Journal of Education and Educational Research
ISSN: 2957-9465 | Vol. 10, No. 1, 2024

Brief Description of the Performance of Tertiary Macau in the PISA 2022 Assessment

Wanying Zhong

Lyceum of the Philippines University-Batangas, Philippines

Abstract: This article focuses on the performance of the Macao Special Administrative Region in the Programme for International Student Assessment 2022 (PISA 2022) and examines its implications for education curriculum reform. The PISA programme provides an important reference for global education policy by assessing the reading, maths and science literacy of 15-year-old students. Macau's performance exceeds the OECD average in maths and science, but there is still room for improvement in reading. The strengths of the Macao education system were analysed, such as the sustained investment and achievements in the teaching of mathematics and the remarkable progress in science education. At the same time, the challenges of educational equity are pointed out, especially in terms of the impact of socio-economic status on students' performance. The impact of the COVID-19 epidemic on the education system has also prompted the need for the Macao education system to integrate digital technologies and innovative teaching methods more effectively. By comparing the education system with that of Singapore, the East Asian region and some European countries, this paper proposes strategies for Macao to enhance the quality of education and promote the all-round development of students. Recommendations include strengthening STEM education, enhancing teacher professional development, improving educational equity, and integrating technology and continuing education. The impact of PISA 2022 on Macau's education system is summarised and directions for future education reforms are proposed to ensure that Macau remains a leader in the global education arena and provides better educational opportunities and resources for students.

Keywords: PISA 2022; Macau PISA; STEM.

1. Introduction

When the latest results of the Program for International Student Assessment (PISA) were released, they aroused wide concern in the global education community. The multinational assessment not only measures 15-year-olds' academic performance in reading, math and science, but also casts light on deeper issues such as educational equity, teaching methods and student well-being. In this context, the performance of Macao, a special administrative region of China, in the PISA assessment not only reflects the current situation of regional education, but also invites a comprehensive review of the strengths and challenges of its education system.

Macao's education system is unique and complex, and its performance is influenced by a variety of factors such as the level of economic development, social structure and cultural values. As a former European colony, Macao has a unique historical background, and its educational practice incorporates multicultural and international perspectives, providing a valuable reference case for global education. In particular, Macao's efforts and achievements in narrowing the performance gap caused by socioeconomic status and promoting educational equity are instructive for the global education community. However, with the release of PISA 2022 results, the challenges of Macao education in achieving higher quality education opportunities have also emerged, especially in dealing with the impact of COVID-19 on the education system and how to effectively integrate global education standards into the local social-cultural context. In conducting an in-depth analysis of PISA scores in Macao and other countries and regions, we not only identified performance gaps in the Macao education system in the three core subject areas of mathematics, science and reading, but also observed several key areas of concern in educational practice. This includes how to cultivate students' innovation ability and problem-solving ability in the current educational environment, and how to strengthen the cultivation of students' social emotional skills to improve their quality of life and social adaptability.

In addition, PISA 2022 data highlights the importance of universal secondary education and how education gaps that exist between different regions and groups can be addressed through innovation in education policy and practice.

To sum up, PISA provides an important perspective and data support for the assessment of the global education system, especially for Macao, China. The latest results of PISA not only reveal the challenges facing the education field, but also provide a valuable reference for education reform and development. The education system of Macao needs to learn from the successful experience of countries and regions with excellent performance in PISA assessment and formulate effective improvement strategies for its own problems, so as to continuously improve the quality of education and achieve the goal of educational equity and all-round development of students.

2. Objectives of the Paper

1). Present the PISA 2023 results

Science, and reading

Encompassing an extensive array of cultural, economic, and educational contexts, PISA has evolved into a worldwide standard for evaluating the quality, fairness, and efficiency of education. Incorporating various countries and economies increases the comprehensiveness and depth of data gathered, fostering a more detailed and all-encompassing examination of worldwide educational patterns. PISA, leveraging a constantly expanding participant pool, underscores the global

education community's interdependency, underscoring common goals and hurdles nations encounter in equipping students for the demands of an evolving global environment. The 2022 PISA initiative observed alarming worldwide patterns, especially the steep decrease in math results. The Organization for Economic Cooperation and Development (OECD) report indicates that the mean mathematical score in OECD nations has experienced nearly 15 points decrease from 2018.The alteration holds notable importance given the steadiness of mathematical scores from 2003 to 2018.For instance, the mean score in mathematics for a single nation stood at 490 points in 2018, dropping to roughly 475 points by 2022, a seldom-seen decrease in historical records.

In member countries of the Organization for Economic Cooperation and Development, average reading scores have fallen by about 10 points since 2018. In some OECD countries, reading scores have also declined. For example, in a different Organization for Economic Cooperation and Development (OECD) country, the percentage of reading scores dropped from 503 in 2018 to 493 in 2022. At the same time, reading scores have declined to varying degrees in other OECD countries. This means that reading scores continued to decline from their peak in 2009 through 2012.

From 2018 to 2022, member countries of the Organization for Economic Cooperation and Development (OECD) maintained uniform average standards in science proficiency, indicating that students' mastery and application of science are stable across all fields. Taking a member country of the Organization for Economic Cooperation and Development as the study object, its scientific evaluation score is basically flat, roughly maintaining the level of 490 points, and there is no significant fluctuation since 2018.

Regarding equity, PISA2022 conducted a study on differences in educational outcomes based on socioeconomic status. The study found that while access to and quality of higher education has improved in most developing countries, there is still a large imbalance between different types of schools and within cities. Over the past decade, the average gap between OECD member countries has gradually widened, even as socio-economic inequalities persist across a wide range of countries, highlighting the urgency of action to mitigate inequalities in education. In the comparison between the United States and China, it is found that although there is no significant difference in the level of educational equity between the two countries, the United States' educational equity status is better than China's on the whole. Studies have shown that in some countries, the difference in math skills between students from low-income families and those from high-income groups can be more than 40 points.

Although there are still gender differences in math achievement in many countries, it is worth noting that the average preference for male students is gradually increasing across OECD countries.

In PISA2022, the idea of distance learning has become particularly critical, especially when dealing with learning difficulties caused by the pandemic. The report analyzes the major factors influencing online learning among U.S. college students and the impact these factors have on their participation in online courses or other educational activities. The report makes clear that there is a general lack of enthusiasm and challenge in the use of distance learning resources by many students, which highlights the urgent need to upgrade students' abilities in digital reading and independent learning.

The general ultimate goals for PISA2022 will be setting the guidelines within the world education systems in a manner that may lift and hence improve the academic performance, decline inequalities of educational resources, and finally, improve overall students' wellbeing. It further thus scopes its review and assessment towards the different actions that are taking place globally in the implementation of the educational reform. This deepening analysis of these data and their tendencies will provide better understanding in relation to the strategies of intervention that orient themselves to the improvement of the quality of education in the whole world, having as an objective that all the students learn in an ambiance of positiveness for learning and growth, having justice and well-being as a priority.

What Macao has got in the Programme for International Student Assessment (PISA) 2022 should not count as a phenomenal outcome but rather represent the result of firm status in international education. Through the analysis of these indicators, we can understand the efforts made by Macao in basic education and the future development direction. Macau's performance in the three core subjects of mathematics, reading and science has exceeded the OECD average, which is a testament to the robustness and effectiveness of its education system.

In the field of mathematics, Macau performs very well. In the 2022 Programme for International Student Assessment (PISA), Macau's mathematics score reached 552 points, an average increase of 15.7 points over the decade compared to 2012.

The notable expansion trend indicates the sustained investment and achievements of the Macao education system in mathematical teaching. Nonetheless, it's crucial to recognize a minor decrease in the latest semester relative to 2018 (-5.7), possibly indicating the rise of fresh challenges or alterations in policies lately.

Regarding the allocation of capabilities, there was a 4.2% rise in students exhibiting outstanding performance in Macao, contrasted by a 2.3% decrease in their underperforming counterparts. This indicates Macao's advancement in enhancing its students' total abilities in math and concurrently lessening the ratio of students achieving lower grades. Nonetheless, the impact of socioeconomic status (ESCS) on student outcomes is significant, with an increasing discrepancy in student performance.

(1) read

Macao attained 510 points on the PISA 2022 evaluation for reading skills, marking a 4.4 point rise from 2012.The extraordinary improvement in performance stands as evidence of Macao's advancements in enhancing students' understanding of writings. From 2018 through 2022, there was a 14.7-point drop in reading scores, highlighting Macao's struggle to adjust educational approaches in response to the evolving learning landscape and evolving demands.

(2)science

The PISA 2022 Science evaluation reveals that Macao students' exceptional academic output was numerically authenticated, achieving a score of 543. It strongly signifies Macao's outstanding accomplishments and considerable benefits in the science education area.24.2 Notable advancements have been made by Macao University's education system in enhancing students’ proficiency in science. The analysis reveals that Macao's strategic long-term planning in science education has yielded positive results, sustaining consistent enhancements in education quality

against obstacles.

The 2022 Programme for International Student Assessment (PISA) has concentrated worldwide studies on Macao's educational infrastructure. This examination offers an in-depth analysis, emphasizing Macao's exceptional performance in mathematics, science, and reading education, and delves into the comparison of its teaching approaches with those in Singapore, key East Asian areas, and various European educational institutions.

2). Macao and Singapore

Both Macao and Singapore excel in the field of mathematics, and Singapore is often out of reach in global mathematics rankings. Singapore has begun to implement the new standard of basic education curriculum reform in the middle school stage, and has achieved remarkable results. They are successful because of their strong commitment to problem solving and the application of knowledge, which accurately demonstrates the robustness of their educational structures. In a sense, Macau's success depends mainly on its schools. Singapore's high ranking in Macau is due to its innovative teaching methods and active use of technology in education, which form a core part of its educational goals.

From a young age, Singapore has been deeply commit to STEM education, focusing on fostering scientific innovation and exploration. Its cultural environment in these fields is notably more robust than that of Macao, potentially contributing to the disparity between them.

3). Comparing territories of Macao with East Asia

When contrasted with East Asian countries like South Korea, Taiwan, and Hong Kong, Macao emphasizes an notably high educational culture, with parents and the public holding very elevated expectations for its effectiveness. Macao's proficiency in reading competently rivals other regions, underscoring reading's critical role in the educational focuses of East Asia. Though Macao doesn't excel in a particular field compared to several East Asian neighboring countries, its equitable concentration on these areas in the Programme for International Student Assessment (PISA) might demonstrate a more cohesive educational approach.

Liu and Lin, in their study on teaching methods and scientific success, delved into regions like Macao and performed thorough research on educational tactics, examining the link between these methods and science success in the top 10 regions as ranked by the 2015 PISA, with a focus on how teaching techniques influence student performance. Concentrating on effective instances in Macao, Singapore, and Japan, this research underscores the crucial influence of varied teaching approaches in achieving elevated student outcomes. Studies confirm that combining teaching methods and engaging learning enhances research efficiency (Lau&Lam, 2017), providing significant benchmark for educators and policymakers to refine local science education. In 2009, SohKayCheng undertook an in-depth comparative analysis of student outcomes across seven cities in East Asia in the Program for International Student Assessment, particularly emphasizing the minor variations in educational achievements within these regions, notably Macao. This document delivers a thorough and analytical overview of Pisa's 2009 data on teenager ages 15 across seven East Asian cities, focusing on their performance and ranking in reading, mathematics, and science. The research by Soh uncovers the intricate pattern of educational rivalry in East Asia using a clustering method, underscoring the crucial influence of background factors in analyzing PISA scores. (Soh, 2012).

4). Macao along with nations in Europe

Macao distinguishes itself from other European nations like Finland and Estonia, known for their groundbreaking educational frameworks, by offering a distinct educational philosophy. The key to educational achievement in Finland and Estonia is frequently a child-focused teaching methodology, emphasizing on nurturing innovation, critical thinking skills, and the well-being of students. The success of Macao's learning framework indicates that integrating European academic strictness with a nurturing learning setting is essential for ensuring student success.

Vong and Wong's research delved into Macao's involvement in PISA and its wider impact on the educational landscape of Macao. named "Lost in Translation? The detailed analysis in the case of "Building a European Education Space in Asia" explores the impact of worldwide standards for the Programme for International Student Assessment on local educational strategies and procedures. This research explores the historical backdrop of Macao, formerly a European colony, and scrutinizes how Macao has been integrated into the PISA framework starting 2003.The writers contend that although Macao's involvement in PISA propels educational changes, it also highlights the challenge of adapting worldwide standards to local scales, suggesting the necessity for a reevaluation of the implementation and interpretation of these international standards within Macao's distinct socio-cultural environment.

3. Conclusion

Macao's educational triumph is diverse, originating from the Chinese government's post-handover support, the principles of an inclusive society, and a proactive curriculum focusing on academic success and nurturing diverse skills. This area's sustained dedication to educational financing leverages educational technology, uses stringent evaluation techniques to further develop instruction and learning, and promotes an environment that treats education as a means for both personal and societal progress. Macao, similar to other educational systems, confronts hurdles in bridging disparities and adjusting to the worldwide need for innovative and adaptable minds. Research indicates Macao may benefit from the instructional adaptability and focus on creative problem-solving in Singapore and other European nations, enhancing educational results.

Boosting the teaching of STEM (Science, technology, engineering, and Mathematics): Strategic investment in the area should focus on ensuring equipment optimality in the laboratories and integrating up-to-date scientific and technology tools in practical teaching. Besides, even curriculum content should be updated every year for continued developments of STEM.

Integrating technology into the education environment: Macau's education curriculum encourages the effective integration of digital resources and tools across disciplines to enhance interactive learning experiences for students. In the course of curriculum reform, the Macao SAR Government has begun to try to integrate information technology with other disciplines, such as the use of multimedia courseware or video to display various data information in the classroom of subjects such as geographic science and mathematics. Such integration needs to include not only the use of technology in instructional presentations, but also instructional software, digital media, and online LABS to enhance student engagement and actively promote experiential learning.

Implementation of technology in the means of education: The task of the education system is to bring an interest in studying among students and develop the skills to continue doing so outside the classroom of a school or university. A school should try to develop a student's interest in various ways. Complementary to teaching, best students are encouraged to make use of after-school science clubs, coding classes, and art workshops for developing their inquisitiveness and spirit of exploration.

Viewed together, the results of the Macao 2022 Programme for International Student Assessment (PISA) suggest more adaptability, comprehensiveness, and innovativeness towards the curriculum design and overall educational framework. The program puts higher demands on teachers and thereby sets the table for the same to take part in future teaching practices to garner the same. Doing so, an enhanced Macau education system would be how it reinforced their academic performance and made sure that students were more fully prepared to succeed in a setting that became much more challenging and interrelated.

Finally, educational policies and practices can be continuously monitored and improved through regular systematic evaluations and encouragement of educational innovation. Supporting pilot projects and partnering with EDtech companies will help explore new teaching methods and learning tools that promote overall innovation and progress in the education system.

In summary, by implementing the above recommendations, Macao will not only be able to further enhance the quality of its education system based on the 2022 Programme for International Student Assessment (PISA), but also ensure that its educational practices keep pace with the rapidly changing global environment, providing students with the skills and knowledge needed to meet the challenges and opportunities of the future.

References

[1] China Basic Education Quality Monitoring Collaboration Innovation Center. (n.d.). PISA2022 (China) pilot work completed successfully. Retrieved from https://cicabeq.bnu.edu.cn/syxw/xwdt/ddb8bd6dfb524762b89cd354d439820e.htm.

[2] People's Daily. (2022, September 10). China's education has achieved historic achievements (China this decade series of theme press releases). Retrieved from http://politics. people. com. cn/n1/2022/0910/c1001-32523651.html.

[3] The People's Republic of China Central People's Government. (2023, September). Xi Jinping: Solidly promote the construction of a strong education country. Retrieved from https://www.gov.cn/yaowen/liebiao/202309/content_6904156.htm.

[4] Ministry of Education of the People's Republic of China. (2019, December 4). PISA Experience: International Vision and Local Exploration. Retrieved from www.moe. gov.cn/jyb_ xwfb/moe_2082/zl_2019n/2019_zl94/201912/t20191204_410709.html.

[5] China Education Information Network. (2019, December 13). International Student Assessment Program. Retrieved from https://web.ict.edu.cn/world/w3/n20191213_64232.shtml.