

Research Article

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Comparative of Cost and Return in International and Bilingual Education Programs in a Developing Country

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Abstract

Background/purpose. This study investigates the costs and returns of education in Thailand, comparing the International and Bilingual Education Programs. It examines the financial implications of these educational choices, aiming to determine the economic viability of each program. The findings offer insights to guide parents and policymakers in making informed choices.

Materials/methods. Data were collected from 1,230 participants, including 794 from the International Education Program and 436 from the Bilingual Education Program, using a structured questionnaire. The analysis employed cost-benefit principles, focusing on metrics such as net present value (NPV), benefit-cost ratio (B/C ratio), internal rate of return (IRR), and payback period.

Results. The International Education Program incurs higher costs (4,883,078 THB per student) than the Bilingual Education Program (1,634,480 THB per student). Despite the higher costs, graduates from the International Education Program achieve a higher cumulative income of 76,961,952.97 THB, with an NPV of 10,326,880.71 THB, a B/C ratio of 3.11, an IRR of 16.39%, and a payback period of 8 years. In comparison, the Bilingual Education Program offers a cumulative income of 48,101,220.61 THB, with an NPV of 7,871,744 THB, a B/C ratio of 5.82, an IRR of 25.30%, and a shorter payback period of 5 years.

Conclusion. Both programs are economically viable investments. The International Education Program yields higher lifetime income, while the Bilingual Education Program offers greater cost efficiency and faster returns. These findings underline the significance of aligning educational investments with long-term economic goals and individual affordability.

1. Introduction

Education is a crucial factor that helps develop human potential, particularly in Thailand, which emphasizes its education program, whether through public or private schools. This research focuses on the international education program and the bilingual (Bilingual) program in Thailand. The international education program emphasizes instruction in English and is divided into four main curricula: American, British, IB, and other curricula from countries such as China, Australia, and France (Namraksa & Kraiwanit, 2023). The bilingual program involves teaching using two different languages as the medium of instruction for various subjects, typically with the national language as the primary language and a foreign language as the secondary language. Since 1999, the Ministry of Education has implemented bilingual education to meet the nation's lifelong educational goals. This initiative aims to develop a skilled workforce with strong English proficiency for a competitive global environment. The ministry has established two categories: the Mini English Program (MEP) and the English Program (EP) in Thailand (Laksanasut, 2020). Currently, a significant issue is the continually rising educational costs in both programs leading to questions about the value of investing in education. Although high costs prompt many families to carefully consider their options, there remains a noticeable trend of increasing enrollment.

Education is an essential process for sustaining life in society; thus, parents must support their children's education to acquire skills and knowledge that can be applied in the future. Analyzing the costs and benefits of education is necessary for parents to decide whether investing in education is worthwhile. The expansion of formal education is a key sign of social progress linked to the rise of nation-states and modern economies. This growth has led to a complex network of institutions that guide individuals through different stages of life, from early education to higher education and lifelong learning (Spiel et al., 2017). The international and bilingual education systems offer courses from kindergarten to bachelor's degree level, with a total duration of 19 years. The choice of a second language depends on social needs, such as Thai and English. Developing communication skills is crucial for learners in an era of rapidly changing labor markets. However, the costs of education at various levels and types, such as public education, international education, and bilingual education, vary significantly. Quality education should consider labor market demands and economic adaptation to ensure that parents' educational investments yield valuable future returns (Atthapulsap, 2020).

Therefore, analyzing the costs and benefits of education is an intriguing topic, especially in today's digital economy, where technology plays a vital role in career development and sustainable living. This study aims to assess the costs and returns associated with educational investments for graduates of the International Education Program and the Bilingual Education Program in Thailand. Providing educational opportunities helps create a skilled workforce, preparing learners for future success. Education is, thus, an important tool for developing Thailand's economy, both directly and indirectly.

2. Literature Review

2.1. Human Capital Theory

Early economists emphasized traditional approaches to studying the returns on education since the 1950s, focusing on the increased productivity resulting from human factors. Despite widespread debate on human capital, numerous theories have emerged, suggesting that economic growth is related to production factors (capital, labor, and natural resources) according to regional demands. The human capital model posits that individuals' decisions to invest in training depend on the ratio of costs to benefits of that investment. In other words, the decision to invest in human capital is based on the net present value and future income of that investment, taking into account the rate of return and market interest rate.

According to Schultz (1964) and Becker (1964), enhancing the population through educational investment is necessary for increasing productivity, which ultimately impacts the economy and regional development. Human capital theory suggests that investing in education enables individuals to become more capable, positively affecting national growth rates. A key premise of this theory is that investing in self-improvement not only increases labor productivity but also promotes national advancement and increases real returns. Human capital theory links individuals' education levels to career success, indicating that returns on educational investment benefit both individual growth and society as a whole, as individuals' increased income creates positive spillover effects on society, enhancing health and family formation. Quality education is essential to causally influence economic and social growth processes, making effective investment in human capital necessary.

In the context of economics, human capital and factors affecting its development play a crucial role in both economic growth and individual success. Research in macroeconomics underscores that human capital is a vital production factor for a country's economic growth. Studies by Lucas Jr. (1988), Romer (1990), and Mankiw et al. (1992) present a framework wherein human capital influences economic growth through interactions among skilled labor, leading to innovations that enhance production efficiency. Importantly, the role of human capital can grow infinitely, unlike physical capital, which shows diminishing returns as quantity increases. Therefore, investing in human capital development is critical for a country's economic growth. Concurrently, microeconomic research highlights that human capital is essential to individual success. Studies by Becker (1964) and Mincer (1974) illustrate the role of human capital regarding labor market outcomes, using education and work experience as proxies for human capital. This research emphasizes the returns to schooling, indicating how increased education can lead to higher returns for individuals (Kilenthong, 2023). While education levels and work experience are not direct measures of human capital, they are crucial processes in its development. Therefore, developing human capital must consider education, training, and work experience to achieve sustainable and continuous long-term growth.

Measuring the returns on educational investment regarding growth and regional development over a long period relies on the assumption that education is a key factor in enhancing the quality of the population, impacting regional labor efficiency. Human capital shows potential for reducing economic disparities and promoting regional development, increasing productivity capabilities, reducing production costs, and leading to higher income due to increased production returns. Thus, the impact of human capital is no longer a minor issue but has become one of the crucial factors for economic growth and a source of positive impacts on regional development. Direct effects impact labor income and production functions, while other factors, such as capital and technology, are essential for training labor to enhance job-related skills, impacting productivity and potentially increasing income. Indirectly, this leads to increased technology availability in production processes, creating new opportunities for production (Rodrigues, 2023). Private Returns (PR) refer to the set of benefits derived from investing in education, focusing on the individual. While private returns emphasize individual benefits, they can also have external impacts. Thus, the benefits of private returns can be divided into internal returns and external returns.

2.2. Investment Decision in Education

Education is considered a form of investment. When an individual wishes to pursue a particular course, they should gather information to make the best choice or the option that offers the highest value for their investment. The criteria for making investment decisions include two main factors: Time Value of Money and Cost-Benefit Analysis.

2.2.1. Time value of money

Choosing an educational investment requires consideration of both the costs and benefits, which can be compared. If the educational benefits exceed the invested costs, this aligns with the economic

principle of maximizing utility. Education is an investment where the investor seeks to enhance both physical and mental capabilities. Understanding the benefits of educational investment requires applying theories related to investment decision-making.

Additionally, the duration of the project is crucial. If the project lasts only one year, the decision is straightforward due to minimal currency fluctuation. However, if the project extends beyond one year, changes in currency value become more significant, and the net benefits of the project may vary each year, making it challenging for investors to decide. Thus, time value adjustments (calculating the future value of money to present value) must be made for all costs to ensure they are analyzed on the same time basis.

The present value of educational costs can be calculated using the following formula:

Present Value of Educational Costs

[$PV = \sum \left(\frac{C_t}{(1+r)^t} \right)$] Where:

C_t : Educational costs from year 1 to n

r: Discount rate

t: Year of the project

n: Number of years for analysis

2.2.2. Cost-Benefit Analysis (CBA)

This comprises three common concepts used for calculations:

1) Net Present Value of Benefits (NPV): Calculating the net present value of the costs of any investment project compared to the present value of the rate of return from that educational investment. Gittinger (1972) suggested using a discount rate of 12%, which is commonly accepted in developing countries. In Thailand, financial analysis typically employs the market interest rate to determine the discount rate. When undertaking any investment project, the net present value (NPV) of benefits (B) and costs (C) is considered, then calculated against the discount rate to find the difference between the total present value of benefits and costs. This analysis determines whether the investment yields worthwhile benefits. Benefits may result in positive, negative, or zero values, and one should select projects with a NPV greater than zero or the highest positive value. When comparing two or more projects, investment should be made in those with greater NPV. The formula is:

Net Present Value (NPV)

[$NPV = \sum \left(\frac{B_t - C_t}{(1+r)^t} \right)$] Where:

B_t : Benefits in year t

C_t : Costs in year t

r: Discount rate

t: Year of the project

n: Number of years for analysis

2) Internal Rate of Return (IRR): The internal rate of return is the rate at which the present value of benefits equals the present value of costs or the discount rate that makes the NPV equal to zero. It should exceed the specified interest rate. If:

IRR > r: The project is worth investing in.

IRR < r: The project is not worth investing in.

IRR = r: The benefits equal the costs, making the decision dependent on other factors, such as the project's necessity for public welfare or national security.

Common formulas for calculating IRR are:

From Definition; $\sum \left(\frac{B_t - C_t}{(1+IRR)^t} \right) = 0$

Using Linear Interpolation

$IRR = rL + (rH - rL) \left(\frac{NPVL}{(NPVL - NPVH)} \right)$ Where:

rL: Lower discount rate

rH: Higher discount rate

NPVL: NPV calculated from (rL)

NPVH: NPV calculated from (rH)

3) Benefit-Cost Ratio (B/C ratio): The Benefit-Cost Ratio (B/C ratio) represents the ratio of the present value of benefits to the present value of costs or expenses. In this context, costs or expenses are considered as a total sum without separating different types of costs, serving as a measure of the project's drawbacks. A B/C ratio value greater than 1 indicates that the project is worth investing in. This can be expressed in the formula:

Benefit-Cost Ratio (B/C ratio)

$B/C \text{ ratio} = \frac{PV \text{ of Benefits}}{PV \text{ of Cost}}$] Where:

PV (of Benefits)) is the net present value of the benefits

PV (of Cost)) is the net present value of the costs

B is the benefit in year (t)

C is the cost or expenses in year (t)

r is the interest rate (discount rate)

t is the year of the project

n is the number of years or the duration for analysis

Since all three methods have their own advantages and disadvantages, relying solely on one method may not conclusively determine whether a project is worth investing in. For instance, a project may have a positive NPV, but when calculating the IRR, certain discount rates might render the NPV to zero. Therefore, it is essential to consider the B/C ratio as well to make an informed decision. If the IRR is greater than the specified interest rate, it indicates that the project is a good investment. Conversely, if the IRR is less than the interest rate, it suggests that the project may not be worth the investment. Hence, this study employs all three methods to address these limitations.

4) The Payback Period : The payback period refers to the duration for which the net returns from an educational investment equal the cost of that investment. The payback period can be calculated using the following formula (Tongyingsiri, 1999).

Payback Period = (Investment Cost in Education) / (Average Annual Net Return)

Discount Rate

The interest rate mentioned here is significant as a discount rate or rate of return, representing the yield from an investment as a percentage. For instance, if we invest a certain amount of money and want to know what percentage return we can expect, the question of which discount rate to use in evaluating the project becomes relevant. In other words, what rate of return will be used as a

discount rate to calculate the present value, ensuring that the present value of the expected future returns matches the investment cost?

When investing in projects, investors typically expect a return that exceeds the borrowing costs incurred. If the anticipated rate of return is less than the cost of borrowing, investors will be disinclined to invest in that project. The choice of discount rate depends on the numeraire we select to represent the depreciation of value over time between the future and the present.

Once we choose a discount rate, it must be applied as a constant rate throughout the project's duration. If we select consumption as the numeraire, the discount rate will reflect the value of consumption over time, related to the interest rate on consumption, which indicates varying levels of satisfaction over time when consuming today versus postponing consumption until next year. However, if public investment is chosen as the numeraire, the appropriate discount rate should reflect the opportunity cost of capital in the economy.

An important factor in choosing the discount rate is the "Opportunity Cost of Capital," which indicates the return we could achieve by deploying capital to the best alternative use. If the available capital could be invested in another project, using it for the current project would forfeit the opportunity to invest elsewhere. Therefore, the opportunity cost serves as a measure of the potential return from investment choices that the investor might miss if they choose to invest in the project under evaluation.

Thus, choosing the discount rate is a delicate and crucial matter, as it not only measures the expected returns from the investment but also considers the returns that may be lost by choosing to invest in projects that do not yield adequate long-term benefits (Tongyingsiri, 1999).

3. Methodology

3.1. Data Collection from the Sample Group

This research is quantitative. Quantitative methods were chosen because of their ability to perform systematic and empirical analyses with statistical tools (Shaengchart et al., 2025). Convenience sampling was used among the population, yielding a total sample of 1,230 people. Data was collected through an online questionnaire created by using Google Forms, which was distributed via various online channels such as Facebook and Line from July to September 2024.

3.2. Variables and Measurement of Variables

The study examines factors affecting the costs and returns of educational investment, which include:

1. Variables for Studying Education Costs: These consist of direct educational expenses, including costs related to education overall, such as fees paid to institutions and tuition fees.
2. Variables for Studying Returns on Investment in International and Bilingual Educational Programs: This includes income from employment of graduates and salary growth rates. Both systems have a salary growth rate of 7% per year, based on the civil service salary increase rate of 5–10% for the years 2023-2024 from the Thai government, and this study used 7%.

3.3. Development and Quality Assessment of Instruments

The research followed these steps to create and evaluate the effectiveness of the questionnaire:

1. A review of concepts, theories, and research related to costs and returns on investment in international and bilingual educational systems, which formed the basis for developing the questionnaire.

2. Development of the questionnaire based on the identified sub-factors from the literature review.

3. The developed questionnaire was reviewed with guidance from the supervising professor to verify the appropriateness of the content, the suitability of the language used, and to make preliminary adjustments before testing the tool's effectiveness in the next step.

4. Content validity testing was conducted by calculating the Index of Item Objective Congruence (IOC) (Kraiwanit et al., 2023; Nivornusit et al., 2024). The questionnaire was sent to three experts in the relevant field to evaluate the clarity, appropriateness for measuring the variables, and suitability of the language used to inform the development and improvement of the questionnaire (Limna & Kraiwanit, 2024; Tanantong et al., 2024).

5. Reliability testing was conducted using 30 questionnaires, which is sufficient for testing (Iacobucci & Duhacheck, 2003) and administered to individuals with characteristics like the sample group. The data collected was used to calculate Cronbach's alpha coefficient (Coefficient Alpha's Cronbach), considering variables with ordinal data on a five-level scale (Gliem & Gliem, 2003). An alpha value of 0.70 or higher indicates a reliable questionnaire (Santos, 1999).

6. The questionnaire, validated for content and reliability, was subsequently used to collect data from the sample group.

3.4. Data Analysis

The research collected data for analysis as follows:

Part 1: General information about respondents was analyzed using descriptive statistics, calculating percentages and presenting data descriptively.

Part 2: An analysis of the costs and returns on educational investment is vital for investment decision-making. The analysis includes methods such as:

1. Net Present Value (NPV) Analysis
2. Benefit-Cost Ratio (B/C ratio) Analysis
3. Internal Rate of Return (IRR) Analysis

4. Payback Period: Examining the time it takes for net returns from educational investment to equal the initial investment costs.

The discount rate was defined based on the opportunity cost of capital, which in most developing countries typically has a real rate between 7% and 15% per year. This study set the average discount rate at 7.5% per year (Bank of Thailand, 2017).

The criteria for deciding whether to invest are as follows:

If $NPV \geq 0$, it indicates that the project provides returns or income valued at present equal to or higher than the costs involved, making it suitable for investment.

If $B/C \text{ ratio} \geq 1$, it signifies that the total benefits of the project have a present value equal to or greater than the total present value of costs, indicating that investment is advisable.

If $IRR \geq r$, it shows that the project's internal rate of return exceeds the project's discount rate, making it suitable for investment.

Table 1. Education Investment Model: International program Cost and bilingual program (Baht)

Educational level	Tuition Fees	
	International program	Bilingual program
Kindergarten	510,300	225,000
Primary	1,633,590	522,000
Lower Secondary	759,306	277,764
Upper Secondary School	912,282	287,364
Bachelor's Degree (Social Sciences)	1,067,600	322,352
Total cost	4,883,078	1,634,480

The data indicates that tuition fees at various educational levels are consistently higher in the international program compared to the bilingual program. For the kindergarten level, tuition fees are 510,300 THB for the international program, while the bilingual program charges 225,000 THB. At the primary level, fees amount to 1,633,590 THB in the international program, compared to 522,000 THB for the bilingual program. For lower secondary education, the international program has tuition fees of 759,306 THB, whereas the bilingual program charges 277,764 THB. At the upper secondary level, the fees reach 912,282 THB in the international program, while the bilingual program costs 287,364 THB. Lastly, for a bachelor's degree in social sciences, the international program costs 1,067,600 THB, while the bilingual program charges 322,352 THB. Overall, the total tuition fees amount to 4,883,078 THB for the international program and 1,634,480 THB for the bilingual program, highlighting a significant difference in educational costs, with the international program consistently charging higher fees across all levels.

Table 2. Income since graduating with a bachelor's degree (Social Sciences) for bilingual program and international program until retirement age of 60 years

Age at start of work (years)	Working period (years)	Bilingual program Expected income / year	International program Expected income / year
24	1	300,000.00	480,000.00
25	2	321,000.00	513,600.00
26	3	343,470.00	549,552.00
27	4	367,512.90	588,020.64
28	5	393,238.80	629,182.08
29	6	420,765.52	673,224.83
30	7	450,219.11	720,350.57
31	8	481,734.44	770,775.11
32	9	515,455.85	824,729.37
33	10	551,537.76	882,460.42
34	11	590,145.41	944,232.65
35	12	631,455.59	1,010,328.94

Age at start of work (years)	Working period (years)	Bilingual program Expected income / year	International program Expected income / year
36	13	675,657.48	1,081,051.96
37	14	722,953.50	1,156,725.60
38	15	773,560.25	1,237,696.39
39	16	827,709.46	1,324,335.14
40	17	885,649.12	1,417,038.60
41	18	947,644.56	1,516,231.30
42	19	1,013,979.68	1,622,367.49
43	20	1,084,958.26	1,735,933.22
44	21	1,160,905.34	1,857,448.54
45	22	1,242,168.71	1,987,469.94
46	23	1,329,120.52	2,126,592.84
47	24	1,422,158.96	2,275,454.33
48	25	1,521,710.09	2,434,736.14
49	26	1,628,229.79	2,605,167.67
50	27	1,742,205.88	2,787,529.40
51	28	1,864,160.29	2,982,656.46
52	29	1,994,651.51	3,191,442.41
53	30	2,134,277.11	3,414,843.38
54	31	2,283,676.51	3,653,882.42
55	32	2,443,533.87	3,909,654.19
56	33	2,614,581.24	4,183,329.98
57	34	2,797,601.93	4,476,163.08
58	35	2,993,434.06	4,789,494.50
59	36	3,202,974.45	5,124,759.11
60	37	3,427,182.66	5,483,492.25
		48,101,220.61	76,961,952.97

The compares the expected incomes for graduates from bilingual and international programs over a working period of 37 years, starting at age 24. In the bilingual program, the income begins at 300,000 THB per year, increasing annually to 3,427,182.66 THB by age 60, totaling 48,101,220.61 THB. In contrast, the international program starts with an annual income of 480,000 THB, growing to 5,483,492.25 THB by age 60, resulting in a total income of 76,961,952.97 THB. This shows that although both programs see income growth, the international program achieves a higher cumulative income.

Table 3. Comparison of Educational Investment in the International and Bilingual program

	Educational Investment	
Total Income by Age 60 (over 37 years)	48,101,220.61	76,961,952.97
Discount Rate	7.50%	7.50%
NPV (Net Present Value)	7,871,744	10,326,880.71
IRR (Internal Rate of Return)	25.30%	16.39%
B/C Ratio (Benefit-Cost Ratio)	5.82	3.11
Payback Period (Year)	5	8

Table 3 shows that the educational investment between the bilingual and international programs reveals several key findings. First, in terms of accumulated income by retirement age (60 years), the bilingual program yields 48,101,220.61 THB, compared to 76,961,952.97 THB from the international program. Both systems operate with a discount rate of 7.50%. The Net Present Value (NPV) of accumulated income for the bilingual program is 7,871,744 THB, while the NPV for the international system stands at 10,326,880.71 THB. Regarding the Internal Rate of Return (IRR), the bilingual program boasts a return of 25.30%, considerably higher than the 16.39% for the international program. The Benefit-Cost (B/C) ratio also favors the bilingual system with a ratio of 5.82, compared to 3.11 for the international program. Finally, the payback period is shorter for the bilingual program at 5 years, while the international system takes 8 years to recoup its investment. Overall, the bilingual program demonstrates greater efficiency in terms of costs and returns.

4. Discussion

The research presents a detailed examination of the financial implications associated with pursuing education in bilingual versus international programs. The findings reveal a stark contrast in tuition fees, with the international program costing significantly more, totaling 4,883,078 THB compared to the bilingual program's 1,634,480 THB at all educational levels from kindergarten through a bachelor's degree in social sciences. According to Cheng (2019), the cost of education in Thailand is considered low for Chinese families who are learning a bilingual program. The open policy of the Thai government brings more opportunities to Thailand. Thailand has advantages in offering business opportunities, including international education business. As with the research of Patrinos and Velez (2009) the advantages of bilingual education for disadvantaged indigenous populations represent a significant investment in human capital. In Guatemala, students enrolled in bilingual schools experience higher rates of attendance and promotion, along with lower rates of repetition and dropout. These students also achieve better scores across all subjects, including Spanish. A simple cost-benefit analysis supports the effectiveness of bilingual education, indicating that transitioning to bilingual schooling can yield substantial cost savings by reducing the need for repetition. By enhancing the quality of education and increasing promotion rates, students are more likely to complete primary education, which significantly boosts completion rates at a low cost. It is estimated that the savings from implementing bilingual education could amount to \$5 million, equivalent to the cost of primary education for 100,000 students.

Although the international program demands a higher initial investment, it is projected to lead to a greater cumulative income of 76,961,952.97 THB by the age of 60, compared to 48,101,220.61 THB for graduates of the bilingual program. This disparity suggests that, while the international option

may offer the potential for higher long-term earnings, it does not necessarily provide the most efficient returns relative to its costs.

The analysis of financial metrics, including Net Present Value (NPV), Internal Rate of Return (IRR), Benefit-Cost (B/C) ratio, and payback period, further emphasizes the advantages of the bilingual program. Specifically, the bilingual program demonstrates a higher NPV of 7,871,744 THB and a superior IRR of 25.30%. Its B/C ratio of 5.82 indicates that for every baht invested, it yields greater value compared to the international program's B/C ratio of 3.11. Moreover, the bilingual program has a shorter payback period of 5 years versus 9 years for the international program, which is a crucial consideration for families evaluating the long-term financial burden of educational investments. According to Rodríguez-Limachi et al. (2024), the educational project has a net present value of 794,874.30 at social prices and a social internal rate of return of 9.56%. It is possible to incorporate the cost/benefit methodology in the formulation and evaluation of standard and simplified technical specifications, as well as in profile-level studies of public investment projects in the educational sector. It is concluded that the social evaluation of investment projects in the educational sector of the Peruvian state is feasible, using the cost/benefit methodology in the region and in the country, through the profitability indicators NPV and IRR, achieving a higher internal rate of return.

The study also shows that income increases with higher education levels. Chakkaphan et al. (2018) found that graduates with more work experience earn more than those with less experience. Graduates in the private school also earn more than those in the public school. The return on investment is about 266.68%, with private school graduates seeing a return of 342.08% and public-school graduates at 222.84%. The overall internal rate of return for graduates is 28.84%, with private school graduates at 31.97% and public-school graduates at 26.76%.

Yenyuak (2010) found that students from all study areas make worthwhile financial investments. Graduates from international programs usually earn more than those who do not study abroad. Research by Amaonye and Ofojebe (2023) shows that the returns from master's and doctoral programs can vary greatly depending on the chosen field. Bashir and Siddique (2023) found that master's degree holders earn about 29.8% more than those without a doctoral degree.

Khan (2021) discovered that higher education degrees yield better economic returns than lower education levels, based on studies from Pakistan. These results highlight the need for policies and financial support to improve access to education and emphasize the long-term benefits of international education programs in developing areas. In summary, developing higher education is crucial for better career opportunities and higher income in the future.

5. Conclusion

In summary, this research highlights the financial implications of choosing between bilingual and international education programs. The international program incurs significantly higher tuition fees, amounting to 4,883,078 THB, compared to the bilingual program's 1,634,480 THB across all educational levels, from kindergarten to a bachelor's degree in social sciences. While the international program may provide the potential for higher cumulative income projected at 76,961,952.97 THB by age 60 versus 48,101,220.61 THB for bilingual graduates, this does not necessarily translate to more efficient returns on investment.

The financial metrics analyzed, including Net Present Value (NPV), Internal Rate of Return (IRR), Benefit-Cost (B/C) ratio, and payback period, favor the bilingual program. With a higher NPV of 7,871,744 THB, an IRR of 25.30%, and a beneficial B/C ratio of 5.82, the bilingual program offers greater value for every baht invested compared to the international program's B/C ratio of 3.11. Additionally, the bilingual program benefits from a shorter payback period of 5 years versus 8 years

for the international option, making it a more appealing choice for families concerned about long-term educational costs.

In conclusion, while the international program may offer the allure of higher income potential, the bilingual program emerges as a more economically efficient and cost-effective alternative. Prospective students and their families should carefully assess these financial implications when making educational choices, as selecting the bilingual program may result in significant advantages in terms of overall costs and long-term value.

Future research should delve deeper into the implications of educational investments in both bilingual and international programs by incorporating a comprehensive cost-benefit analysis of additional factors. These may include extracurricular activities, study abroad opportunities, and networking potential, as such elements can profoundly impact the overall returns on investment and contribute to an individual's personal development.

Declarations

Author Contributions. S.N.: Conceptualization, software use, validation, investigation, resources, writing, review and editing, and supervision. T.K.: Conceptualization, software use, validation, formal analysis, investigation, resources, writing—original draft preparation, writing—review, and editing. All authors have read and approved the publication of the final version of the article.

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