Assessing Educational Progress: A Comparative Analysis of PISA Results (2018 vs. 2022) and HDI Correlation in the Philippines

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Abstract: The Philippines took part in PISA 2018 and 2022 conducted by OECD. Filipino students are still among the least proficient in the world in math, reading, and science. Its performance did not significantly improve from the assessment in 2018. Through statistical analysis design, the PISA score (2018 and 2022) was compared to all countries' PISA scores and correlated to HDI in the Philippines, with the use of T-test and Pearson r. Results showed that there is a notable variation in the Philippines' PISA score compared to all countries participating in PISA. In addition, there is a robustly positive correlation between the PISA score to the HDI in the Philippines.

Index Terms - **Human Development Index, OECD, Philippines, PISA**

INTRODUCTION

The foundation of the educational system is the advancement of society, and an assessment of it offers important information on how a country's intellectual capital is developing. Since education plays such an important role in our society, it seems sensible to argue that it should be upheld throughout life to keep a workforce that is competitive and a cohesive citizenry (Hettlemen, 2007). In this context, the Program for International Student Assessment (PISA) compares educational standards across countries, serving as a benchmarking tool. This began in 2000 and is carried out every three years by the Organization for Economic Co-operation and Development (OECD). OECD was established in 1961, it is an international organization with 38 member countries. The OECD aims to advance policies that enhance the global population's economic and social welfare. Moreover, the institution carries out in-depth research, offers analysis, and releases reports on various subjects, such as trade, taxation, economic growth, innovation, and environmental sustainability. Its main goal is to help governments create effective policies through data-driven research and recommendations.

OECD's engagement in PISA is the assessment's design, coordination, and analysis. Policymakers, educators, academics, and other stakeholders worldwide frequently reference and use the data and insights from PISA reports to understand educational performance better and make evidence-based decisions that will improve educational outcomes. Meanwhile, COVID-19 has significantly exaggerated the global education crisis (Wajdi et al., 2020), and the PISA 2021 was canceled and moved to 2022 by the OECD.

So, the PISA 2022 result just came out last December 5, 2023. According to the report, 31 economies and countries have at least maintained their math performance since PISA 2018 under challenging circumstances, (OECD, 2023). As a PISA participant, the Philippines has been evaluated on multiple occasions, most recently in 2018 and 2022, which has made for an interesting longitudinal analysis of its educational system. According to recent results from the Program for International Student Assessment (PISA), students from the Philippines are still among the least proficient in the world in math, reading, and science. The nation's performance in 2018 did not significantly improve as measured by the most current PISA 2022 test results (Chi, 2023). Moreover, way back in November 2023, Vice President Sarah Duterte, also a secretary of the Department of Education, had foreseen the poor Pisa results already. "Our educational system is not the only thing reflected in the Pisa scores. It is a mirror that reflects our combined efforts, financial commitments, and—above all—our dedication to learnings and the future we want for our kids," (Duterte, 2023). This study is based on the concept of Human Capital Theory which was notably developed and popularized by economists Gary Becker and Theodore Schultz in the 1960s and 1970s. According to Becker's research, spending on education and training boosts productivity both individually and as a society, which is why it is essential for economic growth and development. Furthermore, Schultz made a substantial contribution to the advancement of the human capital theory. His research brought to light the significance of investing in human capital, including health, education, and on-the-job training, to boost economic growth and productivity. Their groundbreaking studies and writings established the groundwork for the Human Capital Theory, influencing our knowledge of how investments in knowledge and skills promote social and economic progress. Meanwhile, Social Capital Theory (Coleman, 1998) in Education complements Human Capital theory, by focusing on the social relationships, networks, and

collaborations within educational set-up. It examines how social interactions contribute to educational outputs and skills development.

PISA results can be used to gauge educational progress. The book edited by Heinz-Dieter Meyer and Aaron Benavot "PISA, Power, and Policy: The Emergence of Global Educational Governance" (2013)., provides knowledge regarding the impact of PISA and other global assessments on educational policy and governance structures worldwide. It dives into the methods via which global assessments impact national education policies. Moreover, PISA tests evaluate students' academic performance globally, including in the Philippines. Higher educational attainment is associated with better human capital, leading to increased productivity and societal growth, according to the Human Capital Theory. On top of that, the HDI takes into account several factors, including income, health, and education. PISA results show that educational attainment has a considerable impact on the HDI's education dimension, consistent with the philosophies focused on education as the foundation for creating human capital.

The study focusing on comparing PISA results from 2018 to 2022 and analyzing their correlation with the HDI in the Philippines reveals potential gaps in existing research. Firstly, prior studies may have separately analyzed either PISA results or HDI in the Philippines, overlooking the examination of how educational achievements measured by PISA have evolved and their correlation with broader developmental indicators. This lack of analysis might hinder a comprehensive understanding of the changes in educational outcomes between 2018 and 2022 and their implications within the context of broader development. Secondly, many studies have been produced to identify the dimensions that are related to students' academic success. These variables include the abilities and competencies of teachers (Tiria & Caballes, 2020, Doblada & Caballes, 2021, Dapitan & Caballes, 2019, Caballes, et.al, 2021), as well as their awareness, perceptions, and barriers (Dapitan & Caballes, 2020, Quintos, et.al, 2020, Caballes, et.al 2020, Narca & Caballes 2020, Gatilogo & Tan, 2019), modern pedagogies (Caballes & Belen, 2020, Capinig & Caballes, 2020, Caballes & Abenes, 2020, Gaveta & Caballes, 2017, Caballes & Belen, 2020, Dapitan & Caballes, 2019), and others (Caballes & Villena, 2020, Asparin & Tan, 2018, Duque & Tan, 2018, Tan-Ucang & Tan, 2013, Galarosa & Tan, 2021, Tan, et.al, 2021, Pagtulon-an & Tan 2018), nevertheless, minimal has been done on investigating the relationship of PISA score and the HDI in the student's academic success. Lastly, potential research might have compared the OECD average only without delving into specific comparisons between different countries that participated in PISA and the Philippines. Consequently, there could be a gap in understanding how the Philippines' educational performance contrasts or aligns with specific countries rather than just the broader OECD average, impacting the depth of analysis regarding the country's educational standing on a global scale.

By identifying and filling in these possible gaps in the study, the existing literature in this area will be enhanced and a more thorough understanding of the relationship between educational achievements as measured by PISA and more general developmental indicators like the HDI within the Philippines will result.

Thus, this study does a thorough investigation to evaluate the educational development in the Philippines through a comparison of PISA 2018 and 2022 findings. The research goes beyond just measuring educational outcomes; it also looks at more general developmental indices, such as the HDI. This item explores the complex relationships between educational accomplishments, societal advancement, and the general well-being of the Filipino people to connect educational attainment with the larger human development paradigm.

By analyzing comparable PISA results over the specified years, this study endeavors to identify trends, shifts, or advancements in educational performance across multiple subjects such as mathematics, reading, and science, shedding light on the nation's educational trajectory. Concurrently, the relationship between PISA scores and the Human Development Index introduces a comprehensive viewpoint, investigating possible connections between academic achievement and the other dimensions of human development, including income, health, and social progress. Thus, the findings of this study are significant to the Philippine Education Policymakers, Government, Educators, Parents, Students, Researchers, International Organizations, and Education Agencies.

This study aims to determine the trend of PISA 2018 and 2022 results in the Philippines and compare it to all countries' averages. It seeks to determine the extent of the relationship between educational performance, as indicated by PISA scores, and the overall human development status of the country, represented by HDI.

Specifically, this study aims to answer the following questions:

1. What is the trend in PISA scores between 2018 and 2022 in various educational domains in the Philippines such as:
1.1 mathematics;
1.2 reading; and
1.3 science?

2. Is there a significant difference between the average scores of all countries in the PISA score (2018 and 2022) and the PISA score (2018 and 2022) in the Philippines in terms of the following dimensions:
2.1 mathematics;
2.2 reading; and
2.3 science?

3. Is there a statistically significant correlation between PISA scores in 2018 and HDI levels across different regions within the Philippines?

Hypotheses:
1. There is no significant difference in terms of the average score of all countries in the PISA 2018 and PISA scores 2018 in the Philippines.
2. There is no significant difference in terms of the average score of all countries in the PISA 2022 and PISA scores 2022 in the Philippines.
3. There is no significant correlation in terms of the PISA scores in 2018 and HDI levels across different regions in the Philippines.

Scope And Limitation:
This study is focused on the trend of Philippine PISA results for 2018 and 2022 and the significant differences in the averages of math, reading, and science of all countries who participated in the PISA 2018 and 200 with the Philippine average in the said

subjects in PISA 2018 and 2022. In addition, the significant correlational analyses of the PISA 2018 results to the Human Development Index in the Philippines setting are also being assessed.

There are potential limitations that were considered in this study, the availability and completeness of data and the scope of correlational analyses. The available data in the Philippines on PISA scores is limited to two years only, 2018 and 2022 since the Philippines joined the PISA last 2018. The mean score in the Philippine PISA result is already calculated for each subject of math, reading, and science but the individual score for each student in the Philippines is not available. Meanwhile, PISA scores 2018 are the only available data in each region in the Philippines and are utilized to correlate with the Human Development Index in each region in the Philippines. Some data are not available for the year studied since the Philippine Statistics Office does not conduct a yearly survey instead, they do it every two to three years or so.

Moreover, only sixteen regions were included in the study. The BARMM region was not involved because the said region was not included in taking the exam. So, therefore, there will be no data on the region to be compared.

Review of Related Literature:

a. Program for International Student Assessment (PISA)

An international study called PISA (Program for International Student Assessment) got underway in 2000. The OECD is conducting a global survey to assess the academic achievement of 15-year-old students across a range of nations. PISA evaluates students' ability to apply math, reading, and science to real-world scenarios. It attempts to discover effective educational policies and practices and gives governments information about how their education systems are doing about those in other nations. A reasonable indication of the latitude that local or national governments may have been provided by the numerous restrictions to which they may be subject (Atkinson et al., 2017). Every three years, PISA examinations are carried out, and participating nations use the findings to enhance their educational programs, (OECD). PISA results serve as a benchmark for participating countries to gauge their educational systems' strengths and weaknesses compared to other nations. It helps policymakers identify areas for improvement and implement strategies to enhance educational outcomes.

In PISA 2018, 79 participating nations and economies with 660,000 pupils representing about 32 million took the 2-hour exam. Moreover, 690,000 15-year-old pupils took the test in 2022 from 29 million students in schools of the 81 participating nations and economies. The OECD average PISA 2018 for mathematics is 489 points, reading is 487 points, and science is 489 points. While the OECD average PISA 2022 for math is 472 points, reading is 476 points, and science is 485 points. The OECD (2023) reports that there is no discernible variation between the PISA 2018 and 2022 scores for any given subject's average.

Meanwhile, in the Philippines, there were 7,233 pupils from 187 schools who finished the assessment in 2018, accounting for 1,400,584 kids, or 68% of the total number of 15-year-olds. Moreover, in PISA 2022, there were 7,193 students, in 188 schools, who completed the exam in mathematics, reading, and science, representing about 1,782 900 15-year-old students.

Moreover, in the past PISA 2018 Philippines results, math subjects got 353 points, reading got 340 points and science got 357 points on average. Meanwhile, the latest result of PISA 2022 which was just released last December 5, 2023, revealed that math has 355 points, reading has 347 points and science has 356 points averages (OECD, 2023). Each 20-point shortfall from the OECD average implies a one-year lag in the annual learning pace of 15-year-olds in PISA-participating nations, (OECD, 2023). Thus, the Philippines performed poorly than the OECD average in those three criteria, mathematics, reading, and science, in prior PISA cycles 2018 and 2022. Usman (2016) states that to minimize expenses and raise the caliber of teaching and learning in the classroom, the education system must include the following requirements to actualize academic goals and objectives: adequate resource accessibility, complete use, and appropriate management of educational resource objectives. In general, institutions should prioritize initiatives that are in line with strategic main objectives and find a comfortable striking balance between continuing obligations and spending (Nnebedum et al., 2017).

However, the PISA 2018 and 2022 mean scores in the Philippines compared only with the OECD average in the subject's math, reading, and science, despite that, the PISA score in the Philippines must also be compared to the countries' average that participated in PISA, to measure how far is the Philippines behind all countries joined the PISA. According to Reimers and Chung (2016), global learning philosophy's main goal is to use education to promote intercultural competency and global citizenship. It places a strong emphasis on how educational curricula should incorporate diverse cultural perspectives, global perspectives, and cross-cultural understanding. Therefore, all countries' scores participating in PISA must be compared to determine how far each country's strengths and weaknesses in academic performance to adopt and implement changes. According to Bray and Adamson (2007), Cross-cultural comparative education theory makes a comparison between educational systems and practices in various cultures and nations. It investigates how cultural variations affect trends and educational outcomes in international assessments such as PISA.

According to the Department of Education (2019) in the PISA score 2018, the overall reading literacy, of students from region 11 (Southern Mindanao) Region 7 (Central Visayas), and the National Capital Region (NCR), scored highest in the island groups of Mindanao, Visayas, and Luzon, respectively. Moreover, the mean score of six regions was greater than the 340-point national average. The National Capital Region (NCR), the Cordillera Administrative Region (CAR), Region 7 (Central Visayas), Region 8 (Eastern Visayas), and Region 3 (Central Luzon) were among them. Meanwhile, the nation's highest average score for mathematical literacy was attained by the National Capital Region (NCR). In Mindanao and, respectively, Regions 11 (Southern Mindanao) and 7 (Central Visayas) had the highest average scores.

The nation's top ratings for Scientific Literacy were attained by the NCR. The highest mean scores were obtained in Visayas (Region 7) and Mindanao (Southern Mindanao) correspondingly. Moreover, the NCR, CAR, Region 7, and Region 4A all had average scores greater than the 357-point national average. However, the mean scores for Scientific Literacy fell into Proficiency Level 1b in Region 9 (Western Mindanao), Region 12, and CARAGA Administrative Region, while Proficiency Level 1a was achieved in the remaining areas.

The findings have highlighted aspects of the nation's educational system that need to be improved. To address these issues, the Philippine government has implemented changes meant to raise educational standards and boost student performance. Revisions to the curriculum, efforts to improve school facilities and resources, and teacher training programs are examples of initiatives. After two years of research, the Department of Education released the MATATAG K-10 curriculum, which lowered the competencies that pupils must master. To better allocate time to basic skills for improved learning outcomes, almost 70% of the current curriculum

was eliminated, bringing the total number of learning competencies down from over 11,000 to roughly 3,600, (CNN, 2023). According to Duterte, the pilot implementation phase will cover Kindergarten, Grades 1, 4, and 7 for the school year 2023-2024. The theory of Diffusion of Innovations by Rogers (2003) explores how new ideas, processes, or laws proliferate in various contexts. It investigates the variables affecting the uptake, modification, and application of innovations or policies in education.

b.   Human Development Index

The main goals of the study of human development are to characterize patterns of consistency and change throughout life and to pinpoint the underlying mechanisms responsible for these patterns, (Kagan, 1991). And these mechanisms, the so-called Human Development Index (HDI), were created by the Indian economist Amartya Sen and Pakistani economist Mahbub ul Haq. HDI was initially presented by the United Nations Development Program (UNDP) in its Human Development Report in 1990.

HDI is a combined statistic used to measure a country's average accomplishments in three key dimensions of human development: education, health, and gross national income, (UNDP). The purpose of education is to produce productive citizens who will make major contributions to all areas of human development (Abulencia, 2021).

The three indicators, income, education, and health are combined and normalized to construct the HDI formula, which yields a single index with a range of 0 to 1, where a value closer to 1 dictates higher human development, (UNDP, 2021). Utilizing the HDI and other indicators, the UNDP's annual Human Development Report offers in-depth analysis, trends, and insights into global human development. Policymakers, scholars, and organizations who strive to improve human well-being globally can benefit greatly from it.

In the Philippines, HDI is usually calculated at the national level as opposed to the regional level. The HDI is a composite index that evaluates a nation's overall level of human development by taking into account variables including life expectancy, education (including enrollment rates and literacy), and GDP.

Periodically, the Philippine Statistics Authority (PSA) publishes reports that offer regional summaries of several variables, such as income, health, education, and other facets of human development. These studies frequently provide statistical information and analysis on various Philippine regions. Additionally, publications and studies that may analyze regional differences in human development are published by (National Economic Development and Authority) NEDA. They frequently emphasize social and economic trends in various locations in their publications. Even though the UNDP periodically publishes assessments that concentrate on particular areas inside nations, like the Philippines. These studies could shed light on differences in human development metrics between regions. According to Alkire and Santos (2014), Multi-dimensional Poverty theory, which draws inspiration from the MPI (Multidimensional Poverty Index), evaluates poverty by taking into account a variety of deprivations in terms of living standards, health, education, and other areas in addition to money. This approach helps to provide a more thorough understanding of poverty and development.

In 2021, the HDI of the Philippines is 0.699 which is at the medium level. Based on the HDI category according to UNDP, there are four levels of HDI, 0.550 or less is low HDI, 0.550-0.699 is for the medium HDI, 0.700-0.799 belongs to high HDI lastly, 0.800 or greater is a very high HDI. Meanwhile, the last recorded HDI for 2023, is 0.718. There is a slight increase in HDI from 2021. According to Sachs (2015), Sustainable Development theory integrates economic, social, and environmental facets of development. It highlights the necessity of meeting present demands without compromising the ability of coming generations to meet their own requirements.

c.   PISA to HDI

The Program for International Student Assessment (PISA) is a standard test by which students from all around the world are measured for academic achievement. The Philippines took part in the PISA exams in 2018, which gave important information on how well its children performed academically in reading, science, and math. Simultaneously, the HDI is a commonly employed measure to measure the entirety of human development, integrating factors other than schooling, like income and life expectancy, into a composite index.

Several studies have looked into the connection between the larger human development measures like the Human Development Index (HDI) and education indicators like academic success as determined by tests like PISA which evaluates the academic achievement of 15-year-old students worldwide in mathematics, reading and science. These two are distinct indices used to measure different aspects of societal development. A 2011 study ("International norm dynamics and the 'end' of the MDGs: understanding current development challenges") by Fukuda-Parr and Hulme proposed a positive relationship between a country's HDI and its pupils' performance on PISA tests. PISA results are higher among students in higher HDI nations, suggesting a possible relationship between overall development measures and academic performance. In similar study, concentrated on the policy implications that result from the correlation between PISA scores and HDI scores. The significance of school quality as determined by assessments such as PISA in promoting economic growth is highlighted by research conducted by Hanushek and Woessmann ("The Role of Cognitive Skills in Economic Development"). They contend that spending on raising educational standards, as determined by PISA, can favor a nation's overall human development, as demonstrated by the HDI.

However, critics argue that evaluating a country's development or educational system exclusively based on HDI or PISA scores oversimplifies complicated facts. For instance, a paper by Adamson, et.al, (2016) emphasizes that although these indices may show some correlations, they are not able to fully capture the range of progress or quality of education. They support a more thorough evaluation that considers additional socioeconomic and cultural aspects.

Some research investigates how HDI serves as a predictor of educational attainment and achievement. According to research, countries with higher HDI typically have better educational results, such as greater enrolment rates, better infrastructure, and better access to education (Psacharopoulos and Patrinos, "Returns to Investment in Education: A Further Update"). This suggests a connection between chances for education and general measures of human development. Moreover, PISA results frequently influence Participating nations' educational strategies and reforms. The article "PISA as a Lever for Changing Educational Governance" by Grek and Lindgren explores how PISA has evolved into a tool for influencing educational policies, resulting in modifications to curricula, instructional strategies, and assessment procedures across national boundaries. PISA comparisons and rankings act as a spark for changes in education that are meant to raise student achievement.

Meanwhile, the focus on standardized testing, such as PISA, as a gauge of educational quality is criticized by certain academics. In her book "The Death and Life of the Great American School System,", (Maranto, 2010) education historian Diane Ravitch makes

the case that a well-rounded education is compromised by a heavy reliance on standardized testing. Critics contend that a "teach to the test" approach can result from a restricted concentration on test results, ignoring other important facets of learning and growth. Studies frequently emphasize how crucial context is for understanding PISA findings. Researchers like Sellar and Lingard, (2016), "The OECD and Global Governance in Education", highlight how social, cultural, political, and economic circumstances have a big impact on how well students score on PISA exams. To avoid oversimplified interpretations or policy suggestions based only on test results, they argue for a more comprehensive understanding of these contextual aspects when examining PISA outcomes. These viewpoints go further into the HDI's predictive capacity for education, PISA's impact on educational policies, the critique of standardized testing, and the importance of contextual elements in interpreting PISA results.

The differences between various areas and nations as indicated by the HDI and PISA scores are heavily emphasized. Both indexes are frequently used in reports such as the UNESCO Global Education Monitoring Report to highlight the differences in educational access and quality and their consequences for human development in general. These ideas and discussions warn against simplifying or over-reliance on these indices to quantify complicated societal progress, while also highlighting the connections between educational attainment (as measured by PISA) and broader measures of human development (as measured by HDI).

RESEARCH METHODOLOGY

Research design is the entire plan for conducting a study to successfully resolve the research concerns and challenges (De Vaus, 2016). It is also known as the "blueprint" for data gathering, measurement, and analysis. This study employs a statistical analysis design to comprehensively analyze the relationship between PISA results (2018 vs. 2022) and the correlation between these scores and the HDI in the context of the Philippines. The combination of quantitative analysis of PISA data and correlational assessment with HDI indicators offers a multi-dimensional understanding of the educational landscape and its implications for broader developmental aspects. The research problems identify the research design to be used, (Creswell, 2017).

PISA scores in the Philippines 2018 and 2022 are based on quantitative data obtained from the OECD database and the Department of Education (DepEd). These databases include performance measures of each region in the Philippines related to science, math, and reading for Filipino pupils. There were 7,233 pupils from 187 schools who finished the test in 2018, accounting for 1,400,584 kids, or 68% of the total number of 15-year-olds. Then, for the year 2022, 7,193 students from 188 schools—representing roughly 1,782,900 15-year-old kids—completed the evaluation in science, arithmetic, and reading. This represents an estimated 83% of the 15-year-old population.

Furthermore, the United Nations Development Program (UNDP) database and the Philippine Statistics Authority (PSA) provide a broader developmental background for each region in the Philippines throughout the stated period for the HDI statistics and its components, education, health, and income.

Descriptive and inferential statistics are the tools used in the quantitative analysis to compare PISA scores from 2018 to 2022 and the average of countries to the Philippine PISA score from 2018 and 2022. But first, Shapiro-Wilk was being utilized to test the Normality of the data. Moreover, a significance level of 0.05 is being utilized to measure the normality of the data. Meanwhile, graphical representations of trends and significant differences between all countries and the Philippines' PISA score means are produced using statistical tools like Excel, T-test software for unequal variances, and SPSS. Correlational analyses are used to look at the relationship between PISA scores and HDI components. Pearson correlation coefficient will be used for normal distribution. The responsible use of publicly available data without violating someone's privacy or confidentiality is ensured by ethical concerns. The methodological approach integrates quantitative analyses of PISA results with correlational assessments of HDI components, providing a comprehensive understanding of educational trends and their connections to broader developmental indices within the Philippines.

IV. RESULTS AND DISCUSSION

In this section, the data that was obtained from the OECD, UNDP, and Philippine Statistics Authority (PSA) are presented, interpreted, and analyzed. This has three sections which include: Section I explains the assessments of the trends of PISA scores in the Philippines and all countries, Section II focuses on the results of the test of significant differences of the PISA results of all countries with the Philippines based on the T-test and Section III highlights the significant correlational analyses between the PISA scores and Human Development Index.

To facilitate understanding, the data is given in narrative form; also, tabular formats are constructed to offer a more comprehensive picture of the values and data interpretation. The corresponding analysis and interpretation are provided in six tables. The complete set of results is now on display.

Section I - Assessment of trends in PISA scores between 2018 and 2022 in various educational domains in the Philippines.

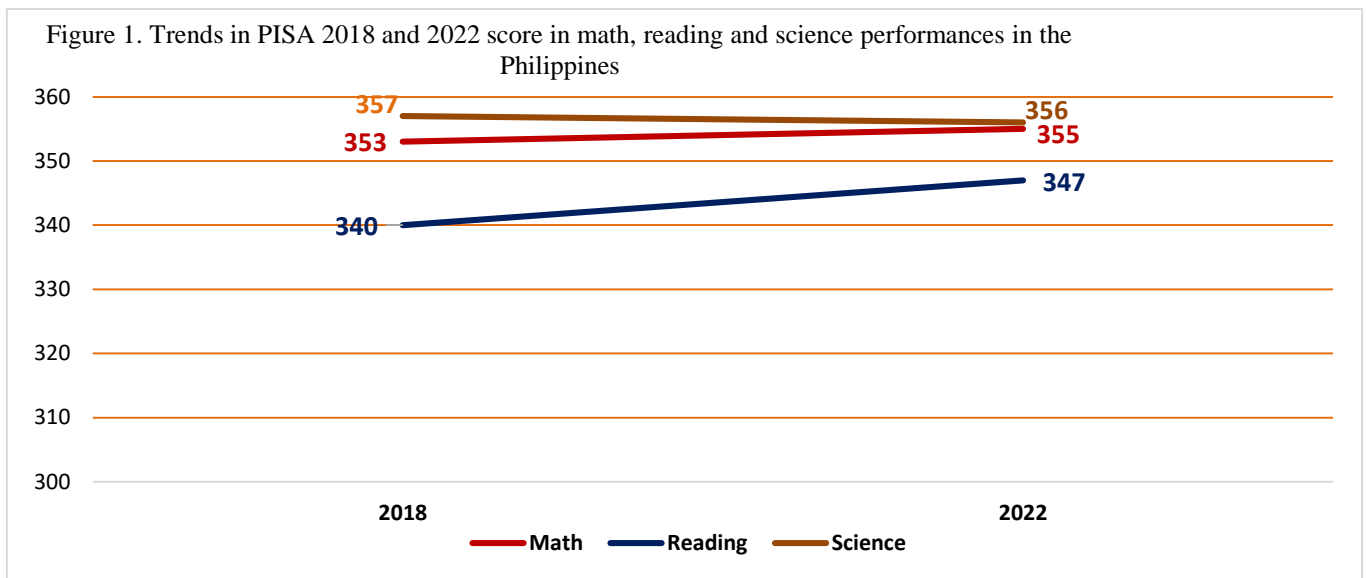Figure 1. Trends in PISA 2018 and 2022 score in math, reading and science performances in the Philippines

Figure 1 showcases the trend in Pisa scores 2018 and 2022 average in math, reading, and science in the Philippines. In 2018 in terms of the math subject, it has an average score of 353 and 355 mean score for 2022. There is a shift of 2 points in the average score from 2018 to 2022. For the reading subject average, there was an increase of 7 points from 340 to 347 in 2018 and 2022 consecutively. However, there was a decrease of 1 point in science subjects from 357 down to 356, from 2018 to 2022 sequentially. Overall, there was no impact from the change in the average scores from 2018 to 2022 of the PISA score due to a minimal shift of points. Educational Policy theory (Ball, 1993) analyzes how educational policies are created and implemented. It focuses on the ways that policies including those about international examinations such as PISA affect curriculum, instructional methods, and educational systems. The government of the Philippines should extend its investigation into the curriculum of education, not only that but the educational resources must be also put into the right allocation, to upgrade the status of the academic performance of the students. Santos (2007) and Volk et al. (2001) assert that there is still much to learn about the distribution of institutional resources and how they work toward the institution's ultimate goals of generating graduates of the highest caliber and offering the greatest possible teaching-learning experience.

Table 1. Results of the PISA score 2018 and 2022 in all countries and the Philippines

Results of the PISA Scores 2018 and 2022						
	2018			2022		
	Population	Mean	S.D.	Population	Mean	S.D.
Math (Philippines)	7,233	353.00	78.00	7,193	355.00	65.00
Reading (Philippines)	7,233	340.00	80.00	7,193	347.00	85.00
Science (Philippines)	7,233	357.00	75.00	7,193	356.00	78.00
Total Average (Philippines)	7,233	350.00	77.67	7,193	352.67	76.00
Math (All countries)	609,673	454.78	88.90	620,259	437.65	84.88
Reading (All countries)	609,673	453.12	94.64	620,259	435.02	93.85
Science (All countries)	609,673	457.94	89.13	620,259	446.86	89.89
Total Average (All countries)	609,673	455.28	90.89	620,259	439.85	89.54

Table 1 shows the results of PISA scores in 2018 and 2022 in all countries that participated in PISA and the Philippines. The Philippines trend has already been shown in Figure 1 and explained briefly above. Specifically, the number of students that joined the PISA 2018 had 609,673 pupils while in PISA 2022 620,259 students joined the PISA in all countries. In terms of all countries that participated in PISA 2018, math subject has a mean of 454.78 and 437.65 mean scores in PISA 2022. It has a decrease of 17.13 points, but it does not have a big impact since it drops down points and is not that large enough. For the reading subject, it has 453.12 and 435.02 mean 2018 and 2022 respectively. It has an 18.76-point decrease in the mean. Lastly, Science has a score of 457.94 and 446.86 mean for 2018 and 2022 consecutively, with a drop point of 11.08. Thus, the overall scores for all countries that participate in PISA 2018 and 2022 have a decline in the mean score of all dimensions, but the OECD reported that there is no significant difference in the changes of the score from PISA 2018 to 2022.

Section II - Test of Hypotheses (T-test)
This study promoted the null hypothesis, which examined the at-the-0.05 threshold of significance utilizing the T-test software for populations with unequal variances. In this section, the results of the hypothesis test are presented, analyzed, and interpreted.
Table 2. T-test PISA Score 2018 (All countries vs. Philippines)

T-test PISA Score 2018 (All countries vs. Philippines)				
Subject	t-value	p-value	Remarks	Decision to Ho
Math	110.13	0.00	significant	Reject
Reading	119.27	0.00	significant	Reject
Science	113.52	0.00	significant	Reject
Overall	118.40	0.00	significant	Reject

Table 2 presents the T-test result of the Pisa score 2018 of all countries vs. the Philippines. It shows that the test statistics for math is 110.13 with a p-value of 0.00, this is lower than the significant level of 0.05 which means that there is a significant difference between all countries and the Philippines. In terms of the reading test statistics is 119.27 with a p-value of 0.00, therefore there is a significant difference between all countries and the Philippines. For the science subject, the test statistics is 113.52 with a p-value the same as the other subjects, which leads to the conclusion of significant differences between all countries and the Philippines. The overall results showed that significant differences are comparing the average of all countries and the Philippines in the PISA score 2018. This must be addressed by the Philippine government, especially the education sector which is the Department of Education (DepEd). VP Duterte, also the secretary of DepEd already created a new curriculum Matatag K-10 and it is in the pilot implementation phase this school year. This will lower the number of curricula to master the basic competencies for basic education.
Table 3. T-test PISA Score 2022 (All countries vs. Philippines)

T-test PISA Score 2022 (All countries vs. Philippines)				
Subject	t-value	p-value	Remarks	Decision to Ho
Math	106.80	0.00	significant	Reject
Reading	87.22	0.00	significant	Reject
Science	98.05	0.00	significant	Reject
Overall	96.51	0.00	significant	Reject

Table 3 depicts the T-test result between all countries and the Philippines in the PISA score 2022 average. The Math subject has the test statistics outcome of 106.80 and the p-value is 0.00, it is lesser than the significance level of 0.05, which means that there is a significant difference in the PISA score 2022 of all countries with the Philippines average. The next one is Reading with a test statistic of 87.22 and a p-value of 0.00, which is less than the significant level of 0.05, therefore there is a significant difference between all countries and the Philippines average in the PISA 2022 result. Lastly, the science has a test statistic of 98.05 with a p-value of 0.00, it is the same as the math and reading result that there is a significant difference between all countries and Philippines in the result of PISA 2022 averages. Therefore, the overall averages have a significant difference comparing all countries that joined the PISA 2022 and the Philippines. According to Cizek, Educational Assessment theory is very important to investigate how assessment procedures affect current developments in education. It examines how PISA and other standardized tests influence educational practices and policy. The DepEd must be focused on examining the various assessments given to the students to align if the main objective of the competencies is being met. Immanuel Wallerstein's theory (1974) looks at how international economic systems affect social systems. It investigates how shifts in the world economy impact educational practices and policies.

Section III – Test Hypotheses of Correlational Analyses
Table 4. Correlational analysis of the PISA score of the Philippines vs. Human Development Index (Pearson r)

Variables	Pearson r	Sig. value	Remarks	Strength of relationship	Decision to Ho
Math*HDI	0.798**	0.000	Significant	Positive strong	Reject
Reading*HDI	0.747**	0.001	Significant	Positive strong	Reject
Science*HDI	0.738**	0.001	Significant	Positive strong	Reject
Overall*HDI	0.772**	0.000	Significant	Positive strong	Reject

*Correlation is significant at a 0.05 level
**Correlational significant at 0.01 level

Table 4 shows the association of the Philippine PISA score and the Human Development Index using by utilizing Pearson R since the data are in normal distribution that were measured by Shapiro-Wilk. Results present a significant strong positive relationship between the HDI in the PISA score of Math (r=0.798, p-value=0.0), Reading (0.747, p-value=0.001), and Science (r=0.738, p-value=0.001). The relationship exhibits that the higher the Human Development Index, the higher the mean score result in PISA and vice versa. As mentioned earlier by Becker (1964), spending on education and training boosts productivity both individually and as a society, which is why it is essential for economic growth and innovation. The increase in funding for education with the right allocation will result in a better economic status for a country.

CONCLUSION AND RECOMMENDATIONS

In light of the findings, the comparative analysis between the PISA results in 2018 and 2022 in the Philippines suggests that there is a slight shift in results in the subjects of math and reading while science has decreased by a point only. This means that there is no educational progress from 2018 to 2022 in the Philippines. Meanwhile, there is a significant difference between the Philippine PISA average and all country's mean scores who participated in PISA 2018 and 2022 in terms of the subject's math, reading, and science. Moreover, the correlation between these findings in the HDI shows a potentially strong relationship between the quality of education and overall societal development. Still, more studies are needed to fully comprehend the complexities of this correlation.

The recommendations listed below are based on the conclusions mentioned above:

Since there is no educational progress in the Philippine PISA results from 2018 and 2022 in all subjects and it is far away from the average score of all countries, the Philippines educational sector needs to create focused interventions to address weaknesses and replicate those observed in PISA assessment in other countries that obtained high PISA score. Next, examine current policies for education to make sure they reflect current trends and fix any issues that have been found. Consider global best practices and modify rules to meet regional requirements. Then, Place a strong emphasis on educators' ongoing professional development. Provide them with cutting-edge teaching strategies and resources to raise the standard of instruction.

In terms of the HDI and academic results, strategically distribute resources. Spend more funding on education based on the standard of UNESCO because it is essential to the development of society as a whole. Next, create a mechanism for ongoing assessments beyond PISA cycles to regularly track students' academic progress. Add qualitative metrics to enhance quantitative information. Lastly, encourage community involvement. Involve parents, neighborhood associations, and other interested parties to establish a conducive learning environment at home and in the classroom.

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