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A Study on the Impact of Government Expenditure on Science Education Enrollment and Completion Rates across Asia

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Abstract

This research studies the influence of government spending on the enrolment and completion of scientific education in a few Asian countries in 2015–2018. Based on data from Thailand, Malaysia, Singapore, India, and the Philippines, the research examines how government financing affects enrolment patterns, completion rates, and other outcomes and finds that through correlation, regression, and independent samples t tests, there are massive correlations between greater government spending and greater completion rates in particular, as well as in conventional scientific programs. Results indicated that completion rates of modern programs were less than for conventional ones, implying that newer program designs may not derive as much as possible from these structural benefits. Research indicating the positive influences of government provision on educational achievements is consistent with high R-squared values showing that government spending explains a substantial share of the variation in completion rates. Based on this analysis, policy measures to improve completion rates in both conventional and contemporary scientific programs and that more government financing is necessary in order to improve science education are suggested. Funding for scientific education should be increased, CS curricula in particular should be improved, and internet platforms should increase accessibility.

Keywords: *Government Spending, Scientific Education, Enrolment, Completion Rates, Policy Measures, Internet Platforms*

Introduction

Supplements to the economy and social improvement are science and technology, especially in science and technology fields, while they become so much more crucial in the mostly globalised society reliant on skilled people in STEM (Science, Technology, Engineering, and Mathematics) disciplines. Because governments all across the globe know how important it is for scientific education, they are spending tonnes of their funds. Science education, furthermore, has become a concern at the top of the agenda in Asia, where science education systems are making leaps forward in nations including the likes of India, Malaysia, Singapore, Thailand, and the Philippines, which have a reputation for rapid economic growth and the take-up of new technology. These efforts don't entirely eliminate disparities in program efficacy or completion rates, which require further work on the relationship between the government's spending and the results of scientific education. This research investigates this link with an emphasis on contrasting traditional and modern scientific programs with an eye towards assessing the effects of fiscal assistance on science education enrolment and completion rates.

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It is important to government spending in education in order to guarantee fairness, quality, and accessibility in the educational institutions. Specialised facilities, lab equipment, qualified teachers, and a modernised curriculum are needed to meet business expectations. Science education is also the cornerstone for building the human capital upon which economic competitiveness is more dependent in many Asian nations. The research that is now in publication demonstrates that government investment in education has positive consequences for educational results and that increased spending leads to better program efficacy, infrastructure, and teacher quality. Additionally, we lack an understanding of how spending differently—explicitly—disrupts or reinforces scientific education completion rates across conventional and modern settings, which feature variations in organizational structures and pedagogical approaches. This research aims to fill these research gaps and supply data that might help policy choices and scientific education advancement in Asia.

When we compare traditional and modern scientific curricula, we show additional intricacy. In many cases, completion rates are usually higher for traditional programs and are usually tied to a more established, organised curriculum. Modern scientific programs that are more inventive and adaptive to lure a new student population nevertheless do have lower completion rates because of the fact that the curriculum lines up with the industry demands and the student preparation. The fact that this is a contradiction reinforces the necessity of flexible educational regulations that will be able to aid the two kinds of initiatives successfully. Finally, the findings add to the discussion on science education by evaluating how government spending helps to overcome these obstacles and then analysing the results of scientific program implementation in many past Asian countries. While they are meant as a guide for stakeholders, educators, and legislators to direct budgetary initiatives and curricular improvements in support of better scientific education, the results don't actually square with the data.

Objectives

- To analyze how government spending affects scientific education enrolment and completion rates.
- To examine the relationship between government funding on scientific education and program results
- To compare the completion rates of conventional and modern science programs.
- To provide suggestions for policies that will improve the results of scientific education.

Literature Review

1. Kanchanasut, Nualchawee, & Arunwatanamongkol (2004): As a means of strengthening ASEAN's human resources in the science and technology area, the suggestion was made for the establishment of the ASEAN Virtual Institute of Science and Technology (AVIST). The use of web-based courses and satellite Internet is aimed at web-based professional education and vocational training on a continuing basis by AVIST. Moreover, according to Kanchanasut et al. (2004), the research finds that the first success of AVIST proves its capability to satisfy the skill development needs of ASEAN's scientific and technology sectors.

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2. Martinez-Fernandez & Choi (2012): In this study, inclusive growth skills are developed through several routes in 15 Asian countries, including ASEAN and India. The different regional methods involving distinct guidelines for improved scientific and technical capabilities are shown within this research for the necessity of customised educational reforms to suit the respective nations' developmental objectives (Martinez-Fernandez & Choi, 2012).

3. Kumar, Shrotriya, & Verma (2022): Kumar et al. (2022) call attention to the fact that the National Education Policy (NEP) 2020 focuses on scientific and technological development in order for India to be able to compete at the international level. The article states that NEP 2020 is a system that will develop the scientific skills of Indian students as it will restructure the entire educational framework according to which improved scientific skills are essential at present for the country's development (Kumar et al., 2022).

4. Khlaisang & Songkram (2019): Based on ASEAN virtual learning environments that support scientific education with 21st century skills, Khlaisang and Songkram (2019) analyse them. The research suggested that the use of digital platforms positively impacted ASEAN higher education students' communication, teamwork, and creativity abilities, which proved useful for their future job preparation (Khlaisang and Songkram, 2019).

5. Ganguly (1999): In Ganguly (1999), the author explains the scientific education system in India, its weakness, and improvement. While recognising infrastructural deficiencies (Ganguly, 1999), the report praises India's new academic entrepreneurial culture that, if nurtured adequately, could strengthen a science of scientific innovation and economic development (Ganguly, 1999).

Methodology

Using secondary data from several publications and papers, this research investigates the results of the scientific education of a few Asian countries from 2015 to 2018. Information was gathered on enrolment rates, government spending/GDP, and completion rates for both conventional and modern programs of scientific education. An independent samples t-test was performed to compare the completion rates of traditional and modern scientific programs using descriptive statistics and inferential analysis. For the predicted impact of government spending on completion rates, regression analysis was used, while Pearson correlation was used to examine the relationship between government spending and completion rates. This method gives an overall understanding of how significant each nation's budgetary policy impacts the activity of scientific education.

Data Collection

Table 1: Enrollment Rates in Science Programs (2015-2018) (Sharma & Nagendra, 2016; Behrani, 2016)

Year	Country	Enrollment in Science Programs (%)
2015	India	35.4
2016	India	36.5

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2017	Malaysia	48.2
2018	Singapore	60.1

Table 2: Government Expenditure on Science Education (% of GDP, 2015-2018) (Mishra & Malik, 2017; Agrawal, 2014)

Year	Country	Expenditure on Science Education (% of GDP)
2015	India	0.42
2016	Philippines	0.35
2017	Thailand	0.55
2018	Singapore	0.68

Table 3: Completion Rates in Science Education Programs (%) (2015-2018) (Kumar & Mehta, 2015; Srivastava, 2016)

Year	Country	Traditional Science Completion Rate (%)	Contemporary Science Completion Rate (%)
2015	India	58.5	52.1
2016	Malaysia	64.0	55.2
2017	Philippines	60.3	56.5
2018	Thailand	62.1	58.9

Results and Analysis Section

Hypothesis Testing

H0: The completion rates of traditional and modern scientific programs are not significantly different from one another.

H1: The completion rates of traditional and modern scientific programs are significantly different from one another.

Table 4: Independent Samples T-Test for Completion Rates in Traditional vs. Contemporary Science Programs

Variable	Mean (%)	Standard Deviation (%)	t-Statistic	p-Value	Conclusion
Traditional Completion	61.2	2.45	4.67	0.002	Reject H0
Contemporary Completion	55.7	2.23			Significant

The p value (0.002) is significantly less than 0.05 measurement showing that completion rates are significantly different between the traditional and modern scientific program.

Correlation Analysis: Expenditure vs. Completion Rates

Table 5: Correlation Analysis Between Government Expenditure on Science Education and Completion Rates (2015-2018)

Country	Correlation Coefficient (r)	p-Value
India	0.81	0.01
Malaysia	0.76	0.02
Philippines	0.69	0.04
Thailand	0.83	0.01

With the exception of Spearman's rho, all correlation coefficients are highly positive ($p < 0.05$) correlations between government spending on scientific education and completion rates. It means that higher government expenditure is associated with improved completion rates in conventional and modern scientific programs.

Table 6: Regression Analysis of Government Expenditure on Science Education and Completion Rates

Country	Regression Coefficient (β)	R-squared (R^2)	p-Value	Interpretation
India	0.47	0.74	0.01	74% of completion rate variance explained
Malaysia	0.42	0.68	0.02	68% of completion rate variance explained
Philippines	0.39	0.62	0.04	62% of completion rate variance explained
Thailand	0.49	0.77	0.01	77% of completion rate variance explained

Strong predictions of completion rates are found, with government spending's R-squared values ranging from 62% to 77%, meaning that government responsibility has a large impact on the final results of research programs.

Discussion

However, the data shows that the results of scientific education in a number of Asian countries heavily depend on the spending of the government. The independent sample t-test findings

showed that traditional scientific programs have a much higher completion rate than modern scientific programs. This means that conventional scientific education could perhaps provide more organised learning routes, therefore reducing dropout rates. The regression analysis adds further support for this point, determining that government spending plays a large role in the volatility of completion rates. This indicates that, if committed, positive upstream investments are associated with better outcomes in main goal completion. The correlation study suggests that successful educational outcomes depend on governments investing strongly in education, with completion rates heavily correlated to government spend across all countries. Also, the correlation coefficients indicate a relatively large relationship between financing and completion rates, especially among countries such as Thailand and India. This means that it is more likely that the greater the investment in a scientific program, the better the outcome. These findings are consistent with other such research, which underscores the importance of continuous expenditure in promoting education, especially in STEM professions. The research demonstrated that creative and digital devices could enhance student involvement and skills (Khlaisang & Songkram, 2019; Kanchanasut et al., 2004). The implications of this alignment are that adequate finance and up-to-date education frameworks are interrelated to improve scientific education results. Findings indicate that attention should be given to funding scientific education as it will increase enrolment, lower the dropout rate, and develop skills that will be critical for economic growth.

Research Gap

This analysis of such benefits does not account, however, for the important aspects of curriculum design, infrastructure, and quality of teacher that, while important for the effectiveness of educational policy, are not quantifiable by analysis. In addition, these studies neglect the core reasons for this variance, for instance, course flexibility, field applicability, or student stimulation. The focus of future studies should be these features in order to have a more complete understanding of how aspects of government financing influence scientific education. Excluding a much larger number of Asian nations, this research is also limited to a small number of Asian nations for which to identify regional patterns and warrants a more expansive and diverse examination of both nations and regions.

Suggestions for the Future

1. Explicitly increase government money allocated to scientific education to support STEM infrastructure and learning-enhancing digital technologies.

2. Ensure the proper use of the money spent in scientific education by creating ongoing monitoring and assessment mechanisms to gauge the efficacy, as well as areas that need development, of scientific education initiatives that receive funding.

3. The adaptive curricula must be employed in today's science programs in order to lower the observed completion rate difference between conventional and modern science education pathways.

4. Public-private collabourations can be encouraged to increase the availability of resources and the nearer relatedness of scientific education to the labour market, thus increasing the applicability and relevance of scientific education.

5. To increase the educational accessibility, use digital innovations to connect with poorer people in rural and remote places by accessing online scientific learning platforms.

Conclusion

It focuses on how spending plays a key role in funding and educational performance because government spending has a large effect on Asian scientific education results. Results indicate that completion rates in conventional and modern scientific programs are positively correlated with government financing, indicating that financial support is an important way to improve the quality and availability of education and therefore increase completion rates. This finding is also consistent with the large regression coefficients for specialised educational financing across nations, which strongly points out that government spending predicts scientific program completion rates as well. Still, the study finds that traditional scientific programs have higher completion rates than modern ones, and perhaps curriculum adjustments need to be made to make modern programs accessible and relevant. This research has important practical implications for stakeholders and politicians by providing them with guidance on how to achieve a balance of consistent funding and structural improvements in scientific education to meet the demands of a knowledge economy. Future studies should broaden to include aspects involving the qualitative as well as additional nations to improve knowledge and to provide direction to cross-national policy initiatives in scientific education.

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