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Higher Education Financing in Nepal: Mathematical Analysis of Government Expenditure, Enrollment, and Educational Outcomes

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Abstract

Rising enrollment and public expenditure in Nepalese higher education have intensified the need to assess whether financing expansion corresponds with institutional capacity and educational outcomes. This study examines the relationships among public expenditure, student enrollment, institutional capacity, and educational outcomes in Nepal. It employs a quantitative framework based on secondary data from the University Grants Commission, Government of Nepal economic surveys, UNESCO Institute for Statistics, and World Bank analytical documents. The data were analysed using descriptive statistics, growth rates, ratios, elasticity measures, and measures of association. University Grants Commission data show that higher education enrollment increased from 371,184 students in 2016/17 to 633,053 in 2023/24, while public financing for universities and boards rose from NPR 9.30 billion in 2017/18 to NPR 17.457 billion in 2023/24. Graduate output increased more modestly, from 90,922 to 97,564, with a pronounced temporary decline during the COVID-19 period. Although financing grew substantially in nominal terms, additional expenditure was not proportionately associated with improved educational outcomes. The observed patterns were also shaped by enrollment expansion, institutional concentration, teacher availability, programme composition, delayed completion, and expenditure utilisation. These findings indicate that financing reform should move beyond input-based allocation toward transparent, formula-based, and performance-sensitive

mechanisms that support research, quality assurance, programme completion, digital infrastructure, and equitable regional access. Because the national datasets are not fully synchronised across fiscal and academic years, the identified relationships are interpreted as descriptive associations rather than causal effects. The study contributes an integrated quantitative assessment of Nepalese higher education financing and identifies data harmonisation as a prerequisite for more rigorous econometric analysis and evidence-based resource allocation.

Keywords: Educational Outcomes; Higher Education Financing; Nepal; Public Expenditure; Student Enrollment

INTRODUCTION

In recent years, researchers have pushed applied mathematics well beyond traditional physics, using mathematical modeling to untangle complex social systems, policy decisions, and educational challenges. A prominent thread in this movement comes from S. K. Sahani and his colleagues (2023–2025). Across a series of connected studies, they show how differential equations and numerical simulations can help us understand cultural interactions, evaluate educational strategies, and design better public programs for multicultural societies.

Managing the friction between different cultural values is a central challenge in diverse communities. Sahani and Prasad (2023) tackled this by using numerical differential equations to trace how targeted cultural education policies affect literacy over time, revealing that policy interventions rarely follow simple, straight-line paths. Building on this foundation, Sahani and Karna (2024) introduced simulation models to map out how cultural differences and social interactions create friction within mixed communities. Sahani et al. (2025) then broadened this scope to larger multicultural settings, using multi-group simulations to demonstrate how factors like interaction rates and ideological distance shape social stability.

Rather than stopping at measuring conflict, the research team turned toward finding practical solutions. In two follow-up studies, Sahani and Karna (2025) and Sahani and Sah (2025) developed numerical optimization techniques specifically tailored for cultural education programs. These models treat policy planning as a balancing act, helping

leaders distribute tight budgets in ways that maximize community engagement and outreach while keeping costs under control.

Mathematical models are most effective when paired with a grounded understanding of institutional realities. Looking directly at educational infrastructure, Sah et al. (2024) conducted an in-depth study of Nepal's education system, pointing out persistent structural hurdles, access barriers, and needed classroom reforms. Their work serves as a reminder that mathematical optimizations must go hand in hand with hands-on policy reform if they are to make a tangible difference in real schools.

Alongside these social applications, Sahani and his collaborators continue to apply differential equations to classic problems in engineering and astronomy. Sahani et al. (2024) analyzed mathematical models in aerospace engineering to understand flight forces and propulsion, while Sharma et al. (2024) used differential equations of motion to break down rocket trajectory dynamics. On a much larger scale, Jha et al. (2023) used similar differential models to study how stars evolve over their lifecycles. Taken together, these studies highlight how the same fundamental mathematical tools can clarify phenomena ranging from human cultural dynamics to spacecraft flight and stellar physics.

Higher education is simultaneously a social service, a human-capital investment, and a component of national productive capacity. In Nepal, the expansion of universities and affiliated campuses has widened access substantially, but expansion has also created a difficult financing question: whether public resources are growing quickly enough, being allocated efficiently, and producing improvements in completion and quality. This question is particularly important because Nepal's higher-education system combines publicly funded constituent institutions, community campuses, private campuses, universities, and specialized health academies. The institutional structure makes aggregate financing figures useful but insufficient for understanding value for money.

The University Grants Commission (UGC) is the central public institution for coordination, grants, quality enhancement, data collection, and policy support in higher education. Its recent EMIS reporting shows 633,053 students enrolled in national higher education institutions in 2023/24, including 358,140 female students. The same report records 97,564 graduates and 12,082 teachers. Public financing allocated to universities and boards reached NPR 17,457 million in 2023/24, compared with NPR 9,300 million in

2017/18. These figures establish a clear expansion of both demand and public financial commitment.

However, higher enrollment does not automatically mean better educational outcomes. A system may enroll more students while experiencing weak completion, long study duration, limited teacher capacity, uneven quality, or a mismatch between graduate skills and labor-market demand. The World Bank's higher-education reform analysis has similarly emphasized relevance, efficiency, quality, and the need for institutional reforms alongside expansion. More recent UGC evidence also shows that Nepal's system remains highly concentrated, with Tribhuvan University accounting for 77.61% of national higher-education enrollment in 2023/24.

This study therefore asks three related questions: (i) how has public financing changed relative to enrollment; (ii) what mathematical relationships can be observed between expenditure, enrollment, institutional capacity, and graduates; and (iii) what do these relationships imply for financing policy? The analysis is deliberately transparent and reproducible, emphasizing indicators that can be calculated from published national statistics.

Objectives

- To measure the trend and growth of public financing for Nepalese higher education.
- To examine changes in higher-education enrollment, female participation, teachers, campuses, and graduates.
- To calculate financing-per-student, student-teacher, graduate-to-enrollment, growth, and elasticity indicators.
- To assess whether expenditure growth has been accompanied by proportional changes in enrollment and graduate output.
- To propose financing reforms based on evidence, efficiency, equity, and educational outcomes.

Research Questions

- What has been the growth pattern of government financing for higher education?
- How has enrollment changed alongside public expenditure?
- How efficiently has the system converted financial and institutional inputs into graduate output?

- What are the main limitations of interpreting expenditure-outcome relationships from national aggregate data?
- Which financing principles could improve quality, completion, equity, and accountability?

Literature Review and Conceptual Background

The economics of education treats expenditure as an investment whose benefits can appear through higher human capital, productivity, earnings, innovation, social mobility, and public capacity. Yet the marginal return to an additional unit of spending depends on where that spending is directed. Salaries, buildings, laboratories, scholarships, digital infrastructure, research grants, academic development, and quality assurance have different time horizons and outcome pathways.

Nepal's financing literature has repeatedly identified a tension between limited public resources and rapidly growing demand. Baral's analysis of higher-education financing argued that the overall level of funding was inadequate for broad access to quality higher education and noted inconsistency in university grants. The World Bank's Higher Education Reforms Project later described rapid enrollment growth alongside persistent concerns about relevance, efficiency, equity, and institutional performance.

The financing problem is also linked to the structure of the system. UGC's EMIS reports show that private and community campuses constitute a large part of the institutional network, while the public financing mechanism is more directly concentrated on universities and selected public institutions. This creates a policy challenge: government may pursue access through a mixed provider system while simultaneously trying to maintain quality and affordability.

International evidence suggests that simple expenditure totals are poor proxies for educational quality. UNESCO's financing framework distinguishes expenditure by level, source, and nature, while the World Bank emphasizes learning, institutional effectiveness, and human-capital outcomes. For Nepal, this means a useful financing study should combine expenditure measures with enrollment, completion, staffing, equity, and institutional concentration.

Conceptual Framework

The study uses an input-process-output-outcome framework. Government expenditure represents the principal public financial input. Enrollment and campus capacity represent demand and scale. Teachers, student-teacher ratios, infrastructure, scholarships, governance, and quality assurance represent process and capacity variables. Graduates and progression indicators represent immediate outputs, while employability, earnings, research productivity, and broader social and economic returns represent longer-term outcomes.

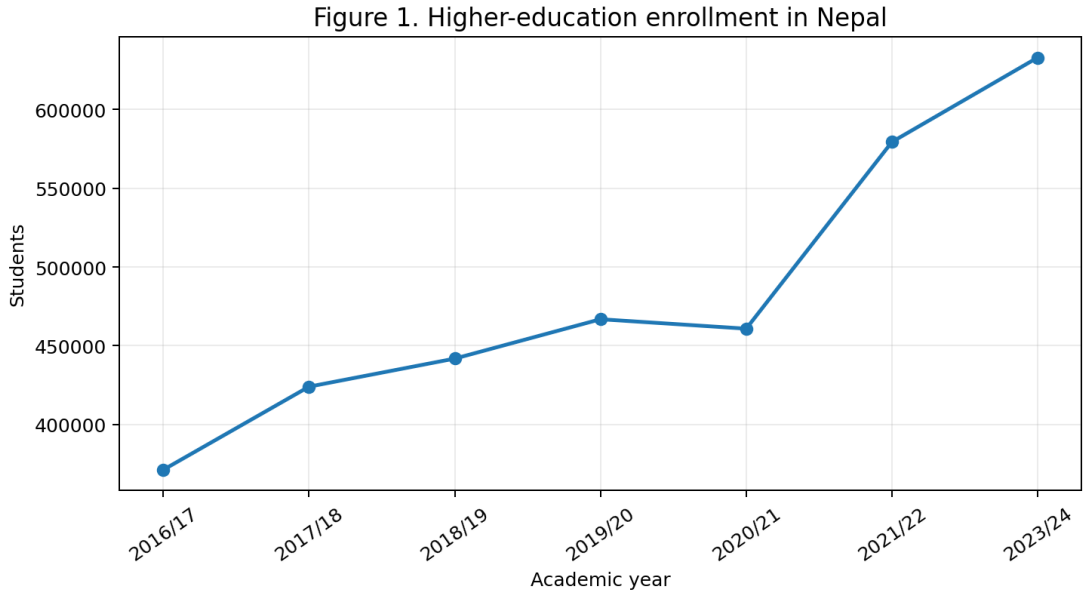

Figure 1. Higher-education enrollment trend used as the principal scale indicator (UGC EMIS data).

METHODOLOGY

The research uses secondary quantitative data. The core national series are drawn from UGC EMIS and annual reports, supplemented by Government of Nepal economic surveys, UNESCO UIS statistics, and World Bank higher-education reform documents. The principal observation window is 2016/17–2023/24 for institutional and student indicators, while the public-financing series reported by UGC is available for selected years from 2017/18 through 2023/24.

Variables

Variable	Symbol	Measurement	Interpretation
Public financing	G	NPR million	Government allocation to universities and boards
Enrollment	E	Number of students	Scale of higher education
Female enrollment	F	Number of students	Gender participation
Teachers	T	Number of teachers	Academic capacity
Graduates	Gr	Number of graduates	Immediate output
Campuses	C	Number of campuses	Institutional reach
Financing per student	GPS	NPR/student	Approximate public input per enrolled student
Student-teacher ratio	STR	E/T	Teaching load proxy
Graduate ratio	GOR	Gr/E ×100	Output relative to enrolled stock

Mathematical Measures

Annual growth rate is calculated as $g_t = ((X_t - X_{(t-1)})/X_{(t-1)}) \times 100$. The compound annual growth rate (CAGR) over n periods is $CAGR = (X_n/X_0)^{(1/n)} - 1$. Financing per student is GPS = G/E. The student-teacher ratio is STR = E/T. A simple expenditure-enrollment elasticity is $\eta_{GE} = \%\Delta E/\%\Delta G$, which describes the proportional association between financing and enrollment rather than a causal effect. Similarly, graduate-financing elasticity can be written $\eta_{G,Gr} = \%\Delta Gr/\%\Delta G$.

To compare changes across indicators, the study also uses index numbers with the first observation set to 100: $Index_t = (X_t/X_0)\times 100$. This allows financing and enrollment series with different units to be plotted and interpreted together.

Data Limitations

The most important limitation is temporal alignment. Government financing is reported by fiscal year, whereas enrollment and graduation are reported by academic year. In addition, UGC's recent trend table does not provide a 2022/23 observation in the same sequence as the surrounding years. Consequently, this paper does not claim a causal annual effect of expenditure on graduation. Instead, it uses transparent descriptive relationships and highlights the need for a harmonized panel dataset before applying ARDL, fixed-effects, instrumental-variable, or production-function methods.

RESULTS

Enrollment, Teachers, Graduates, and Campuses

Year	Enrollment	Female	Teachers	Graduates	Campuses	Female share (%)
2016/17	371,184	195,133	9,299	90,922	1408	52.6
2017/18	423,996	222,981	9,269	88,115	1425	52.6
2018/19	441,819	229,961	9,269	84,510	1432	52.0
2019/20	466,828	247,370	11,748	79,541	1437	53.0
2020/21	460,826	242,103	11,031	37,619	1440	52.5
2021/22	579,448	319,337	10,916	88,902	1455	55.1
2023/24	633,053	358,140	12,082	97,564	1432	56.6

Enrollment increased from 371,184 in 2016/17 to 633,053 in 2023/24, an increase of about 70.6%. Female enrollment increased from 195,133 to 358,140, a rise of approximately 83.6%. The female share therefore increased from about 52.6% to 56.6%. This is an important access and equity result: expansion has not merely increased total participation but has been accompanied by a growing female presence.

Graduate output, by contrast, does not follow a smooth upward path. It fell from 90,922 in 2016/17 to 79,541 in 2019/20 and then to 37,619 in 2020/21 before recovering to 88,902 in 2021/22 and 97,564 in 2023/24. The sharp 2020/21 fall should not be interpreted as a simple financing failure; the COVID-19 disruption, examination delays, academic calendar changes, and institutional closures affected completion processes.

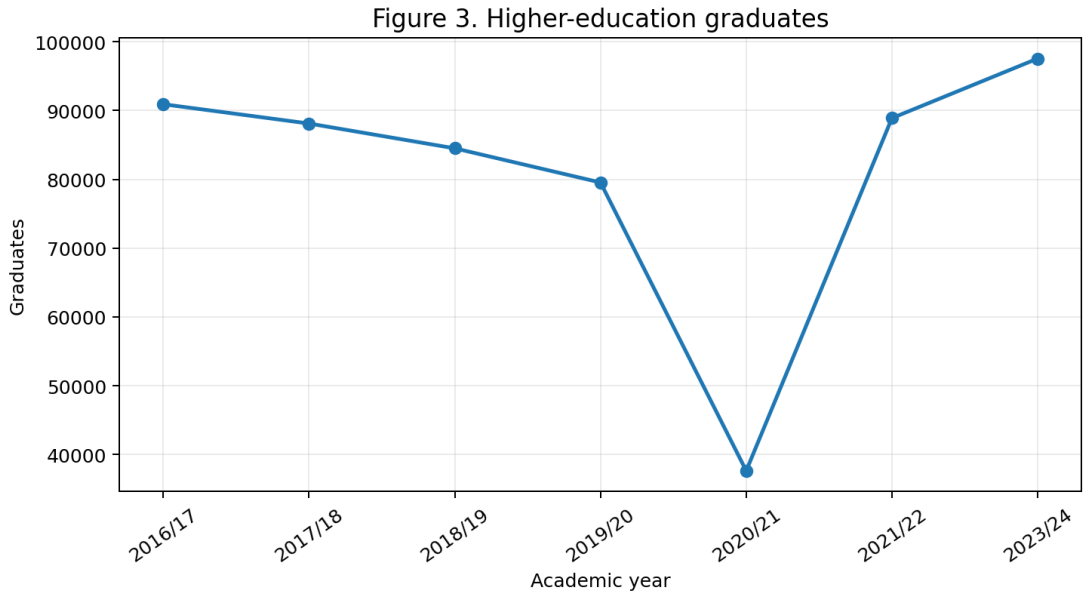

Figure 3. Graduate output, showing the strong temporary disruption around 2020/21.

Public Financing Trend

Fiscal year	Public financing (NPR million)	Growth (%)
2017/18	9,300	—
2018/19	11,310	21.6
2019/20	13,460	19.0
2020/21	13,800	2.5
2021/22	15,105	9.5
2023/24	17,457	15.6

Public financing increased from NPR 9.30 billion in 2017/18 to NPR 17.457 billion in 2023/24. Across the five observed intervals, the implied CAGR is approximately 13.42%. This is a strong nominal expansion, but it should not be read as a real increase without adjusting for inflation and changes in the composition of the grant system.

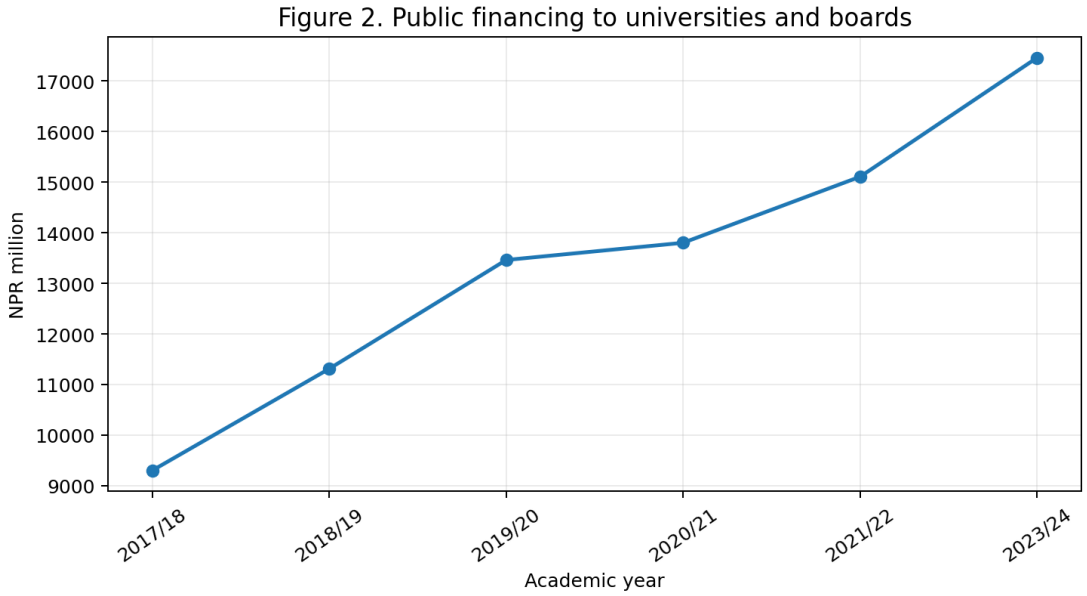

Figure 2. Public financing allocated to Nepal's universities and boards, 2017/18–2023/24.

Financing per Student

Fiscal year	Financing (NPR million)	Associated enrollment	Approx. NPR/student
2017/18	9,300	423,996	21,934
2018/19	11,310	441,819	25,599
2019/20	13,460	466,828	28,833
2020/21	13,800	460,826	29,946
2021/22	15,105	579,448	26,068
2023/24	17,457	633,053	27,576

The approximate financing-per-student indicator rises across the selected observations, but interpretation requires care. The numerator covers public financing to universities and boards, while the denominator is national higher-education enrollment, which also includes students in privately operated and community campuses. The ratio therefore measures public financing relative to the system's total student stock, not the actual institutional cost borne by government for each student.

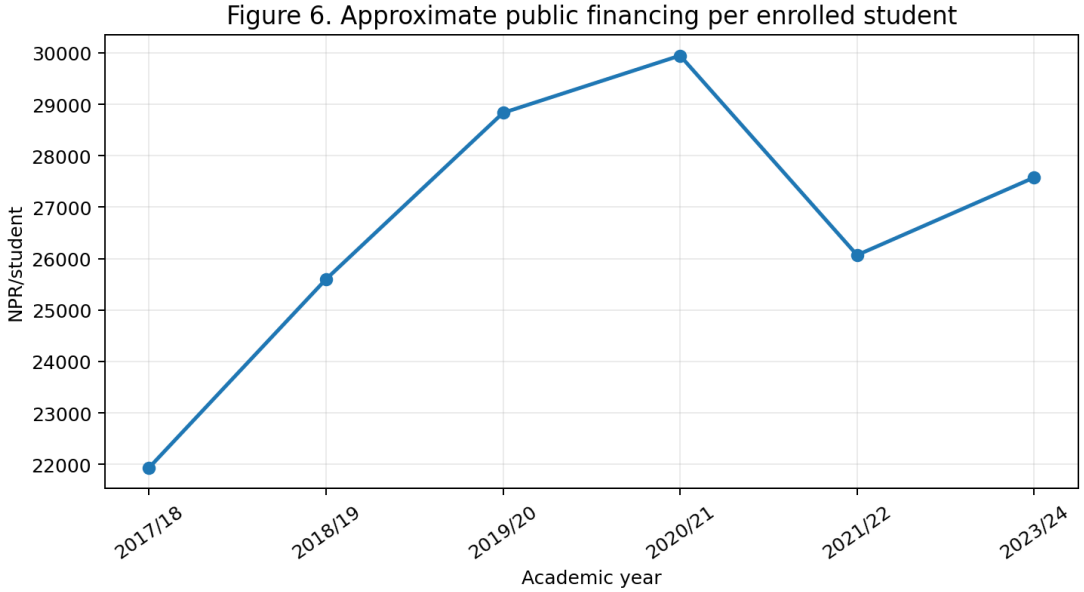

Figure 6. Approximate public financing per enrolled student. This is an analytical ratio, not a direct unit-cost estimate.

Mathematical Analysis

Growth of Enrollment and Financing

Enrollment rose by 70.5% between 2016/17 and 2023/24, corresponding to an approximate CAGR of 9.31% over six intervals. Public financing rose by 87.7% from 2017/18 to 2023/24, with a CAGR of 13.42% over five intervals. Both variables therefore exhibit long-run expansion, but financing grew faster than enrollment over their overlapping period.

Expenditure–Enrollment Elasticity

Using the broad change between 2017/18 and 2023/24 as a descriptive arc, the proportional change in enrollment is approximately 49.3%, while the proportional change in public financing is about 87.7%. The resulting arc elasticity is approximately 0.56. An

elasticity below one indicates that enrollment expanded less than proportionately relative to the nominal financing increase. This does not imply inefficiency by itself because expenditure may have financed quality improvement, infrastructure, research, scholarships, staff development, or institutional strengthening rather than enrollment alone.

Student–Teacher Ratio

Year	Enrollment	Teachers	Students per teacher
2016/17	371,184	9,299	39.9
2017/18	423,996	9,269	45.7
2018/19	441,819	9,269	47.7
2019/20	466,828	11,748	39.7
2020/21	460,826	11,031	41.8
2021/22	579,448	10,916	53.1
2023/24	633,053	12,082	52.4

The national aggregate student-teacher ratio moved from about 39.9 in 2016/17 to 52.4 in 2023/24 when total enrollment is divided by total teachers. This broad ratio should not be compared directly with ratios for individual constituent campuses because coverage differs. Nevertheless, it highlights a structural pressure: enrollment expansion can outpace teaching capacity even when the absolute number of teachers increases.

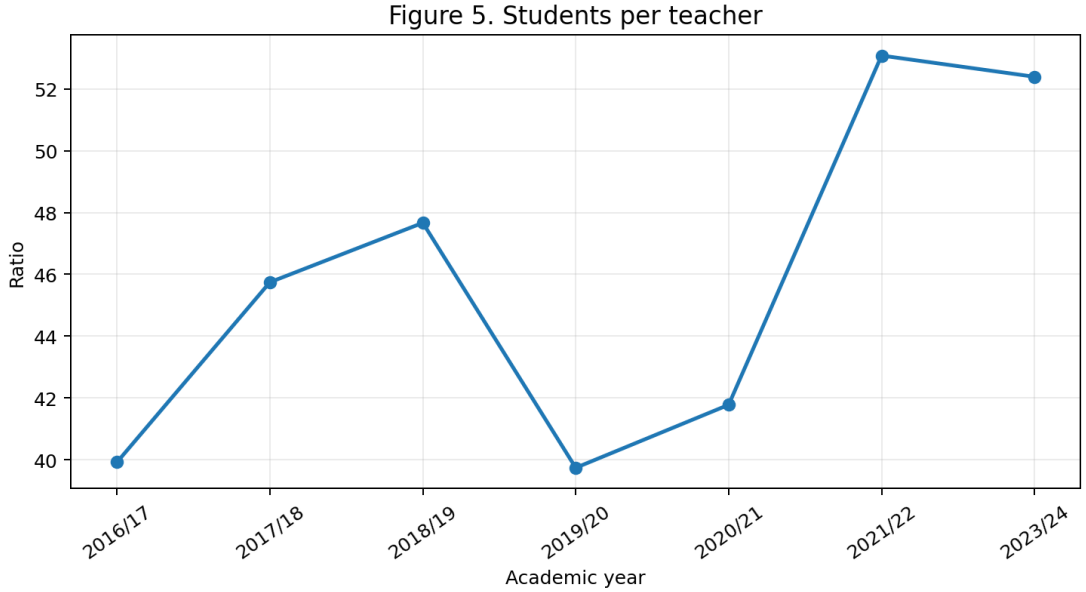

Figure 5. Aggregate students per teacher, calculated from UGC national totals.

Female Participation

Female enrollment increased substantially and exceeded male enrollment in the latest UGC observation. The female share rose from approximately 52.6% in 2016/17 to 56.6% in 2023/24. This suggests progress in access, but gender parity at aggregate enrollment level should not be confused with parity across fields, levels, institutions, geography, or completion. Financing policy should therefore retain disaggregated equity indicators.

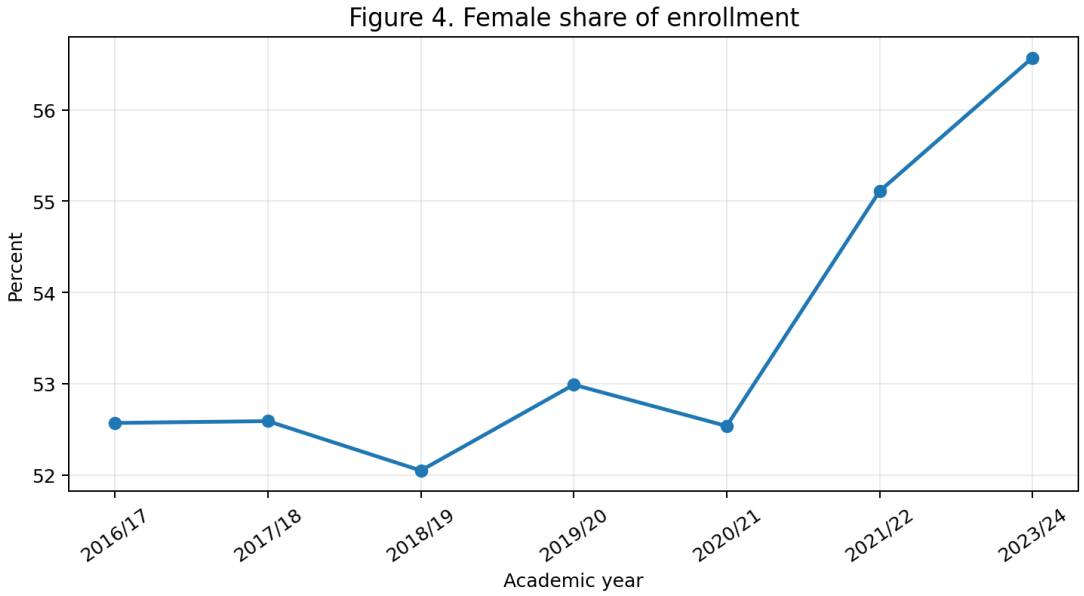

Figure 4. Female share of national higher-education enrollment.

Financing Structure and Institutional Efficiency

The financing architecture of Nepalese higher education is mixed. Public universities receive grants through government and UGC channels, community campuses receive grants, and medical academies are financed through the health sector. Private campuses are not funded directly through the MOEST/UGC system. This means that a national enrollment statistic aggregates students who face very different financing arrangements.

Institutional Concentration

UGC's 2023/24 report records 491,299 students at Tribhuvan University, equal to 77.61% of national higher-education enrollment. TU also produced 74,149 graduates, approximately three quarters of national graduate output. Such concentration has both

economies-of-scale and systemic-risk implications. A large institution can spread administrative and academic infrastructure across a large student base, but excessive concentration can make the national system vulnerable to bottlenecks in examinations, administration, curriculum reform, and quality improvement.

Institution	Students	Share (%)	Graduates	Teachers
Tribhuvan University	491,299	77.61	74,149	8,122
Far-Western University	19,356	3.06	1,194	408
Kathmandu University	21,053	3.33	3,078	496
National total	633,053	100.00	97,564	12,082

Allocation Efficiency

An allocation system should ideally reward not only enrollment but also quality, completion, equity, research, employability, and institutional performance. A purely historical block-grant model can reproduce existing institutional advantages. Conversely, a purely performance-based model can penalize institutions serving disadvantaged populations or expensive disciplines. The stronger approach is a hybrid formula with a stable base grant, a transparent per-student component, equity adjustments, and a limited performance component.

Expenditure Utilization

UGC's 2079/80 annual report illustrates the importance of execution. Under the regular government budget title, the released budget was NPR 17.022 billion and expenditure was NPR 16.631 billion. Under the Nurturing Excellence in Higher Education program, expenditure was much lower than the annual budget, indicating that allocation and actual spending can diverge substantially. This distinction matters because a higher budget ceiling does not necessarily translate into higher educational inputs or outcomes.

Educational Outcomes and the Expenditure Question

The most tempting conclusion in education-finance analysis is that more money should produce more graduates. The Nepalese data show why that conclusion is incomplete. Enrollment increased strongly, but graduate output fluctuated. The relationship is mediated by the time required to complete programs, examination schedules, student repetition, institutional capacity, migration, labor-market incentives, and disruptions such as COVID-19.

Graduation as an Output Indicator

Year	Enrollment	Graduates	Graduates/Enrollment (%)
2016/17	371,184	90,922	24.5
2017/18	423,996	88,115	20.8
2018/19	441,819	84,510	19.1
2019/20	466,828	79,541	17.0
2020/21	460,826	37,619	8.2
2021/22	579,448	88,902	15.3
2023/24	633,053	97,564	15.4

The graduate-to-enrollment ratio is a stock-flow indicator and should not be interpreted as a true graduation rate because the numerator and denominator are not a matched cohort. A low value may reflect long program duration, accumulated cohorts, delayed examinations, or dropout. Its usefulness is therefore diagnostic: large movements signal that the system's throughput should be investigated.

Outcomes Beyond Graduation

Graduation is only an intermediate outcome. A stronger national evaluation would combine completion with graduate employment, earnings, field-of-study match, professional licensing, research productivity, patents, publications, innovation, and regional development. The World Bank has documented positive returns to higher education in Nepal, but also emphasizes the importance of institutional quality and labor-market alignment. Financing should therefore move toward a broader outcome dashboard rather than a single output metric.

A Proposed Outcome Index

For policy analysis, a composite Higher Education Outcome Index (HEOI) can be constructed as HEOI = w1C + w2Q + w3E + w4R + w5L, where C is completion performance, Q is quality/learning, E is equity, R is research/innovation, and L is labor-market alignment. The weights w_i sum to one. The index should be used for internal monitoring, not as a simplistic ranking tool. Weighting should be publicly documented and adjusted for discipline and institutional mission.

Econometric Extension and Model Specification

The descriptive analysis can be extended into a formal time-series model once harmonized fiscal and academic-year data are available. A baseline log-linear model is

$\ln(Gr_t) = \alpha + \beta1\ln(G_t) + \beta2\ln(E_t) + \beta3\ln(T_t) + \beta4\ln(C_t) + \varepsilon_t$. Here $\beta1$ is interpreted as an expenditure elasticity conditional on enrollment, teachers, and campuses. A richer model could include lagged expenditure because many education investments take time to affect graduation.

An ARDL specification is particularly suitable when the sample is moderately small and variables may be a mixture of stationary and first-difference stationary processes. The long-run equation could be written as $Gr_t = \alpha + \beta1G_t + \beta2E_t + \beta3T_t + \beta4X_t + u_t$, with X_t representing relevant controls such as demographic pressure, GDP, inflation, or COVID-related disruption. However, the present paper deliberately does not report spurious precision from a regression built on a small, unsynchronized national series.

Why Causality Is Difficult

- Government may increase funding in response to poor outcomes, producing reverse causality.
- Enrollment growth can itself trigger additional funding, creating simultaneity.
- Fiscal and academic years are not identical.
- Nominal expenditure is affected by inflation and wage changes.
- Aggregate national data hide large differences among universities, disciplines, provinces, and campus types.
- COVID-19 created an unusual shock to examinations and completion.

DISCUSSION

The evidence supports three broad conclusions. First, Nepal has expanded both access and public financial commitment. Second, the expansion has not translated into a smooth increase in graduate output, indicating that capacity and system processes matter. Third, the aggregate figures conceal major differences among institutions and financing arrangements.

The growth in female enrollment is one of the clearest positive developments. However, financing for equity should go beyond aggregate female participation and address geographic access, affordability, disability inclusion, field-of-study disparities, and progression. A financing formula that counts only students can unintentionally reward

institutions with large enrollment while overlooking institutions that provide high-cost programs or serve disadvantaged communities.

The rising approximate financing per student also requires nuanced interpretation. It can be positive if additional resources improve teaching quality, laboratories, research, digital systems, scholarships, and academic support. It can be negative if the increase primarily reflects administrative costs without corresponding improvements in outcomes. Therefore, the policy question is not simply how much Nepal spends, but what marginal educational product is obtained from each additional rupee.

Institutional concentration is another major consideration. TU's dominant share means that changes in its financing, governance, examination system, and academic capacity can materially affect national indicators. Strengthening newer and provincial universities can diversify provision, but decentralization should be accompanied by quality assurance, faculty development, and realistic funding models.

Policy Recommendations

Recommendation	Policy rationale
Adopt a transparent hybrid funding formula.	Combine a predictable base grant, enrollment-based allocation, equity adjustments, and a modest performance component. Publish the formula and annual allocations.
Move from input financing toward outcome-sensitive financing.	Track completion, time-to-degree, graduate employment, research productivity, accreditation, and learning-related indicators alongside enrollment.
Create a national higher-education cost database.	Estimate unit costs by discipline and level so that engineering, medicine, agriculture, science, humanities, and management are not treated as financially identical.
Protect equity funding.	Use geographic, socioeconomic, disability, and gender-sensitive adjustments so that institutions serving disadvantaged populations are not penalized by performance formulas.
Strengthen teaching capacity.	Link enrollment expansion with faculty recruitment, professional development, digital teaching support, and student-teacher monitoring.
Improve expenditure execution.	Require major programs to publish budget, release, expenditure, physical progress, and outcome indicators in a common dashboard.
Support research and innovation.	Increase competitive grants, shared laboratories, doctoral support, research infrastructure, and university-industry collaboration.
Reduce administrative bottlenecks.	Digitize admissions, examinations, transcripts, financial reporting, and academic records to reduce the hidden cost of delay.
Build a harmonized longitudinal	Align fiscal-year financing with academic-year enrollment and

Recommendation	Policy rationale
database.	graduation through institution-level identifiers, enabling robust causal research.
Diversify responsibly.	Support provincial and specialized universities while maintaining national minimum standards for staffing, infrastructure, quality assurance, and financial sustainability.

Limitations and Future Research

This paper is constrained by the availability and comparability of national secondary data. The UGC trend series does not provide a continuous observation for every academic year in the same table, and fiscal-year financing cannot be perfectly synchronized with academic-year enrollment or graduation. The study also uses aggregate measures that conceal university-level and discipline-level heterogeneity.

Future work should construct an institution-year panel covering all universities and campuses, with variables for recurrent and capital expenditure, grants received, own-source revenue, enrollment by level and discipline, teachers by rank, graduation, repetition, dropout, scholarships, accreditation, research output, and graduate labor-market outcomes. Such a dataset would support fixed-effects models, difference-in-differences designs around policy changes, production-function estimation, and stochastic frontier analysis.

A second priority is real-term expenditure analysis. All financial series should be deflated using a suitable GDP deflator or education-cost index. A third is cohort tracking: a student who enters in one year should be followed until graduation or exit. This would replace the graduate-to-enrollment stock-flow ratio with genuine completion and dropout rates.

CONCLUSION

Nepal's higher-education system has expanded markedly in scale, and public financing has increased alongside that expansion. UGC data show enrollment rising from 371,184 in 2016/17 to 633,053 in 2023/24, while public financing to universities and boards increased from NPR 9.30 billion in 2017/18 to NPR 17.457 billion in 2023/24. Female enrollment has grown faster than total enrollment over the observed period, and graduate output has recovered strongly after the COVID-19 disruption.

The mathematical analysis nevertheless shows that expenditure growth should not be equated automatically with educational effectiveness. Enrollment, staffing, institutional structure, completion processes, expenditure utilization, and the distribution of funds all mediate outcomes. The appropriate policy objective is therefore not maximum spending or maximum enrollment in isolation, but the highest sustainable educational and social return from public resources.

A modern financing framework for Nepal should combine predictable public support with transparent formulas, equity adjustments, cost-sensitive allocation, stronger expenditure execution, and measurable outcomes. Most importantly, Nepal needs a harmonized longitudinal higher-education database capable of linking money spent to students served and outcomes achieved. Such evidence would allow future researchers and policymakers to move from descriptive debate toward credible causal estimates of what higher-education financing actually produces.

REFERENCES

Acharya, T. P. (2026). Structural dominance of Tribhuvan University in the higher education landscape of Nepal. *Yugavani, 2*(1), 77–90. https://doi.org/10.3126/yougvani.v2i1.95680

Baral, K. J. (2008). Higher education financing in Nepal. *Journal of Nepalese Business Studies, 4*(1), 1–9. https://doi.org/10.3126/jnbs.v4i1.1025

Dahal, G. P., Khanal, B., Adhikari, D., Ghimire, M., Luitel, G. R., & Dhakal, S. (2025). Public spending, enrolment, and economic growth: A study of higher education in Nepal. *Nepal Journal of Multidisciplinary Research, 8*(5), 45–62. https://doi.org/10.3126/njmr.v8i5.86850

Government of Nepal, Ministry of Education, Science and Technology. (2022). *School education sector plan, 2022–2032*. https://elibrary.moest.gov.np/handle/123456789/178

Government of Nepal, Ministry of Finance. (2019). *Economic survey 2018/19*.

Government of Nepal, Ministry of Finance. (2020). *Economic survey 2019/20*.

Government of Nepal, Ministry of Finance. (2023). *Economic survey 2022/23*.

Government of Nepal, Ministry of Finance. (2024). *Economic survey 2023/24*.

Jha, A., Sahani, S. K., Jha, A., & Sahani, K. (2023). Journey to the cosmos: Navigating stellar evolution with differential equations. *Alifmatika: Jurnal Pendidikan dan Pembelajaran Matematika, 5*(2), 282–297. https://doi.org/10.35316/alifmatika.2023.v5i2.282-297

Khatiwada, S. (2025). Reimagining education financing in Nepal: A policy and budget analysis. *Journal of Emerging Management Studies, 3*(2), 121–135. https://doi.org/10.3126/jems.v3i2.86045

Sah, P., Sah, R., Sahani, S. K., & Sahani, K. (2024). Study and analysis of education system in Nepal and its challenges along with its solution. *Mikailalsys Journal of Advanced Engineering International, 1*(1), 33–42. https://doi.org/10.58578/mjaei.v1i1.2792

Sahani, S. K., & Karna, S. K. (2024). Simulation of the clash between cultural values in heterogeneous society using numerical methods. *Journal of Posthumanism, 4*(3), 543–559. https://doi.org/10.63332/joph.v4i3.2686

Sahani, S. K., & Karna, S. K. (2025). Program for cultural education optimization by the application of numerical methods. *Journal of Posthumanism, 5*(1), 1611–1627. https://doi.org/10.63332/joph.v5i1.2687

Sahani, S. K., & Prasad, K. S. (2023). Modeling the impact of cultural education policies on literacy rates using numerical differential equations. *Journal of Posthumanism, 3*(3), 376–394. https://doi.org/10.63332/joph.v3i3.2905

Sahani, S. K., & Sah, B. K. (2025). Optimization of cultural education program using numerical techniques. *Journal of Posthumanism, 5*(6), 4265–4280. https://doi.org/10.63332/joph.v5i6.2600

Sahani, S. K., Sah, M. K., Agarwal, S. K., Pareek, V., Parihar, P., & Singh, V. V. (2025). Numerical simulation of cultural value conflict in multicultural societies. *Journal of Posthumanism, 5*(3), 1815–1831. https://doi.org/10.63332/joph.v5i3.2651

Sahani, S. K., Sah, A. K., Jha, A., & Sahani, K. (2024). Analytical frameworks: Differential equations in aerospace engineering. *ALSYSTECH Journal of Education Technology, 2*(1), 13–30. https://doi.org/10.58578/alsystech.v2i1.2267

Sharma, P., Sahani, S. K., Sharma, K., & Sahani, K. (2024). Rocket science unveiled: A differential equation exploration of motion. *Alifmatika: Jurnal Pendidikan dan Pembelajaran Matematika, 6*(1), 42–50. https://doi.org/10.35316/alifmatika.2024.v6i1.42-50

UNESCO Institute for Statistics. (2025a). *Repository of education expenditure reports*. https://www.uis.unesco.org/en/data/repository-education-expenditure-reports

UNESCO Institute for Statistics. (2025b). *World education statistics, 2025*. https://www.uis.unesco.org/en/publication/world-education-statistics-2025

University Grants Commission Nepal. (2014). *Higher education management information system (HEMIS) report 2012/13*.

University Grants Commission Nepal. (2018). *Annual report 2073/74*.

University Grants Commission Nepal. (2020). *Annual report 2019/20*.

University Grants Commission Nepal. (2022). *Annual report 2021/22*.

University Grants Commission Nepal. (2023a). *Annual report 2079/80*.

University Grants Commission Nepal. (2023b). *Higher education management information system report 2021/22*.

University Grants Commission Nepal. (2024). *Report on higher education 2023/24 (2080/81 B.S.)*.

University Grants Commission Nepal. (2025). *Annual report 2023/24*.

World Bank. (2014). *Nepal: Higher education reforms project—Economic and financial analysis*.

World Bank. (2021a). *Final technical assessment: Nurturing excellence in higher education program for results*.

World Bank. (2021b). *Nepal: Higher education reforms project*.

World Bank. (2023, August 22). *Nepal makes rapid improvements in quality and inclusiveness of education*. https://www.worldbank.org/en/results/2023/08/23/nepal-makes-rapid-improvements-in-quality-and-inclusiveness-of-education

Appendix A: Core Data Used for Calculations

Year	Enrollment	Female	Teachers	Graduates	Campuses
2016/17	371184	195133	9299	90922	1408
2017/18	423996	222981	9269	88115	1425
2018/19	441819	229961	9269	84510	1432
2019/20	466828	247370	11748	79541	1437
2020/21	460826	242103	11031	37619	1440
2021/22	579448	319337	10916	88902	1455
2023/24	633053	358140	12082	97564	1432

Appendix B: Key Formulas

Growth rate (%) = [(X_t − X_(t−1))/X_(t−1)] × 100
CAGR = (X_n/X_0)^(1/n) − 1
Financing per student = Government financing / Enrollment
Student-teacher ratio = Enrollment / Teachers
Graduate-to-enrollment ratio (%) = Graduates / Enrollment × 100
Arc expenditure-enrollment elasticity = proportional change in enrollment / proportional change in financing
Index number = (Current value / Base-year value) × 100