COPENHAGEN CONSENSUS CENTER

BHUTAN ACADEMY

Education: costs, benefits and value for money

Evidence, worked calculations and Bhutan applications

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Education: what should Bhutan invest in?

- Bhutan’s per-child financing proposal
- What school grants have achieved elsewhere
- What improves access and learning
- How to value benefits and compare them with costs
- Nutrition, preschool, and vocational training
- What this means for Bhutan’s financing decision

Per-child financing in Bhutan

Per-child financing in Bhutan

- Operational budgets based on the number of enrolled students
  - **Context-specific adjustments for different school settings**
- Materials, utilities, minor maintenance, and co-curricular activities
- More school flexibility in how funds are used
  - **Our assignment: assess what changes and what it achieves**

Bhutan Ministry of Education and Skills Development, 11 May 2026

Bhutan PCF announcement (2026)

Start with what changes against current practice

Comparison	What it includes
Business as usual	Current school funding, household spending and committed reforms
Proposed change	Enrolment-based operational grants, contextual adjustments and more discretion
Decision unit	The additional PCF reform, not the value of all education
Count only the difference	Additional costs and outcomes; separate reallocation from a larger budget

Bhutan PCF assessment: learning benefits and BCR are not yet estimated

Bhutan PCF announcement (2026)

Funding, access, and learning

What we measure	Bhutan example	What it tells us
Funding	Budget per pupil, timing of disbursement	Resources available to schools
Access	Enrolment, attendance, completion	Children participate in education
Learning	Reading and mathematics assessments	Children acquire skills
Equity	Resources and outcomes by school context	Who gains from the reform

Bhutan PCF announcement (2026)

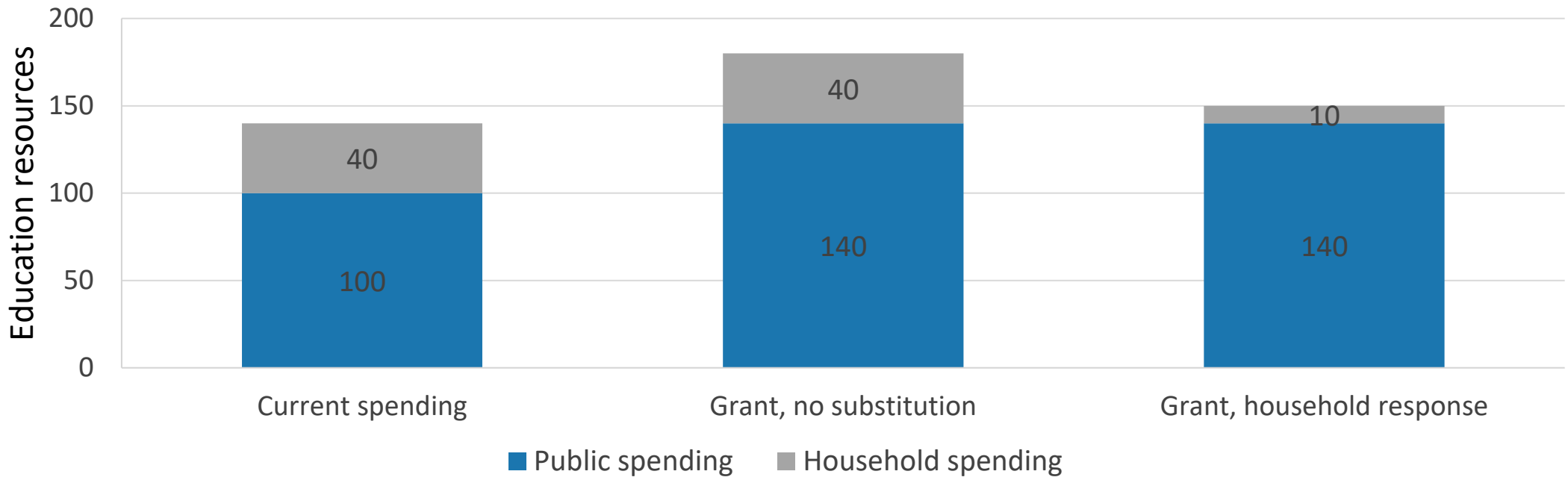
School grants: a range of evidence

Evidence case	What happened	Question for Bhutan
India and Zambia	Anticipated and unanticipated grants produced different learning responses	Will households reduce their own spending?
Niger	Participation and some early-grade enrolment improved, test scores did not	Which outcomes change, and over what period?
Indonesia	Grants and training had limited learning effects, stronger community links performed differently	How will delivery and governance change?

Das et al. (2013), Beasley & Huillery (2017), Pradhan et al. (2014)

Das et al. (2013) | Niger: World Bank research summary | Pradhan et al. (2014)

A grant and the additional resources



The same grant can produce different changes in total resources

Illustration only, amounts are arbitrary units

Das et al. (2013) | Niger: World Bank research summary | Pradhan et al. (2014)

How a PCF learning benefit would be valued

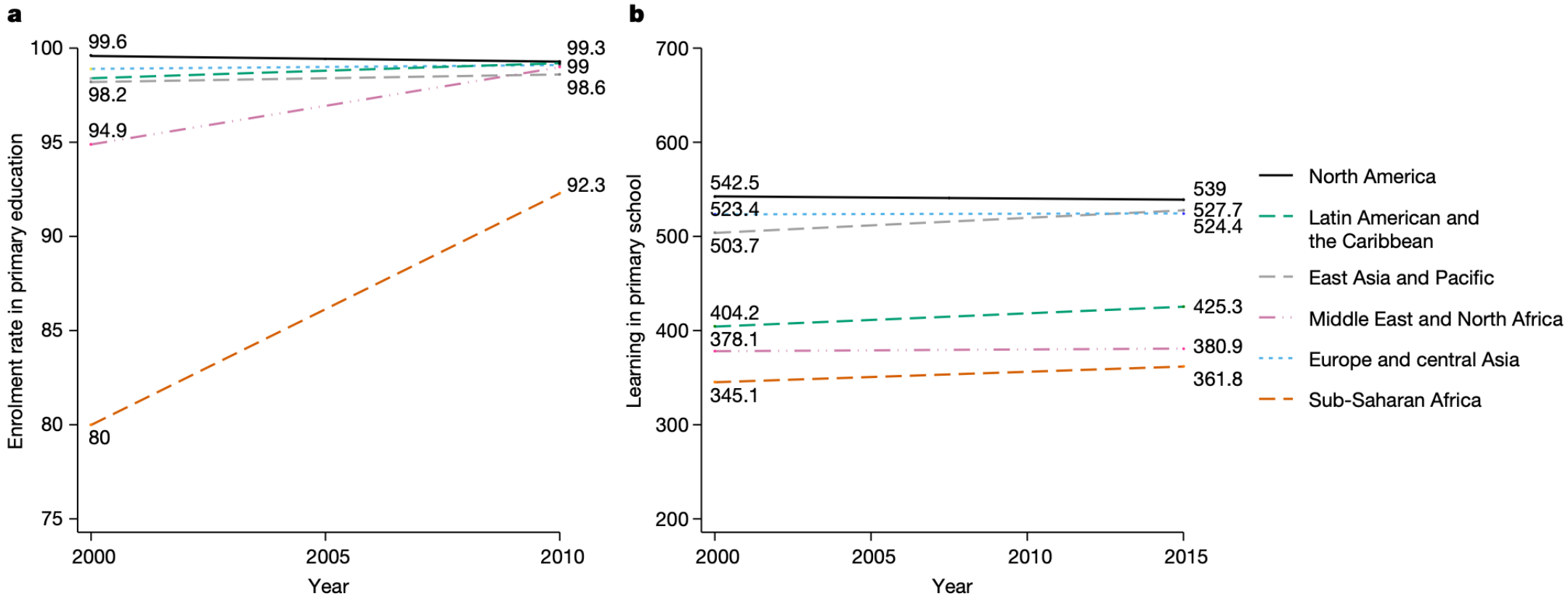
Benefit per child = learning gain × earnings response × lifetime income

Model input	Evidence status
Sustained learning gain	Not established for Bhutan PCF; scenarios require an accepted transfer, spending is not an automatic learning gain
Earnings response to learning	International relationship used in the valuation model
Lifetime income	Bhutan income estimates

Das et al. (2013) | Niger: World Bank research summary | Pradhan et al. (2014) | World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

What improves access and learning?

Many children attend school but learn very little



Angrist et al. (2021), Measuring human capital using global learning data

More spending alone need not close the gap

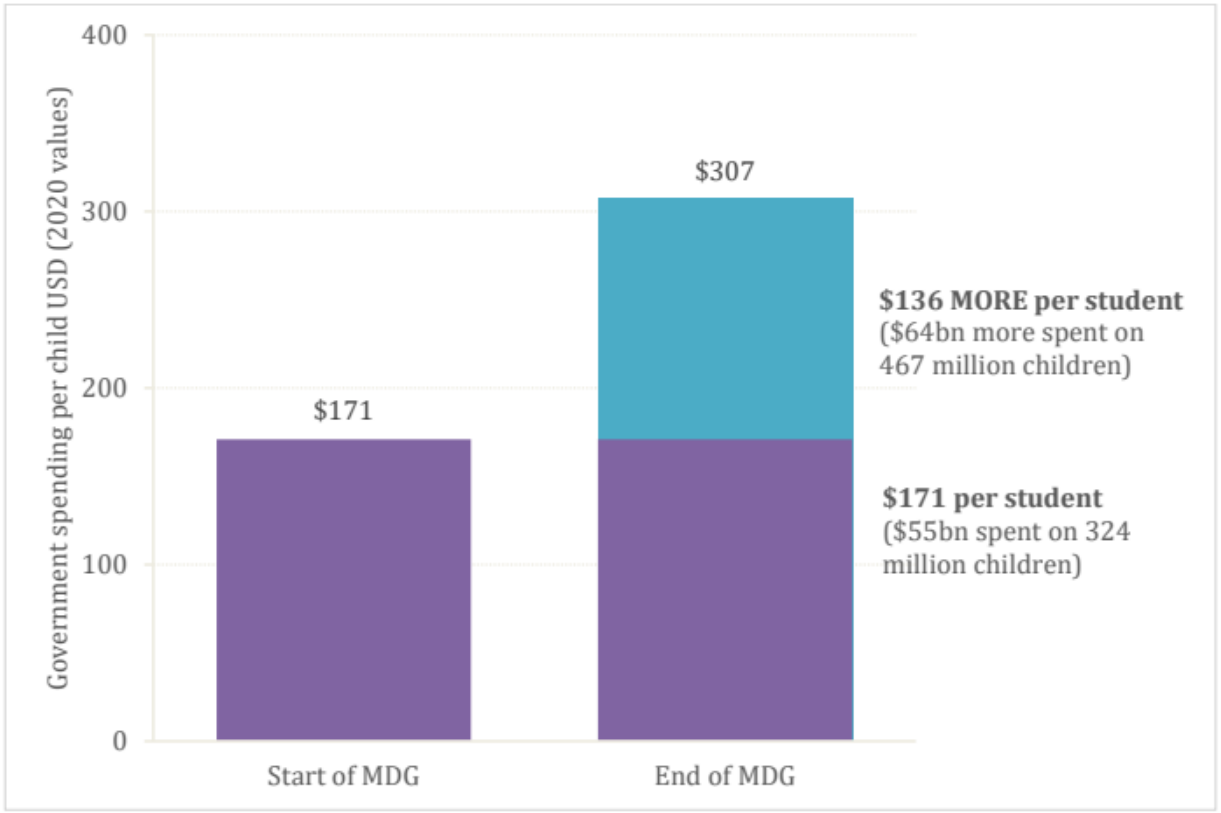


Figure 3: Increase in government spending per primary student across MDG era, LICs and LMCs
Source: Authors' calculations.

- More resources reached schools
  - **Learning improved much more slowly**
- How the money changes teaching matters

Angrist et al., Best Things First education research, Figure 3

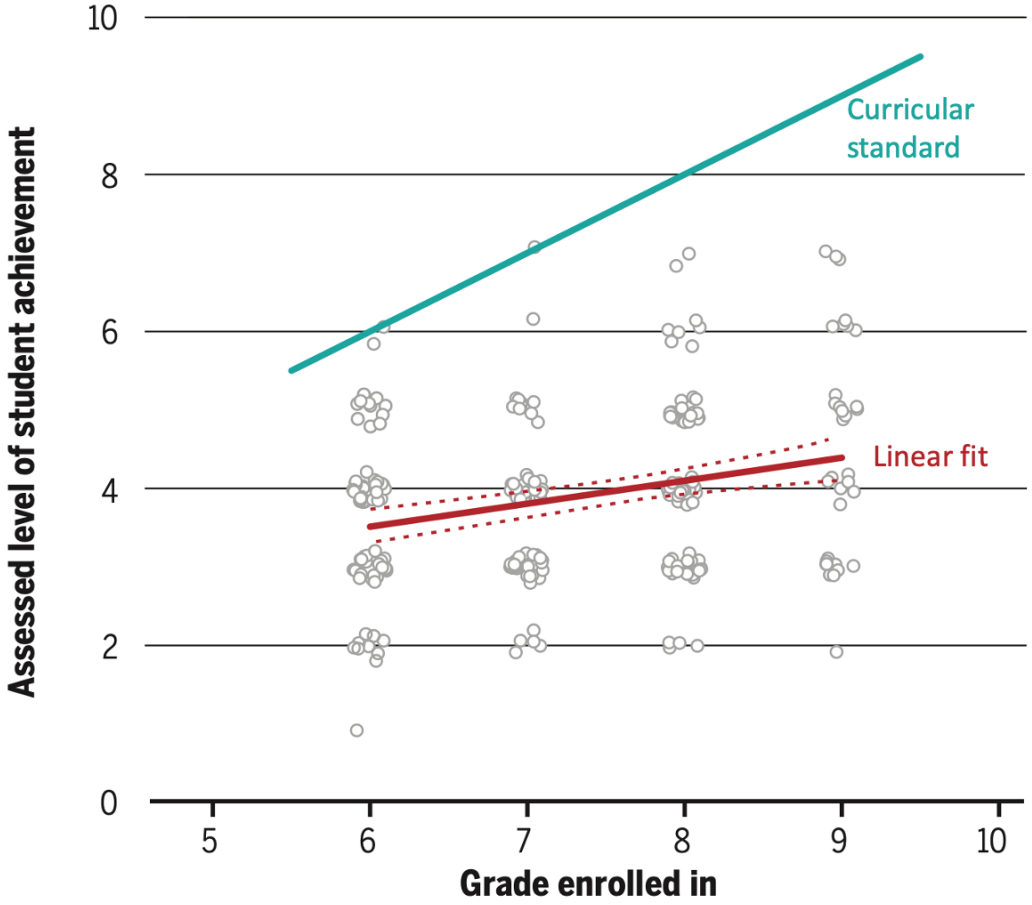
What does “not learning” mean?

Reading comprehension	Basic arithmetic
Vijay has a red hat, a blue coat, and yellow socks.	Two people share six pieces of cheese equally.
What colour is the hat?	How many pieces does each person get?

Illustrative reading and arithmetic tasks

Learning: the challenge

- Children in the same grade can be at very different learning levels
- Teaching the grade curriculum can leave many children behind



Delhi research sample, Muralidharan & Singh (2021)

Muralidharan & Singh (2021)

Learning: what has not worked?

Intervention	Observed learning result	What was missing?
One Laptop per Child, Peru	No improvement in academic achievement	Devices alone did not change instruction enough
Higher teacher pay, Indonesia	No discernible test-score improvement	Pay increases without a change in teaching
Inputs provided alone	Often limited or no learning improvement	An effective approach to using the inputs

Best Things First education research

Education research: inputs and valuation

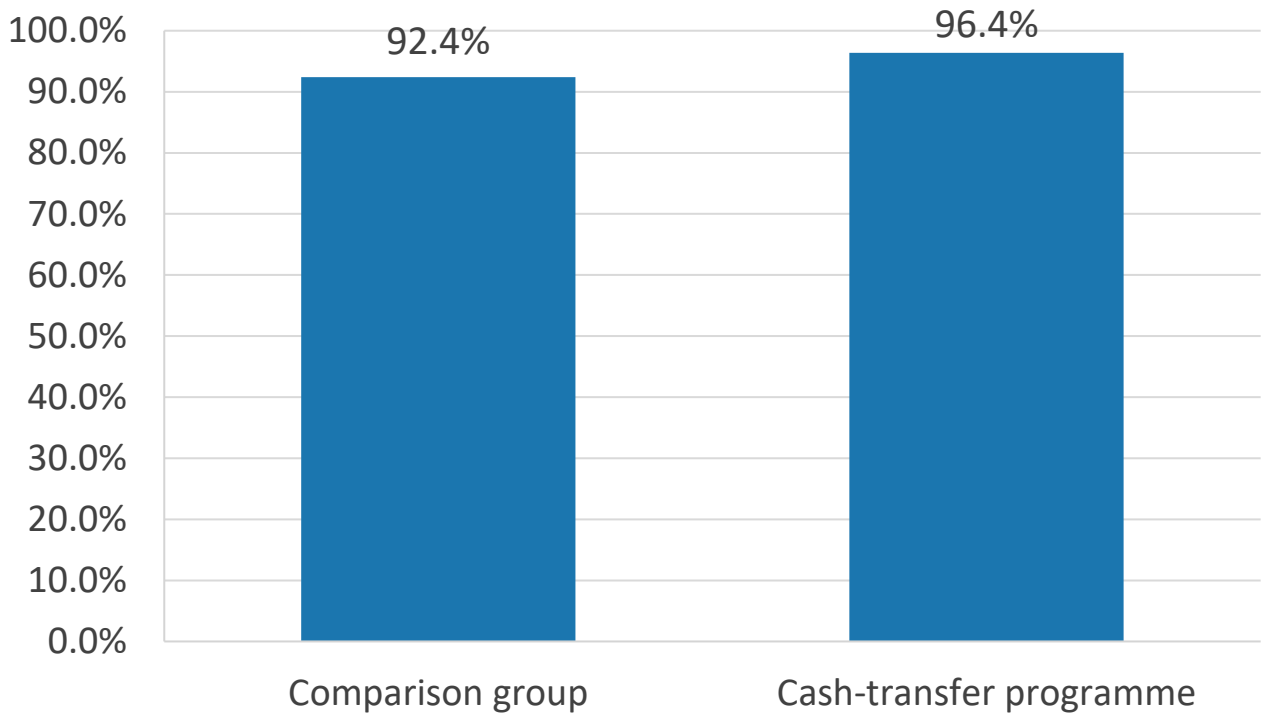
What improves access to education?

Barrier	Evidence-backed response	Bhutan question
Financial cost	Reduce fees and other attendance costs	Which families still face material costs?
Household constraints	Cash support linked or labelled for education	Who needs support to remain in school?
Distance or illness	Shorter travel and effective health interventions	Where do these barriers prevent attendance?

J-PAL review of 31 randomized evaluations (2019)

J-PAL: school participation review | Indonesia PKH evaluation

Cash transfers can increase enrolment



- Enrolment increased by 4 percentage points
  - **Assess learning separately**
- Which outcome does the policy target?

Indonesia PKH, ages 7–15, Cahyadi et al., six-year follow-up

J-PAL: school participation review | Indonesia PKH evaluation

Two effective education investments

- Children learn more
  - **Learn according to level: Teaching at the Right Level**
  - **With or without technology**
- Teachers teach better
  - **Structured pedagogy: semi-scripted lesson plans**
  - **Teaching materials, training and ongoing coaching**

Teaching at the Right Level

Element	What changes for the child
Assessment	A short test identifies actual reading and mathematics skills
Grouping	Children work on tasks suited to their current learning level
Teaching	Dedicated time builds the skills that children have not mastered
Reassessment	Children move to harder material as they progress

Best Things First education case

Education research: inputs and valuation

Structured pedagogy

- Semi-scripted lesson plans for the whole year
- Student materials matched to the lessons
- Teacher training in how to use the materials
  - **Coaching and ongoing support**
- Teachers teach better with a coherent package

Best Things First education case

Education research: inputs and valuation

How do we compare learning gains?

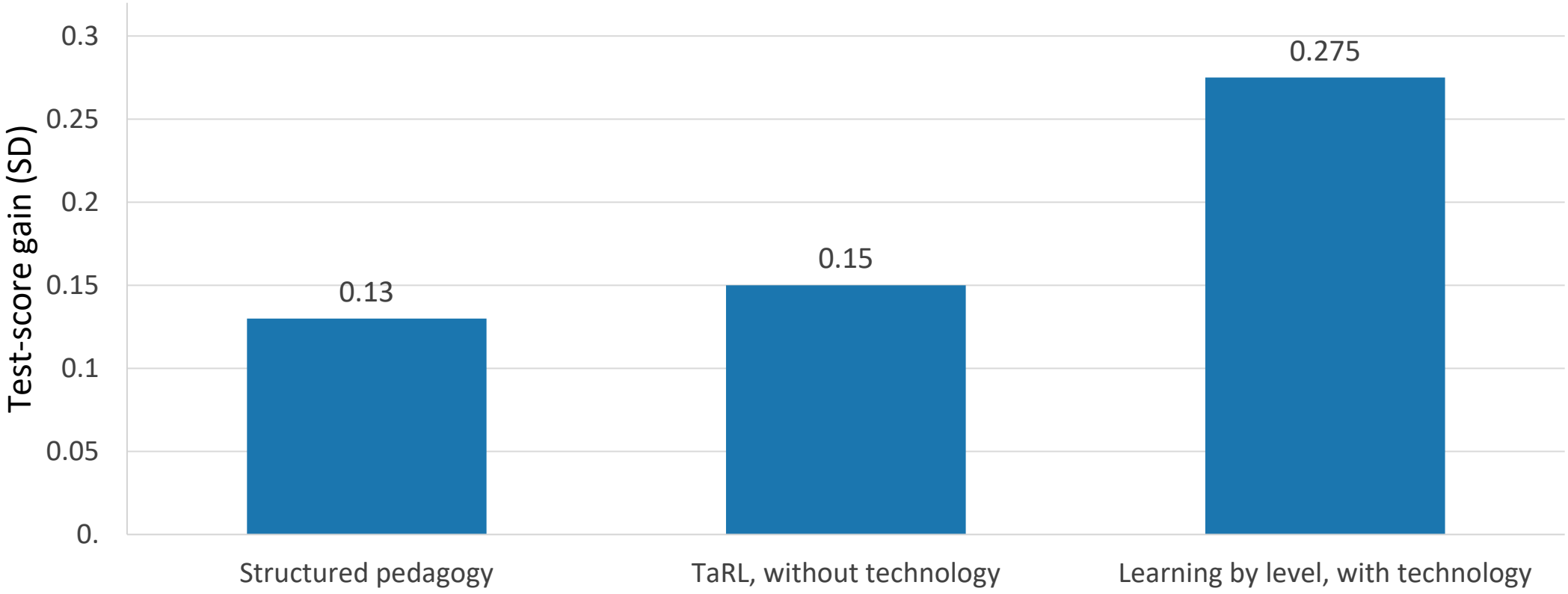
Standardised gain = score gain / spread of scores

Teaching example	Value
Average score gain against comparison	2 points
Standard deviation of scores	20 points
Standardised learning gain	2 / 20 = 0.10 SD

Illustration only, not a Bhutan assessment result

Education research: inputs and valuation

Learning gains used in the education cases



Best Things First inputs from different studies, not a head-to-head comparison

Education research: inputs and valuation

Comparing benefits in the future with costs today

Translating learning into income gains

1 SD of learning ≈ 20% higher income

0.13 SD × 20% = 2.6% higher income

- Apply the estimated earnings gain to lifetime income
  - **The result depends on whether the learning gain lasts**

Valuation relationship used in Best Things First, not a measured Bhutan effect

Education research: inputs and valuation

Education costs: everyone affected

Who bears the cost?	Examples in a Bhutan programme
Government and schools	Materials, training, coaching, administration, facilities
Teachers	Additional preparation and training time
Families	Travel, required purchases, supervision or volunteering
Children / adult trainees	No cost for children’s own school time; adult earnings forgone where relevant

Who pays, and what is a social benefit?

Item	How to treat it
Grant / fee replacement	Public cost and recipient relief on the two sides of the public-money comparison
Materials, staff and administration	Additional real resources, counted once
Learning or access benefit	Only the outcome improvement over business as usual
Caregiver time saved	A benefit; children’s own school time has no opportunity cost

Teaching accounting convention, incremental amounts relative to current practice

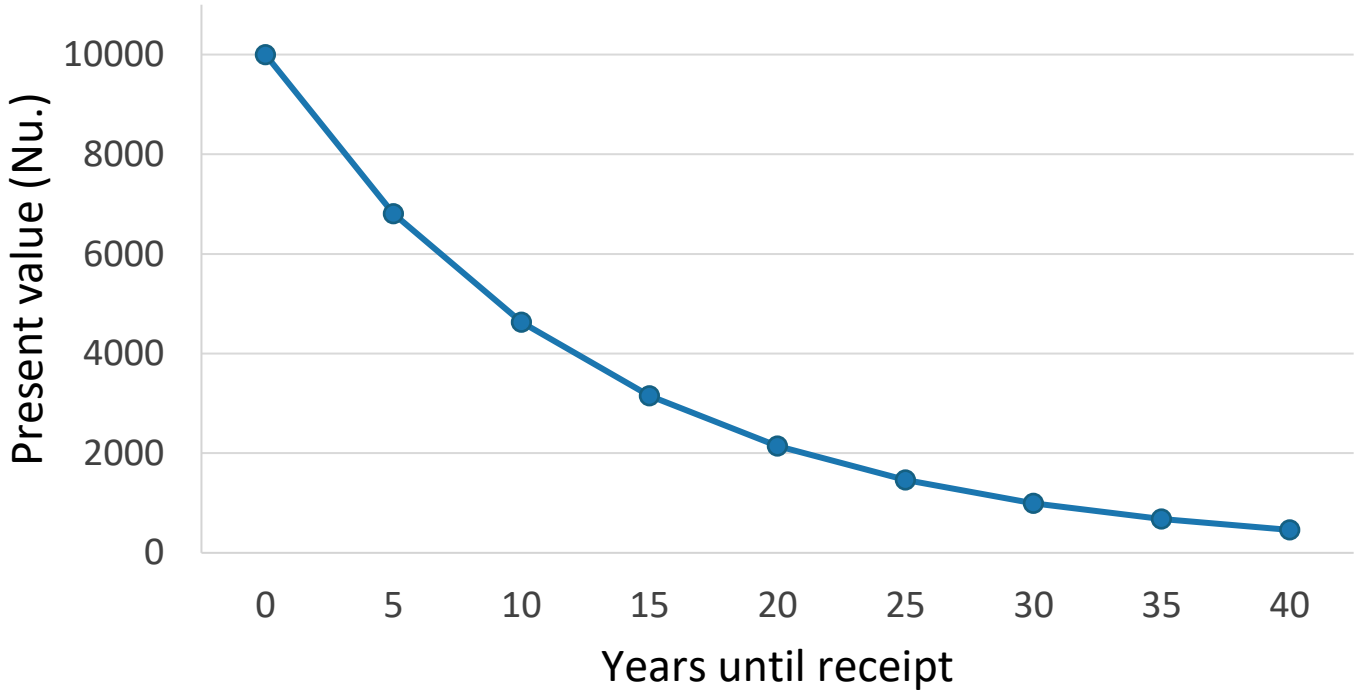
World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Costs today, benefits over many years

Age	What happens	Valuation
8	Learning intervention	Programme cost today
9–17	Skills develop and schooling continues	Include any additional education costs
18–65	Working life in the teaching example	Annual earnings gain
8, our reference date	Compare all flows on the same date	Present value of costs and benefits

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Why discount?



- People prefer benefits now
- Capital has an opportunity cost
  - **Discount future benefits and costs consistently**

Teaching example, Nu. 10,000 received in the future, 8% real discount rate

Bhutan: from nominal to real interest

Input	Bhutan source and value
Nominal market interest rate	9.0%: T Bank government employee floating loan, March 2026
Inflation estimate used	5.5%: midpoint of MoF's 5–6% near-term outlook
Real interest rate	(1.09 / 1.055) − 1 = 3.32%

Real rate = (1 + nominal rate) / (1 + inflation) – 1

This removes inflation from a financial return on money

Bhutan 2026 rates; inflation midpoint is a teaching choice within the official outlook

T Bank loan rates (March 2026) | MoF budget: inflation outlook (2026)

A discount rate for everything in society

- Financial interest concerns money
  - **Influenced by monetary policy, financial markets and loan risk**
- Societal CBA compares all future costs and benefits
  - **Education, health, people's time and the environment**
- World Bank: use 2 × potential income per capita growth

Bhutan: 3.79% × 2 ≈ 8% real social discount rate

Last 10 available years, excluding the pandemic contraction in 2020

World Bank discounting guidance; Bhutan real GNI per capita, 2015–2024

World Bank: social discounting guidance | World Bank: Bhutan income growth

Choosing the income and age inputs

Input	Evidence to use	This exercise
Annual median wage / income	Bhutan labour-force or household survey, with year and definition	Nu. 240,000 placeholder
Child's age	Affected pupils' ages or documented grade-age proxy	Age 8 placeholder
Common units	Convert wages and costs to the same real price year	2026 ngultrum

Teaching inputs must be replaced for a policy appraisal

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

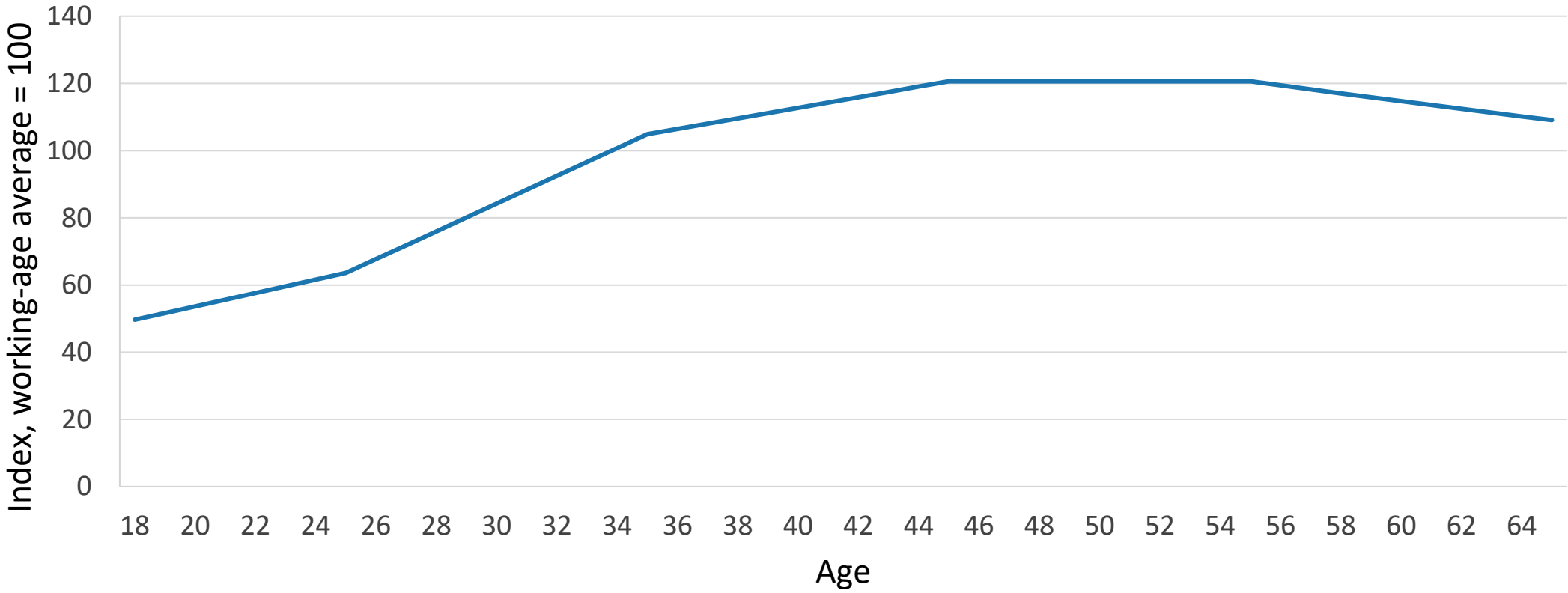
Lifetime income: a Bhutan teaching example

Input	Assumption
Child’s age / working ages	8 / 18–65 inclusive
Annual median income today	Nu. 240,000: illustrative placeholder
Real annual wage growth	4%: half the social discount rate
Real annual discount rate	8%: Academy Bhutan calculation

Teaching assumptions, all income in constant 2026 ngultrum

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

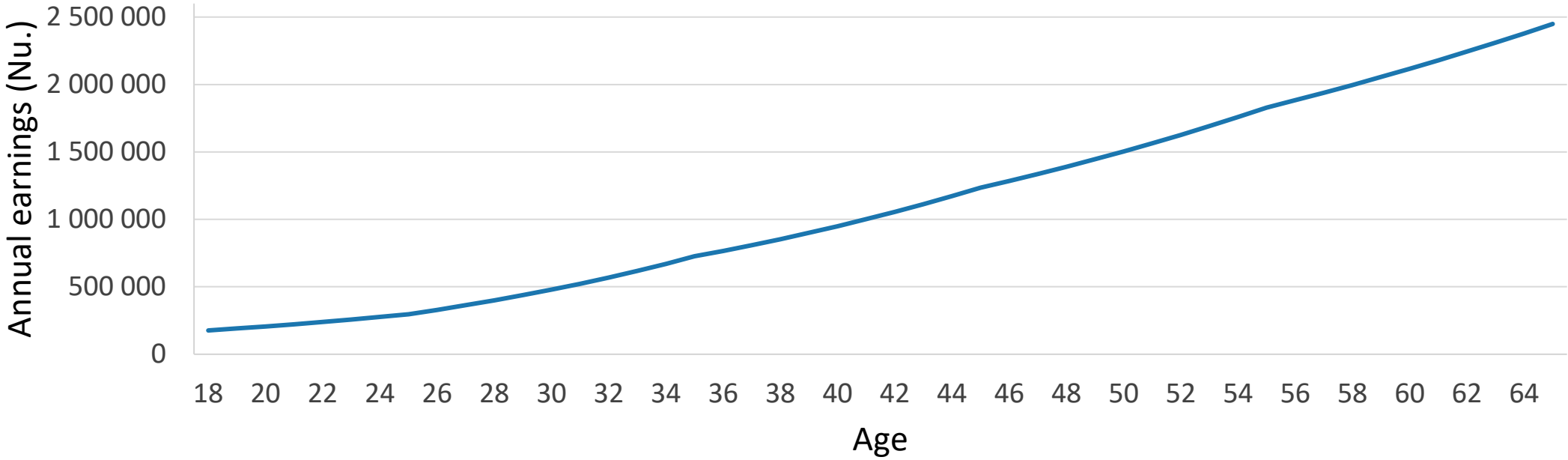
Earnings change over a working life



Modelling assumption; average age weight = 1.00, not a Bhutan estimate

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Future annual income

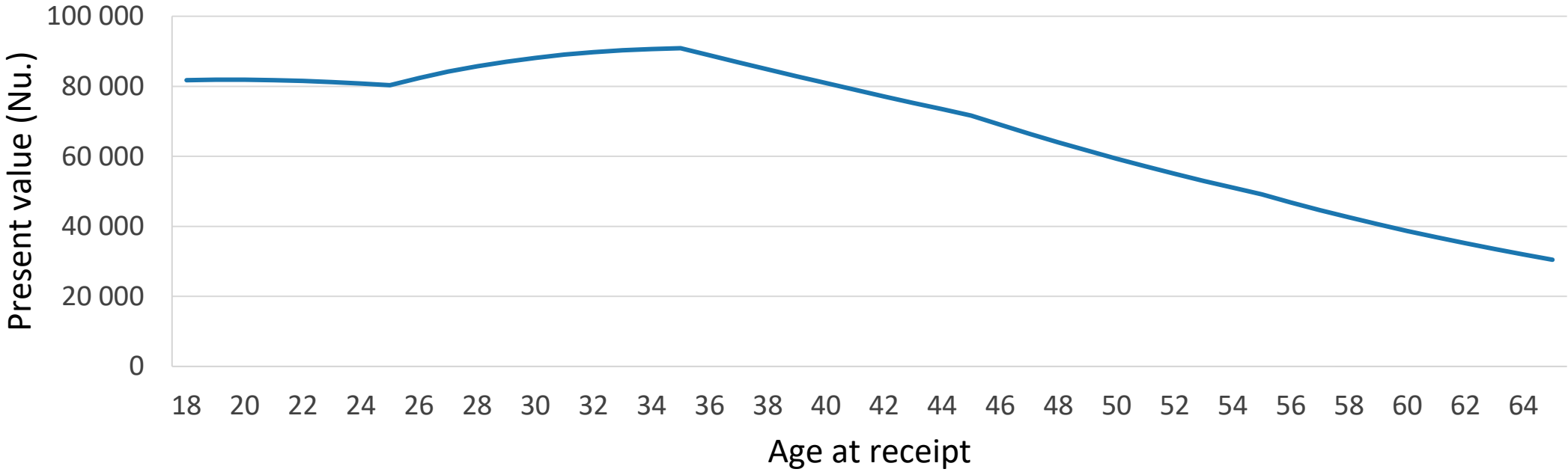


Annual income = median income × age weight × (1 + growth)^{t}

Teaching wage placeholder, Academy age profile and 4% real growth

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Discount each annual income, then add



PV = Σ [240,000 × age weight × 1.04^t / 1.08^t] = Nu. 3,296,679

Bhutan real social discount rate 8%, discounted to the teaching child's age 8

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Follow one year through the calculation

Step at age 18	Calculation
Years from age 8	18 − 8 = 10
Normalize the age-18 weight	0.50 / 1.006644 ≈ 0.49670
Age-specific income today	Nu. 240,000 × 0.49670 ≈ Nu. 119,208
Income after 10 years of real growth	Previous value × 1.04^{10} = Nu. 176,457
Discount that income to age 8	Nu. 176,457 / 1.08^{10} = Nu. 81,734
Repeat for every age 18–65	Add 48 annual present values = Nu. 3,296,679

Teaching example, all amounts in constant 2026 ngultrum

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

What connects learning to lifetime earnings?

Link	Evidence or assumption
Learning improvement	Study-reported test-score effect relative to a comparison group
Income response	Best Things First uses 20% higher income per 1 SD
Bhutan realization	This exercise assumes 100% transfer and a lasting gain
Lifetime income	Academy age profile, local wage input, real growth and discounting

Best Things First learning-to-income transfer; local realization is an assumption

Education research: inputs and valuation

The value of a learning improvement

Intervention	Learning gain	Earnings gain	Benefit per child
Structured pedagogy	0.13 SD	2.6%	Nu. 85,714
TaRL without technology	0.15 SD	3.0%	Nu. 98,900
Learning by level with technology	0.275 SD	5.5%	Nu. 181,317

Structured pedagogy: 0.13 × 20% = 2.6% earnings gain

Benefit = 2.6% × Nu. 3,296,679 = Nu. 85,714

Teaching valuation: wage placeholder, 100% transfer, sustained earnings effect

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Benefit-cost calculations: education cases

Intervention	PV benefit / child	Cost / child	BCR
Structured pedagogy	US$1,118	US$11	102
TaRL without technology	US$1,290	US$29	44
Learning by level with technology	US$2,365	US$32	74

BCR = present value of benefits / present value of costs

Reconstructed teaching case using published education inputs; US dollars, not Bhutan

Education research: inputs and valuation

Build the full incremental cost per child

Cost component	Nu. per child
Materials and delivery	1,200
Coaching and administration	800
Additional teacher time	500
Caregiver time and travel	200
One-time setup allocated to this cohort	300
Total incremental cost	3,000

Illustrative base package: benefit Nu. 85,714 / cost Nu. 3,000 → BCR 29

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Bhutan costs determine the Bhutan BCR

Cost per child	Benefit per child	Benefit-cost ratio
Nu. 1,000	Nu. 85,714	86
Nu. 3,000	Nu. 85,714	29
Nu. 6,000	Nu. 85,714	14

The international effect and the local cost both matter

Cost sensitivity for the teaching package, benefit per child ≈ Nu. 85,714

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Exercise: learning gains and costs

Teaching option	Learning gain	Cost per child
A	0.05 SD	Nu. 1,000, all incremental costs
B	0.15 SD	Nu. 4,000, all incremental costs

- Calculate the earnings gain and benefit per child
- Calculate each BCR
  - **Which would you choose, and what else do you need to know?**

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

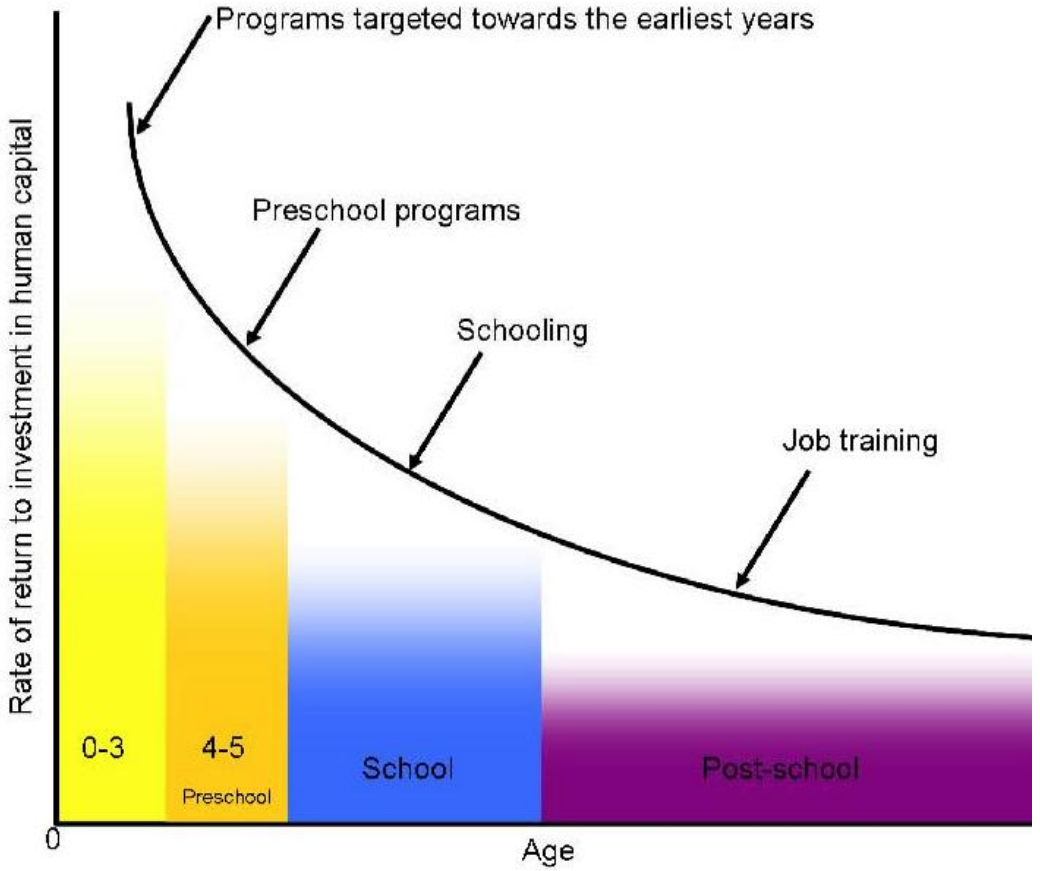
Break: what comes next?

- Nutrition and preschool
- Returns to schooling in Bhutan
- Vocational training and the cost of students' time
- What this means for per-child financing

Nutrition and preschool

Heckman Curve

- Earlier interventions help build skills for later learning
- The curve illustrates the potential of early investment
  - **Especially for disadvantaged children**
- The programme and its costs still determine the return



Heckman (2006), conceptual illustration

Heckman: early investment evidence

Nutrition supports health and later productivity

Table 4: Total annual benefits and costs of SQ-LNS provision to children 6–23 months of age: 2023

Discount rate	Total benefits (US$ million)	Total costs (US$ million)	BCRs
5%	51,674	3,248	15.9
8%	44,515	3,248	13.7
14%	40,884	3,248	12.6

Source: Estimates by the authors.

- Small-quantity nutrient supplements for children aged 6–23 months
- Benefits include fewer deaths and greater lifetime productivity
  - **Targeting and delivery costs matter for Bhutan**

Larsen, Hoddinott & Razvi (2023), original CBA across 40 countries, not Bhutan

Nutrition research manuscript

A nutrition assessment for Bhutan

Programme definition	What the appraisal needs
Eligible children	Age, nutritional risk, and current coverage
Additional services	Supplements or feeding support beyond current provision
Costs	Supplies, delivery, caregiver travel and time
Benefits	Health gains and later productivity, without double counting

Nutrition research manuscript

Valuing nutrition benefits in a Bhutan CBA

Benefit	Academy treatment
Health gains	DALYs averted × local value per healthy life-year (VSLY)
Local VSLY	Transferred VSL / (0.5 × life expectancy at birth)
Future productivity	Indexed lifetime income × evidenced productivity gain
Avoid overlap	Do not add VSL and VSLY for the same outcome; check health–income overlap

Academy valuation: Robinson et al. (2019), Reference Case Guidelines

Preschool: programme design changes the return

Intervention in Malawi	Main changes	Model BCR
Expand into unserved communities	New access to community preschool and childcare	4.5
Improve existing centres	Better facilities, materials, meals, and staffing	2.1

- Caregiver time saved can be a substantial benefit
  - **Additional schooling can also create costs**

Malawi Priorities (2021), model estimates at an 8% discount rate

Malawi preschool CBA

Preschool in Bhutan: access or quality?

Option	What changes	Costs and benefits to include
Expand access	Children without a service gain a place	Delivery costs, travel, child development, caregiver time
Improve quality	Children already enrolled receive better provision	Training and materials, incremental learning and development

The comparison is with the care children receive today

Malawi preschool CBA

Schooling and vocational training

Mincerian Earnings Function Method

$$\ln(\text{wage}) = \alpha + \beta \times \text{schooling} + \gamma \times \text{experience}$$

$$+ \delta \times \text{experience}^2 + \text{other controls}$$

Term	Meaning
β	Estimated wage difference for one additional year of schooling
Experience and experience^2	Earnings rise with experience and then grow more slowly

Kencho (2018), Bhutan earnings study

Returns to schooling: evidence from Bhutan

Table 4.6 Comparison of returns to education from individual data, two-year cohort means, and three-year cohort means.

VARIABLES	Individual data (Cross-sectional regression) OLS (i)	Pseudo-panel (Two-year cohort means) WLS (ii)	Pseudo-panel (Three-year cohort means) WLS (iii)
Years of education	0.0851***	0.210***	0.210***
	(0.000649)	(0.0226)	(0.0255)

- The individual-data estimate is about 9% per additional school year
- The estimate changes with the statistical method
  - **This explains schooling and wages, not the PCF effect**

Kencho (2018), Bhutan Labour Force Surveys 2010–2015, Table 4.6 excerpt

Kencho (2018), Bhutan earnings study

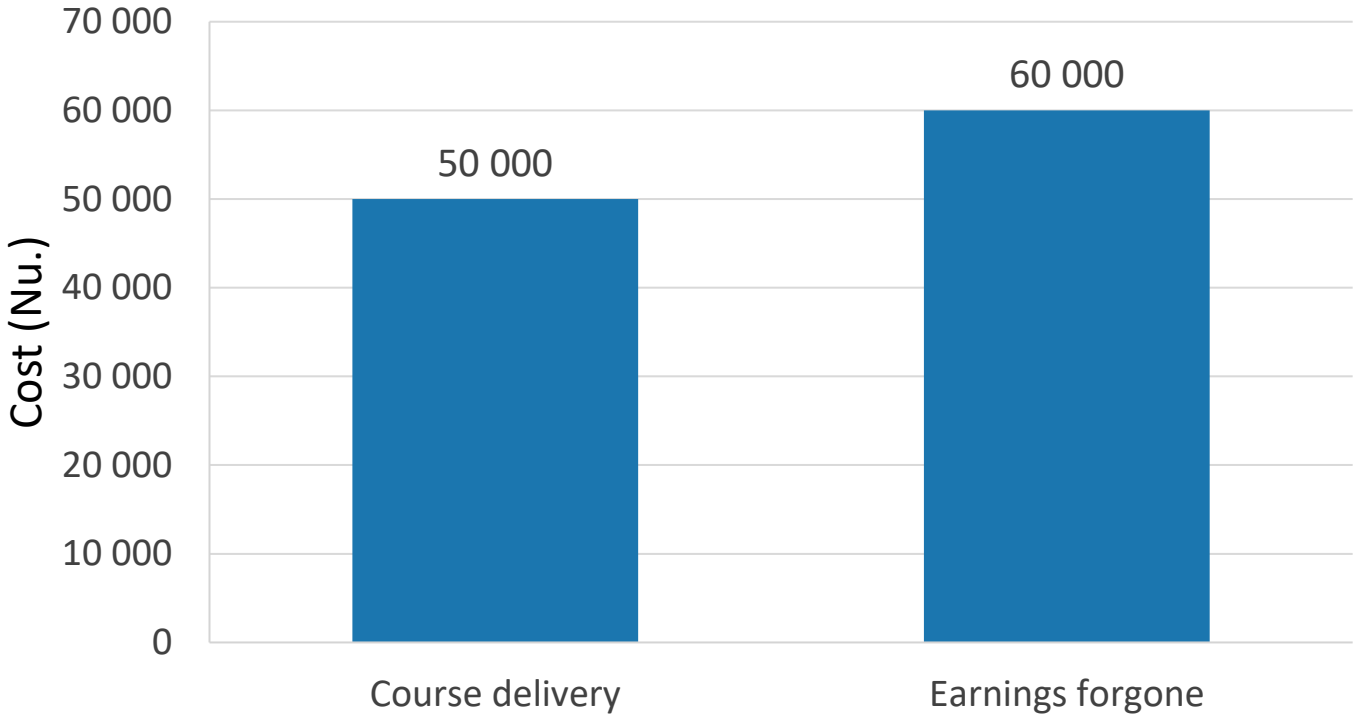
Vocational training: outcomes after the course

Outcome	What to compare
Skills and completion	What participants learn and whether they finish
Employment	Jobs with training versus jobs without training
Earnings	Expected earnings, including time unemployed
Programme design	Practical experience, employer demand, and placement support

J-PAL synthesis of 28 randomized evaluations (2023)

J-PAL: vocational training review

The student's time can be a major cost



- What would students do without the course?
  - **6 months × Nu. 10,000 = Nu. 60,000**
- Include the expected value of that alternative

Teaching example, six-month course, constant 2026 ngultrum

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Worked example: vocational training

Step (all amounts are teaching assumptions)	Calculation
1. Additional expected annual earnings	With course − without course = Nu. 30,000
2. Discount each benefit, years 1–10	Year 1: 30,000 / 1.08 = 27,778 Year 2: 30,000 / 1.08^2 = 25,720
3. Add all 10 discounted benefits	30,000 × [1 − 1.08^{-10}] / 0.08 = Nu. 201,302
4. Add delivery and adult time costs	5,000 setup + 45,000 training + 60,000 time = 110,000
5. Compare benefits and costs	201,302 / 110,000 = 1.8

Illustrative proxy: expected earnings with training minus without training, 8% discount

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

What this means for Bhutan

Back to per-child financing

Question	What would make the assessment useful?
What changes against current funding?	Allocation formula, total budget, timing, school discretion
What changes in behaviour?	School spending, teaching, household responses
Which outcomes improve?	Access, learning, equity, resource reliability
What determines the result?	Effective reach, sustained gains, full incremental costs

Bhutan PCF announcement (2026) | Das et al. (2013) | Niger: World Bank research summary | Pradhan et al. (2014)

Our rapid assessment

- Describe current practice and the proposed change
- List every cost and benefit for everyone affected
- Use evidence for the outcomes the policy aims to improve
  - **Show the assumptions that connect international evidence to Bhutan**
- PCF is not yet a proven learning investment: no estimated BCR

Bhutan PCF announcement (2026) | Das et al. (2013) | Niger: World Bank research summary | Pradhan et al. (2014)

Supporting calculations

Appendix: sensitivity to the social discount rate

Real discount rate	Real wage growth	PV lifetime income
5%	2.5%	Nu. 5,042,810
8%	4%	Nu. 3,296,679
10%	5%	Nu. 2,547,785

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation

Appendix: annualising equipment costs

Annual cost = purchase price × r / [1 − (1 + r)$^{-n}$]

Input	Assumption
Purchase price / useful life	Nu. 100,000 / 5 years
Discount rate / pupils served	8% / 100 per year
Equivalent annual cost	100,000 × 0.08 / [1 − 1.08^{-5}] = 25,046
Equipment cost per pupil-year	25,046 / 100 ≈ Nu. 250; add maintenance

Teaching example, no Bhutan equipment cost estimate

Appendix: exercise answers

Teaching option	Earnings gain	Benefit per child (Nu.)	BCR
A	0.05 × 20% = 1%	1% × 3,296,679 = 32,967	32,967 / 1,000 ≈ 33
B	0.15 × 20% = 3%	3% × 3,296,679 = 98,900	98,900 / 4,000 ≈ 25

- A has the higher benefit per ngultrum spent
- B has the larger benefit per participant
  - **Budget, coverage and feasibility affect the choice**

World Bank: social discounting guidance | World Bank: Bhutan income growth | Education research: inputs and valuation