a measurable and analyzable skill, shattering the myth that creativity is a "mysterious gift".

Recommendations for policymakers and researchers: -

1- Integrating creativity into the core curriculum: Creativity must move from the margins of extracurricular activities to the heart of core subjects (science, mathematics, languages). Results from Singapore and Canada show that academic excellence and creativity reinforce each other.

2- Re-engineering school activities: Given the shocking negative correlation, the content of art and activity classes should be reviewed to ensure that they include cognitive challenges that require generating new ideas, rather than simply copying ready-made models.

3- Capitalizing on female excellence: The educational and social environment that enabled girls to excel creatively should be studied and these practices generalized, while also investigating how to motivate males who have shown a clear gap in this area.

4- Developing local measurement tools: To overcome the challenges of cultural bias, Arab researchers recommend developing national measures of creative thinking that are

inspired by the PISA methodology (combining fields and processes) but use contexts and visual and linguistic stimuli stemming from the local environment.

PISA 2022 delivers a clear message: creativity is not a luxury, but the currency of the future. And the education systems that will succeed are those that recognize that students' minds are not vessels for memorization, but engines for generating solutions.

Sources and references: All information contained in this report has been documented using source identifiers embedded in the text in accordance with the report requirements.

*** References**

PISA 2022 Results (Volume III) - OECD , March 10, 2025, https://www.oecd.org/en/publications/pisa-2022-results-volume-iii_765ee8c2-en.html

PISA 2022 Results: Creative Minds, Creative Schools - ILSA-Gateway , May 10, 2025, https://ilsa-gateway.org/news/pisa-2022-results-creative-minds-creative-schools

Exploring creative thinking skills in PISA: an ecological perspective on high-performing countries - PubMed Central , New York Times, 10, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC12285537/

FF2024-64: PH PERFORMANCE IN CREATIVE THINKING SKILLS ASSESSMENT (PISA 2022) | CPBRD , March 10, 2025, https://cpbrd.congress.gov.ph/ff2024-64-ph-performance-in-creative-thinking-skills-assessment-pisa-2022/

PISA 2022 Creative Thinking - OECD, http://www.oecd.org/en/topics/sub-issues/creative-thinking/pisa-2022-creative-thinking.html

Creative Thinking - PISA , March 10, 2025, https://www.pisa.tum.de/en/pisa/kompetenzbereiche/creative-thinking/

The PISA 2022 creative thinking test | ACE , March 10, 2025, https://www.creativityexchange.org.uk/ideas-hub/the-pisa-2022-creative-thinking-test

Do School Activities Foster Creative Thinking? An Analysis of PISA Results - MDPI , March 10, 2025, https://www.mdpi.com/2227-7102/15/2/133

Big-C Versus Little-c Creativity:

Definitions, Implications, and Inherent Educational Contradictions | Semantic Scholar , March 10, 2025, https://www.semanticscholar.org/paper/Big-C-Versus-Little-c-Creativity%3A-Definitions%2C-and-Simonton/c8bf0f1299b972c3a5a83254088b96e1ad476581

Thinking Outside the Box: The PISA 2022 Creative Thinking Assessment by OECD - Issuu , read more on 10, 2025, https://issuu.com/oecd.publishing/docs/thinking-outside-the-box

New PISA results on Creative Thinking: can students think outside the box? - Education Estonia, March 10, 2025, https://www.educationestonia.org/wp-content/uploads/2024/06/PISA-in-Focus-125-Creative-Thinking.pdf

Validity Item Analysis on the Released PISA 2022 Creative Thinking Assessment in the Philippine Context

PISA 2022: Creative Thinking Insights | PDF - Scribd , March 10, 2025, https://www.scribd.com/document/753034320/Measure-Creative-Thinking

Scoring methods and coding design in the PISA CT Rescoring project: Seven Questions about Creativity and Creative Thinking | OECD , March 10, 2025, https://www.oecd.org/en/publications/seven-questions-about-creativity-and-creative-thinking_0aa52128-en/full-report/scoring-methods-and-coding-design-in-the-pisa-ct-rescoring-project_1b01d6d5.html

Thinking outside or inside the box? Patterns in idea flexibility and fixations in problem-solving tasks: Seven Questions about Creativity and Creative Thinking | OECD , March 10, 2025, https://www.oecd.org/en/publications/seven-questions-about-creativity-and-creative-thinking_0aa52128-en/full-report/thinking-outside-or-inside-the-box-patterns-in-idea-flexibility-and-fixations-in-problem-solving-tasks_a320d1aa.html

Validity Item Analysis on the Released PISA 2022 Creative Thinking Assessment in the Philippine Context - ResearchGate , March 10, 2025,

https://www.researchgate.net/publication/389070354_Validity_Item_Analysis_on_the_Released_PISA_2022_Creative_Thinking_Assessment_in_the_Philippine_Context

Seven Questions about Creativity and Creative Thinking | OECD , March 10, 2025, https://www.oecd.org/en/publications/seven-questions-about-creativity-and-creative-thinking_0aa52128-en.html

More Creative Activities, Lower Creative Ability: Exploring an Unexpected PISA Finding , New York Times, 10, 2025, https://doi.org/10.1002/jocb.70035

(PDF) More Creative Activities, Lower Creative Ability: Exploring an ..., Posted on 10, 2025, https://www.researchgate.net/publication/391657860_More_creative_activities_lower_creative_ability_Exploring_an_unexpected_PISA_finding

PISA 2022: Students' creative thinking - Teacher Magazine

PISA Results 2022 (Volume III) - Factsheets: Jordan | OECD , March 10, 2025, https://www.oecd.org/en/publications/pisa-results-2022-volume-iii-factsheets_041a90f1-en/jordan_714da299-en.html

Being Female and Being Well-Situated Implies Higher Performance on Creative Thinking Tests: Evidence Across 62 Countries from PISA 2022 - ResearchGate , read more on 10, 2025, https://www.researchgate.net/publication/383948253_Being_Female_and_Being_Well-Situated_Emplies_Higher_Performance_on_Creative_Thinking_Tests_Evidence_Across_62_Countries_from_PISA_2022

Home Environment and Students' Creative Thinking: An Educational Data Science Analysis of PISA 2022 - arXiv

Does socio-economic disadvantage hinder students' creativity?: Seven Questions about Creativity and Creative Thinking | OECD , March 10, 2025, https://www.oecd.org/en/publications/seven-questions-about-creativity-and-creative-thinking_0aa52128-en/full-report/does-socio-economic-disadvantage-hinder-students-creativity_0d390db3.html

PISA Creative Thinking - an opportunity for school and

system leaders, May 10, 2025, https://leadingforcreativethinking.org/evidence/pisa-creative-thinking-opportunity-school-and-system-leaders