CREATIVE THINKING IN PORTUGUESE EDUCATION: LESSONS FROM PISA 2022

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Abstract:

This study analyzes Portugal's performance in the PISA 2022 assessment of creative thinking and discusses its implications for educational policies and practices. The objective is to understand the factors associated with the results achieved by Portuguese students and to reflect on the capacity of the educational system to promote this competence considered essential in the 21st century. Methodologically, this is a documentary and reflective study, based on the analysis of the results of PISA 2022, OECD reports, and recent scientific literature on creativity, creative thinking, and educational innovation. Guiding documents for Portuguese educational policies were also examined, namely the Profile of Students Leaving Compulsory Education.

The results show that Portugal is positioned among the countries with above-average OECD performance in creative thinking, although it does not present equally outstanding results in the traditional domains assessed by PISA. The data show particularly favorable attitudes of Portuguese students towards creativity and high levels of support for creativity in the classroom context. However, structural limitations of the educational system are identified, notably curricular rigidity, the predominance of memorization-centered practices, the weight of external evaluation, and insufficient teacher training for the development of creative methodologies.

The discussion suggests that the performance achieved could result not only from school factors, but also from cultural, family, and extracurricular influences. It is concluded that the effective promotion of creative thinking requires more consistent educational policies, focused on curricular flexibility, teacher training, and the adoption of innovative pedagogical methodologies. These measures take on particular relevance in a context marked by digital transformation and the increasing integration of artificial intelligence in teaching and learning processes.

Keywords: creative thinking, educational innovation, PISA 2022, skills, student performance

O PENSAMENTO CRIATIVO NA EDUCAÇÃO PORTUGUESA: LIÇÕES DO PISA 2022

Resumo: O presente estudo analisa o desempenho de Portugal na avaliação do pensamento criativo do PISA 2022 e discute as suas implicações para as políticas e práticas educativas. O objetivo consiste em compreender os fatores associados aos resultados alcançados pelos alunos portugueses e refletir sobre a capacidade do sistema educativo para promover esta competência considerada essencial no século XXI. Metodologicamente, trata-se de um estudo de natureza documental e reflexiva, baseado na análise dos resultados do PISA 2022, de relatórios da OCDE e de literatura científica recente sobre criatividade, pensamento criativo e inovação educativa. Foram igualmente examinados documentos orientadores das políticas educativas portuguesas, nomeadamente o *Perfil dos Alunos à Saída da Escolaridade Obrigatória*.

Os resultados mostram que Portugal se posiciona entre os países com desempenho acima da média da OCDE em pensamento criativo, apesar de não apresentar resultados igualmente destacados nos domínios tradicionais avaliados pelo PISA. Os dados evidenciam atitudes particularmente favoráveis dos estudantes portugueses em relação à criatividade e níveis elevados de apoio à criatividade em contexto de sala de aula. Contudo, identificam-se limitações estruturais do sistema educativo, designadamente a rigidez curricular, a predominância de práticas centradas na memorização, o peso da avaliação externa e a insuficiente formação docente para o desenvolvimento de metodologias criativas.

A discussão sugere que o desempenho alcançado poderá resultar não apenas de fatores escolares, mas também de influências culturais, familiares e extracurriculares. Conclui-se que a promoção efetiva do pensamento criativo exige políticas educativas mais consistentes, centradas na flexibilização curricular, na formação de professores e na adoção de metodologias pedagógicas inovadoras. Estas medidas assumem particular relevância num contexto marcado pela transformação digital e pela crescente integração da inteligência artificial nos processos de ensino e aprendizagem.

Palavras-chave: competências, desempenho dos alunos, inovação educativa, pensamento criativo, PISA 2022.

LA PENSÉE CRÉATIVE DANS L'ÉDUCATION PORTUGAISE : LES LEÇONS DE PISA 2022

Résumé: Cette étude analyse les performances du Portugal à l'évaluation PISA 2022 de la pensée créative et examine ses implications pour les politiques et pratiques éducatives. L'objectif est de comprendre les facteurs associés aux résultats obtenus par les élèves portugais et de s'interroger sur la capacité du système éducatif à promouvoir cette compétence considérée comme essentielle au XXIe siècle. Sur le plan méthodologique, il s'agit d'une étude documentaire et réflexive, fondée sur l'analyse des résultats de PISA 2022, des rapports de l'OCDE et de la littérature scientifique récente sur la créativité, la pensée créative et l'innovation pédagogique. Les documents d'orientation des politiques éducatives portugaises ont également été examinés, notamment le Profil des élèves quittant l'enseignement obligatoire.

Les résultats montrent que le Portugal se situe parmi les pays de l'OCDE affichant des performances supérieures à la moyenne en matière de pensée créative, même s'il n'obtient pas des résultats aussi brillants dans les domaines traditionnellement évalués par PISA. Les données révèlent des attitudes particulièrement favorables des élèves portugais envers la créativité et un fort soutien à celle-ci en classe. Toutefois, des limites structurelles du système éducatif sont mises en évidence, notamment la rigidité des programmes, la prédominance des pratiques axées sur la mémorisation, le poids de l'évaluation externe et l'insuffisance de la formation des enseignants au développement de méthodologies créatives.

L'analyse suggère que les performances obtenues pourraient résulter non seulement de facteurs scolaires, mais aussi d'influences culturelles, familiales et extrascolaires. Il en ressort que la promotion efficace de la pensée créative exige des politiques éducatives plus cohérentes, axées sur la flexibilité des programmes, la formation des enseignants et l'adoption de méthodologies pédagogiques innovantes. Ces mesures revêtent une importance particulière dans un contexte marqué par la transformation numérique et l'intégration croissante de l'intelligence artificielle dans les processus d'enseignement et d'apprentissage.

Mots-clés: compétences, innovation pédagogique, pensée créative, performance des élèves, PISA 2022.

EL PENSAMIENTO CREATIVO EN LA EDUCACIÓN PORTUGUESA: LECCIONES DE PISA 2022

Resumen: Este estudio analiza el desempeño de Portugal en la evaluación PISA 2022 de pensamiento creativo y examina sus implicaciones para las políticas y prácticas educativas. El objetivo es comprender los factores asociados a los resultados obtenidos por los estudiantes portugueses y reflexionar sobre la capacidad del sistema educativo para promover esta competencia, considerada esencial en el siglo XXI. Metodológicamente, se trata de un estudio documental y reflexivo, basado en el análisis de los resultados de PISA 2022, informes de la OCDE y literatura científica reciente sobre creatividad, pensamiento creativo e innovación educativa. También se examinaron documentos clave para las políticas educativas portuguesas, como el Perfil de los Alumnos que Finalizan la Educación Obligatoria.

Los resultados muestran que Portugal se sitúa entre los países con un desempeño superior a la media de la OCDE en pensamiento creativo, si bien no presenta resultados igualmente sobresalientes en los ámbitos tradicionales evaluados por PISA. Los datos revelan actitudes particularmente favorables de los estudiantes portugueses hacia la creatividad y un alto nivel de apoyo a la misma en el aula. Sin embargo, se identifican limitaciones estructurales del sistema educativo, en particular la rigidez curricular, el predominio de prácticas memorísticas, el peso de la evaluación externa y la insuficiente formación docente para el desarrollo de metodologías creativas.

El análisis sugiere que el rendimiento alcanzado podría deberse no solo a factores escolares, sino también a influencias culturales, familiares y extracurriculares. Se concluye que la promoción efectiva del pensamiento creativo requiere políticas educativas más coherentes, centradas en la flexibilidad curricular, la formación docente y la adopción de metodologías pedagógicas innovadoras. Estas medidas adquieren especial relevancia en un contexto marcado por la transformación digital y la creciente integración de la inteligencia artificial en los procesos de enseñanza y aprendizaje.

Palabras clave: habilidades, innovación educativa, pensamiento creativo, PISA 2022, rendimiento estudiantil.

Introduction

PISA 2022 (Program for International Student Assessment) evaluated creative thinking for the first time, recognizing it as a vital competence necessary for young individuals and adults to navigate and adapt to the complexities of contemporary society and the 21st-century labor market. Since 2012, PISA has focused on assessing key competencies relevant to this century, alongside the three traditional core subjects: Mathematics, Reading, and Science. In 2012, it included problem-solving; in 2015, collaborative problem-solving; and in 2018, global competencies. The 2022 assessment has now examined the creative thinking abilities of 15-year-olds across 64 countries and economies worldwide.

Creativity can manifest itself in numerous ways, but literature typically distinguishes between Big-C and Little-C (Csikszentmihalyi, 2013; Simonton, 2013). The little-c type of creativity represents the ability to solve minor everyday problems, stemming from our capacity for change. On the other hand, big-c creativity is quite different and rarer, occurring when someone creates something that significantly impacts people's lives. The PISA 2022 framework defines creative thinking as the ability to actively participate in generating, assessing, and refining ideas, which can lead to innovative and effective solutions, the creation of new knowledge, and significant expressions of creativity (OECD, 2024). This interpretation of creative thinking corresponds to the concept of little-c, which reflects the capabilities of 15-year-old students in everyday contexts, distinguishing it from creative thinking specific to fields such as the arts.

The main goal of this research is to analyze Portugal’s performance in the PISA 2022 assessment of creative thinking, seeking to understand the factors that may explain the results obtained and to discuss the implications of these results for educational policies and practices aimed at promoting creativity. Specific objectives are as follows: to characterise the performance of Portuguese pupils in creative thinking within the international context of PISA 2022, identifying their main strengths and weaknesses; to analyse the extent to which Portuguese curriculum guidelines and educational policies either foster or hinder the development of creative thinking in a school context; to identify implications and recommendations for promoting creativity in Portuguese education, with particular attention to teacher training, curriculum organisation and teaching methodologies.

The results for Portuguese students in PISA 2022 are positive, though the education system may not decisively foster creative-thinking skills.

Literature Review

a. Creativity and Critical Thinking

Creativity is considered an essential dimension for human evolution, existence, and economic and social development in general, and for learning in particular. Given the wide range of areas to which creativity can be applied, the definition of this concept is necessarily dynamic. However, despite the differences we may encounter, authors agree that creativity is based on the combination of two characteristics: originality and utility within a given context. An individual's creativity cannot be separated from the context in which it occurs, at the risk of losing a comprehensive understanding of the creative process, which is constituted within a broader social context (Oppert et al., 2023; Runco & Jaeger, 2012; Van der Zanden et al., 2020).

The skills associated with creativity are broad and essential for transforming ideas and perspectives. In this sense, creative thinking enables solutions to problems that require individuals to think outside the box and explore new ideas, perspectives, and approaches. Creative thinking consists of the ability to generate, evaluate, and refine ideas to produce original and effective solutions, advance knowledge, and create impactful expressions of imagination (OECD, 2023a). In an educational context, creative thinking is the process through which students use their imagination to generate ideas, raise questions, and formulate hypotheses; experiment with different options; and discuss their own ideas and those of their peers, as well as the final products and the processes themselves (Kampylis & Berki, 2014).

In a world characterized by rapid change, creative skills are essential for individuals to adapt and succeed (López et al., 2023). In a globalized, highly competitive, and technologically advanced world, creative thinking has become increasingly important (Alencar et al., 2016). According to the definition presented by the OECD, creative thinking is "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, 2022). Creative thinking refers not only to the ability to generate new ideas but also to solving problems

in an innovative and divergent way (Orbe et al., 2024). This is a skill that transcends disciplines and contexts, and is fundamental to innovation, as a practical application of the implementation of new or significantly improved ideas, products, services or processes that generate value for individuals, organisations or society and progress in today's society (OECD/Eurostat, 2018).

However, creative thinking is not always welcome in both school and professional environments, raising important questions about how to prepare the next generation, particularly Generation Z, to face future challenges. Rigid traditional teaching models are based on memorization and repetition, leaving little or no room for creative thinking (Vásquez, 2021). The same happens in a professional context, where creativity sometimes encounters obstacles and constraints, with negative effects on individual worker growth, productivity, flexibility, and adaptability, as well as on the innovative potential of organizations (Carrillo et al., 2019). However, it is clear that in both education and the professional world, the development of creative thinking offers advantages. The reasoning process associated with creativity develops other skills, namely metacognitive skills, problem-solving, academic and professional success, and social engagement (Barbot & Heuser, 2017; Gajda et al., 2017). This process can be taught, and it is extremely important to understand the degree of development of creative thinking among young people who will become the next generation of professionals, Generation Z.

b. Developing Creative Thinking in School Contexts

Creativity is not innate, but rather a skill that can be developed through programs, interventions, and training that apply specific methods, techniques, exercises, and strategies (Lucchiari et al., 2019; Nakano, 2011). Through this development, individuals improve characteristics inherent to creative thinking and behavior, such as fluency, flexibility, and creativity (Rodrigues & Chagas-Ferreira, 2023). In the classroom setting, it is not always easy to carry out this process. However, empirical studies have shown that the use of innovative methodologies can help students develop the ability to seek innovative solutions, critically analyze received information, cultivate curiosity, and construct knowledge (Alves-Oliveira et al., 2021). New methodologies and specific programs help stimulate creativity in the school environment and have proven effective

in developing creative thinking across various levels of education. Creative teaching, that is, dynamic, inspiring, and interactive, and necessarily student-centered, can enhance creative abilities so that creative potential is transformed into creative behavior (Tulasi & Rao, 2024). Programs designed to foster creative thinking in school settings use a variety of techniques, content, durations, and assessment methods to strengthen the skills that help students think flexibly, imaginatively, and independently. Particularly relevant are studies focused on elementary and middle school students. Gamification has been one of the methods used with positive results. The impact of introducing games into teaching, measured using instruments such as the Divergent Thinking Test and the Creative Tendency Scale, has been associated with improved student performance in fluency, flexibility, and originality in divergent and verbal thinking (Chen et al., 2020). In another study, the use of games was found to facilitate conscious learning, self-efficacy, and creative mastery (Yeh et al., 2019). Furthermore, game-based learning can enhance students' motivation, creativity, and confidence (Yeh et al., 2020). The introduction of creative pedagogy in teaching, specifically creative reading and writing activities, has been tested in various settings, yielding positive results in academic performance. Marcos et al. (2020) concluded that there is a positive correlation between creative thinking developed through these activities and academic performance. Dialogic reading based on illustrated books contributed to increased levels of linguistic divergence, graphic divergence, and linguistic convergence (Cheng et al., 2021). In a different context, results from a specific program designed to develop creative writing showed that the activities positively affected the creative skills of the participating group (Senel, 2019). Liao et al. (2018) concluded that an intervention centered on a new creative approach contributed not only to improved English language learning but also to greater creativity and motivation among students.

Activities related to the teaching and learning of mathematics have been incorporated as techniques in studies that report increased student creativity at the conclusion of interventions or programs (Astini et al., 2020; León et al., 2021; Sypayung et al., 2021). Another relevant study type is the STEAM methodology (Science, Technology, Engineering, Arts, and Mathematics). This methodology provides students with an environment in which to discuss and present solutions to specific problems, thereby

positively affecting students' creativity (Cheng et al., 2022; Ozkan & Topsakal, 2019; Tran et al., 2021;).

The adoption of new teaching methods, gamification, and STEAM are examples of methodologies that contribute to the development of students' creativity. The introduction of these and other innovative approaches requires greater flexibility in academic curricula and teacher training, as teachers continue to play an essential role in fostering a school environment conducive to creativity.

c. Educational Policies, Curriculum and Assessment

Among the main obstacles to the development of creative thinking in a school context are the excessive rigidity of the curriculum, the predominance of external and standardized assessment models, and the insufficient preparation of teachers to foster creativity. When curricula prioritize strict compliance with predefined content and targets, the scope for exploration, experimentation, and open-ended problem-solving tends to be reduced. Similarly, assessment systems centered on standardized answers and uniform criteria may encourage the reproduction of knowledge at the expense of originality and innovation. Furthermore, many teachers do not receive specific training that enables them to understand, stimulate, and assess creative skills consistently. As a result, creativity risks remaining a mere stated intention in educational discourse, without finding effective expression in everyday teaching practices. Among the countries that lead the PISA 2022 creativity ranking, we can find examples that show possible ways of fostering creativity in schools. This is the case in the Republic of Korea, where the flexibilization of curricula and the emphasis on teacher training focused on creativity have yielded very positive results. Similarly, the implementation of design thinking in Singapore aims to integrate innovation into the problem-solving process. In Canada and Finland, academic curricula are complemented by the integration of the visual and performing arts, including music, allowing students to explore various forms of expression and develop their creative abilities (Burakgazi & Reiss, 2025; Kim & Lee, 2022; Trisnawati et al., 2025).

d. Public Policy for Education – The Portuguese Context

In recent decades, the Portuguese education system has shown some capacity for innovation in digitization and the diversification of academic pathways and has made progress in school enrolment rates and teacher training. However, socioeconomic inequalities, high retention and dropout rates, regional asymmetry affecting students living outside major urban centers, the undervaluation of dual certification courses (vocational courses), and low parental involvement in school life are negative factors that compromise the progress reflected in the PISA results. Furthermore, shifting educational policies, influenced by constructivist thinking and the adoption of foreign models that prioritized skills over all else, did not contribute to an upward trend in teaching quality (Crato, 2024). More recently, a consensus seems to have emerged on the model to be followed, which may facilitate the implementation of new methods that combine innovation with knowledge acquisition tailored to different levels of education (Jesus & Azevedo, 2020). However, the education system in Portugal faces several challenges that may hinder the development of students' creative thinking. First and foremost, an excessive focus on memorization, a rigid curriculum, and standardized assessments are among the main obstacles.

Despite efforts to change the traditional teaching model, which is often focused on memorization, it persists, leading to an emphasis on memorization rather than on developing an in-depth understanding and practical application. Assessment criteria favor students' ability to reproduce memorized information rather than their ability to connect it, solve problems in innovative ways, or apply critical thinking. This approach discourages curiosity and the exploration of different perspectives, which are fundamental pillars of creativity. However, since 2017, creative thinking, alongside critical thinking, has been considered one of the pillars of students' profiles upon graduation from compulsory education. Competencies in creative thinking are defined as “involving generating and applying new ideas in specific contexts, approaching situations from different perspectives, identifying alternative solutions, and establishing new scenarios,” in line with the OECD’s definition (Martins et al., 2017). Nevertheless, the development of these competencies is constrained by the general characteristics of education in Portugal, namely the rigidity of the curriculum, content overload, and entrenched professional and organizational cultures (Martins et al., 2025). These factors limit teachers' ability to implement greater curricular flexibility and explore

interdisciplinary projects. Teachers are focused on completing the already extensive programs within the defined planning, which limits the possibility of implementing more dynamic classes, such as debates or other activities that stimulate imagination and creativity (OECD, 2024).

In addition to these characteristics, the Portuguese education system has an assessment system that places significant weight on national exams, both for completing the school cycle and for accessing higher education, which creates a culture of teaching "for the exam." This model promotes standardized answers and discourages originality; as a result, creativity can be devalued as subjective and difficult to quantify or grade.

Finally, the lack of teacher training in creative methodologies is a clear obstacle. Although there is growing global awareness of the importance of creativity, many teachers have not received adequate training in teaching methodologies that stimulate it. The lack of institutional support or knowledge of how to incorporate creative thinking into everyday classroom activities, such as project-based learning or design thinking, hinders the implementation of innovative, creativity-stimulating approaches (Pereira, 2024).

All of these obstacles arise within an educational context shaped by socioeconomic inequalities. The influence of this factor was evident across all PISA 2022 indicators, with positive correlations between socioeconomic conditions and student performance. In Portugal, as in the OECD as a whole, students from more advantaged backgrounds consistently scored higher than students from families with lower socioeconomic and cultural status in mathematics, science, and reading (Duarte et al., 2023). Overcoming these obstacles requires systemic change, involving not only a review of curricula and assessment systems but also ongoing investment in teacher training and in creating a school environment that facilitates experimentation, collaboration, and originality. Portuguese educational policies still appear to provide limited and uneven support for the systematic promotion of creativity in schools. Two significant shortcomings have been identified. Firstly, there is limited space for creative teaching in the curriculum. This can be fostered by taking advantage of opportunities arising from formative work in existing subjects, such as Mathematics, Philosophy, Biology, and Literature. There is no benefit in adding new subjects to existing ones, as this would further overload already heavy school time schedules. Secondly, to bring creativity into the classroom,

teachers need specific training. With proper training, they may be able to systematically incorporate humor, games, teamwork, and creative reading, among other elements, into their classroom strategy. By teaching more literature or more mathematics in a prescriptive, repetitive manner, reducing free time, and reinforcing the content of young people's workloads, we are not better preparing them for the skills required in the 21st century. With the rise of artificial intelligence (AI), machines can now perform these tasks quickly and efficiently, freeing students from time-consuming, repetitive, and routine tasks. AI is programmed to process data, find patterns, and optimize results using algorithms and logic, but it lacks creativity, an intrinsically human characteristic. Creativity is a complex process that involves divergent thinking and originality. It consists of breaking thinking patterns and taking calculated risks. This is why encouraging creativity in a school context offers a glimpse of what the future will be like in the third millennium (Morais & Miranda, 2021). The existing school education policy in Portugal overemphasizes school rankings and the final results of the so-called noble subjects on national exams, which, by definition, are uniform and standardized. When certificated assessment becomes the objective by which school-based training is defined, creativity is excluded.

Methodology

This study adopts a qualitative approach that is documental, analytical, and reflexive, focusing on the interpretation of the PISA 2022 results regarding creative thinking and their relationship to the Portuguese educational context. The objective is to understand the significance of Portugal’s performance and to discuss the implications of these results for national educational policies and practices. The main sources of documentation analyzed included the OECD’s international reports on PISA 2022, particularly the documents dedicated to the assessment of creative thinking, as well as the Portuguese National Report. We also considered Portuguese education policy guidelines, specifically the Profile of Students by the End of Compulsory Education, and recent scientific literature on creativity, creative thinking, pedagogical innovation, and curriculum development. Selected sources were chosen based on criteria of thematic relevance, updated content, scientific recognition, and alignment with the study’s objectives. Priority was given to institutional reference documents and studies

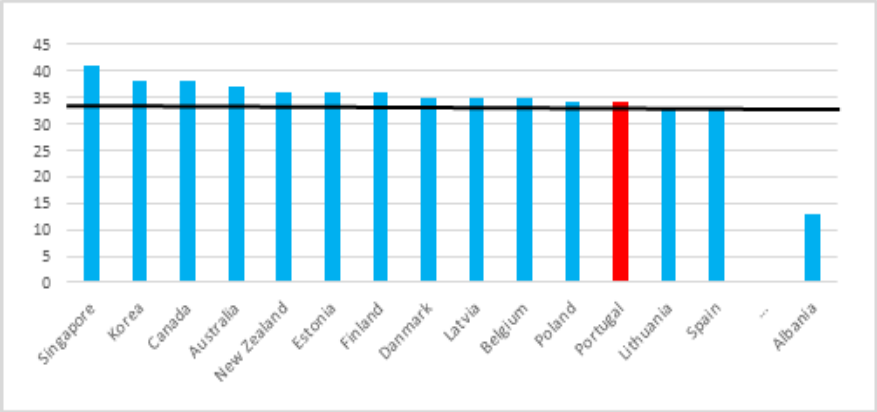
published in scientific journals that address the conceptualization of creative thinking, strategies for its development in an educational context, and factors associated with students' performance in this competence. Analysis was conducted in two complementary stages. In the first stage, a descriptive and interpretive analysis of the Portuguese results in the area of creative thinking was carried out, taking into account Portugal's standing in the international context, differences relative to other areas assessed by PISA, and indicators related to students' attitudes, school experiences, and sociodemographic characteristics. In a second phase, a critical and comparative analysis was conducted of Portuguese curriculum guidelines and educational policies in light of the specialized literature and international evidence on promoting creativity in education. It is important to acknowledge some limitations of this research. First, this study is based on secondary sources and does not involve direct data collection from students, teachers, or schools. Second, the analysis focuses predominantly on the results of PISA 2022, which limits the ability to assess the long-term evolution of creative thinking or to establish causal relationships between educational policies and student performance. Finally, the findings presented here should be viewed as contributions to educational reflection and debate; they are not intended to constitute an exhaustive evaluation of the Portuguese educational system.

Key results for Portugal and Discussion

Portuguese students' results were above the OECD average (33 points), with a performance of 34 points on a scale of 0 to 60. In the total sample of 64 countries, Singapore's score is the highest at 41 points, significantly higher than all others, and Albania's is the lowest at 13 points (Figure 1).

Figure 1

Performance in Creative Thinking



Note. Adapted from PISA 2022 Results (Volume III): Creative Minds, Creative Schools, by OECD, 2024

Three large groups of countries can be observed: 12 countries with a statistically significant score above the OECD average, including Portugal; 8 countries with a score not statistically different from the OECD average; and 44 countries with a score statistically below the OECD average. The 12 countries performing above the OECD average are, in descending order: Singapore, Korea, Canada, Australia, New Zealand, Estonia, Finland, Denmark, Latvia, Belgium, Poland, and Portugal.

In mathematical literacy, Portugal's score was in line with the OECD average (472), reflecting a 21-point drop from 2018. In reading, the score was 477, one point above the OECD average, but also indicative of a 15-point decline compared to previous tests. Finally, in scientific literacy, Portugal's results (484) were one point below the OECD average, i.e., 17 points below the 2018 result.

It was expected that countries with the best results in the core subjects (OECD, 2023a) would also have better results in creative thinking. Of the countries that scored above the OECD average in creative thinking, Portugal was the only one whose results did not differ significantly from the averages across the three main PISA domains.

The Portuguese are among a group of countries (Belgium, Denmark, Estonia, Korea, Latvia, Poland, and Singapore) whose students did not perform highly in creative thinking when compared to their performance in mathematics and reading (OECD, 2024). Portugal was the exception, exhibiting a lower correlation between core subjects

and creative thinking than the OECD average (OECD, 2024). Of the 12 countries that perform significantly above the OECD average in creative thinking, Portugal is the only country not above the OECD average in any of the other core domains assessed, except for Reading.

According to the PISA report, 83 percent of Portuguese students reached the basic level of creative thinking (78 percent in the OECD) and 29 percent reached a high level of proficiency (27 percent in the OECD), demonstrating the ability to create, evaluate, and improve original and diverse ideas for a range of different tasks set in more complex and abstract contexts. Portuguese students stood out for their results in visual expression tasks. However, despite a high overall score, they ranked among the weakest in the item related to generating creative ideas (OECD, 2024). In contrast, 9 out of 10 Portuguese students believe it is possible to be creative in any field and that creative thinking is not exclusive to the arts. In OECD countries, the average is around seven out of ten students. Furthermore, Portuguese students are the ones who find developing new ideas most personally satisfying.

A high percentage of Portuguese students have a very positive attitude towards teaching practices in the classroom: 71 percent believe that teachers give them enough time to develop creative solutions to tasks, 76 percent believe that they encourage them to provide original answers, and 80 percent believe that they value the creativity shown in the classroom.

The differences in gender and socio-economic status follow the OECD average pattern (OECD, 2023b). Girls consistently outperform boys in creative thinking (2 points higher in Portugal and 3 points higher in the OECD), and students from favored socio-economic backgrounds outperform those from disadvantaged backgrounds (a difference of 9 points in Portugal and 9.5 points in the OECD). As in the core domains of Mathematics, Reading, and Science, socio-economic status is a consistently strong indicator of creative thinking performance.

Portuguese students, along with those from Belgium, Denmark, Estonia, Korea, Latvia, and Singapore, combine high levels of average creative thinking ability with low variations in performance, meaning that more students from these countries achieve scores close to the national average, which is, in all cases, higher than the OECD average.

Despite their strong performance, Portuguese students exhibit significantly lower participation in creative activities at school than the OECD average. Less than 15 percent of students participate in art classes, creative writing, or debate clubs at least once. Only 10% of students participate in theatre clubs, music-related activities, science clubs, school newspapers, and other similar activities at least once a month. Despite the low level of participation in creative activities at school, creative thinking is one of the transversal competencies included in the *Students´ Profile by the End of Compulsory Schooling* (Martins et al., 2017). This document aims to establish a unified framework for all schools and educational programs in Portugal, within the realm of compulsory education, specifically regarding curriculum development, planning, implementation, and both internal and external evaluations of teaching and learning processes. The mention of a profile is not intended to promote uniformity; instead, it serves as a reference point.

Conclusion

In Portugal, creative thinking is included in the Profile of Students by the End of Compulsory Schooling, but its explicit curricular operationalisation and systematic integration into teacher training remain limited. Public education policies in Portugal need to be revised to foster creativity in the school environment. Even despite these challenges inherent in the education system's general characteristics, Portuguese students achieved positive results in the PISA 2022 assessment. This apparent paradox can be explained by the development of creative skills outside the school environment, which may be influenced by cultural, family, and extracurricular factors, and by the resilience of the educational system, or at least of some of its agents. According to PISA 2022 data, Portuguese students stand out for their critical thinking skills and ability to put situations into perspective, as well as for the support they receive from their families. These factors may therefore be fundamental in stimulating creativity and compensating for the shortcomings of the education system in this area. Despite the encouraging results in the context of creative thinking, a considerable distance remains to be covered. Learning from a new perspective will be imperative to navigate the complexities of the 21st century.

The selection of creativity as one of the skills assessed in PISA 2022 is significant. It suggests that creative thinking is becoming increasingly important and valuable in the education of young people. Creativity is expected to be among the most valued skills by employers and is projected to see a notable rise in demand over the next five years (Di Battista et al., 2023). One of the future challenges is the impact of AI on creative education. The challenges posed by the use of generative artificial intelligence warrant the attention of researchers, particularly to understand how it can free up time for creative activities, as well as the contributions that the complementarity between AI and human creativity can bring to the teaching-learning process.

Declaração da utilização de Inteligência Artificial Generativa (IAGen)

Statement on the Use of Generative Artificial Intelligence (GenAI)

Declaro que não foram utilizadas ferramentas de AIGen. Os autores são os únicos responsáveis pelo conteúdo dos seus manuscritos.

I declare that GenAI tools were not used. The authors are solely responsible for the content of their manuscripts.

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