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Enrollment, Graduation, and Dropout Trends in Nepalese Higher Education: A Mathematical and Statistical Analysis

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Abstract

Nepalese higher education has experienced substantial enrollment expansion, yet the extent to which this growth has translated into graduate output and timely completion remains unclear. This study examines trends in student enrollment, graduate output, and non-completion in Nepalese higher education using a quantitative secondary-data design. The principal national series was drawn from University Grants Commission higher-education management information reports and supplemented by evidence from the Ministry of Finance Economic Survey, National Statistics Office, UNESCO Institute for Statistics, World Bank, Asian Development Bank, and recent peer-reviewed Nepalese studies. Data were analyzed using statistical trend analysis, percentage-change analysis, moving comparisons, ratio analysis, correlation, and a simple least-squares trend model. Between 2016/17 and 2023/24, higher-education enrollment increased from 371,184 to 633,053 students, representing approximately 70.55% growth, while female enrollment rose from 195,133 to 358,140, increasing the female share from 52.57% to 56.57%. Graduate output was substantially more volatile, declining from 90,922 in 2016/17 to 37,619 in 2020/21 before recovering to 97,564 in 2023/24. Because annual national totals do not follow the same students from entry to completion, the study distinguishes the descriptive graduate-to-enrollment ratio from a true cohort graduation rate. The findings indicate that expanded access has not translated proportionately into timely completion, with persistence shaped by the COVID-19 shock, academic calendar delays, uneven

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institutional quality, migration for study and employment, financial pressures, weak academic integration, and limited labor-market alignment. The study concludes that the central policy challenge has shifted from expanding enrollment alone to converting participation into timely, successful, and relevant graduation. It contributes by providing an integrated national-level assessment of enrollment and completion dynamics and highlights the need for student-level longitudinal data systems, early-warning retention mechanisms, stronger academic advising, flexible financing, curriculum reform, and differentiated support for vulnerable programs and campuses.

Keywords: Graduate Output; Higher Education; Nepal; Student Enrollment; Student Retention

Introduction

Higher education as a national development system

Higher education in Nepal has expanded from a highly concentrated university structure into a broader system containing federal and provincial universities, medical academies, constituent campuses, community campuses, private affiliated campuses, and foreign-university-affiliated institutions. The University Grants Commission (UGC) has become the principal statistical and funding institution for the university sector, while the Ministry of Education, Science and Technology (MoEST), Ministry of Finance, National Statistics Office (NSO), and other agencies contribute complementary evidence. This institutional diversification has increased geographic and programmatic access, but it has also made system management more complicated because institutions differ greatly in size, academic calendar, funding, staffing, and student profile [E1–E5].

The most visible indicator of expansion is enrollment. UGC data show that the national student population in higher education increased from 371,184 in 2016/17 to 633,053 in 2023/24. At the same time, the sector experienced a temporary decline in 2020/21, followed by a sharp rebound in 2021/22. The rebound should not be interpreted mechanically as a sudden increase in new entrants: annual enrollment is a stock that contains continuing students, delayed students and new entrants. This distinction is important for statistical interpretation because a larger enrollment stock can coexist with weak completion if students remain enrolled for longer periods [E1, E6, E7].

Why enrollment alone is not enough

Expansion of access is a necessary condition for human-capital formation, but it is not sufficient. A higher-education system produces social and economic value through successful learning, completion, skills acquisition and transition into productive work. If students enroll but do not complete, resources are used without producing the intended qualification, and the opportunity cost can be substantial for students, families and institutions. Consequently, the three indicators studied here—enrollment, graduation and dropout—should be treated as linked stages of an educational pipeline rather than as three independent statistics.

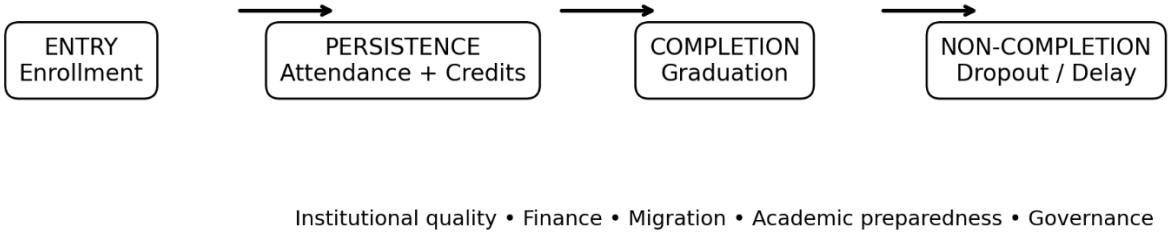


Figure 1. Conceptual student-flow view used in this study. The indicators describe different stages of the same higher-education process.

Nepalese context

Nepal's higher-education system is characterized by strong institutional concentration. In 2023/24, Tribhuvan University (TU) accounted for 491,299 students, or 77.61% of the national total, and produced 74,149 graduates. UGC data also show 1,432 campuses and 12,082 teachers in the national higher-education system. The concentration of students within a small number of large institutions has implications for system-wide performance because delays, examination schedules, curriculum structures and administrative capacity in the largest institution can influence national aggregates .

The national context also includes substantial outward student mobility. Studies of Nepal's higher-education system repeatedly identify migration for overseas study and employment as a factor associated with weak retention, particularly in community and general programs. However, migration should not be treated as the single explanation for dropout: financial conditions, academic preparedness, institutional support, curriculum relevance, family responsibilities and employment opportunities also matter.

Problem Statement and Research Gap

Nepal's higher-education debate often focuses on the number of institutions and the number of students enrolled. Yet a system can appear to expand while experiencing serious internal inefficiency if students take substantially longer than the nominal program duration to graduate, leave before completion, or repeatedly change programs. UGC reports have historically highlighted low graduation rates, poor pass percentages and the sustainability problems of campuses with very small student populations. The challenge therefore is to understand the relationship between access, persistence and output using a common statistical framework.

A second problem is measurement. A simple annual ratio such as graduates divided by enrolled students is useful for describing system output, but it is not a cohort graduation rate. Graduates in year t generally entered in earlier years, while the enrollment denominator contains students from several cohorts. Thus, the ratio can be used as an annual output-to-stock indicator, but conclusions about the probability that a particular student will graduate require longitudinal or cohort data. This paper makes that distinction explicit and treats it as a central methodological issue. Recent research led by S. K. Sahani and collaborators (2023–2025) bridges applied mathematics and computational sociology to quantify how cultural values clash and how education policies can be optimized in diverse societies. Across these five studies, the authors shift cultural analysis away from purely qualitative descriptions toward predictive, data-driven frameworks. Early foundational work by Sahani and Prasad (2023) demonstrated how numerical differential equations can model the non-linear impacts of cultural education policies on literacy rates over time. Building on this system-dynamics approach, Sahani and Karna (2024) alongside Sahani et al. (2025) introduced numerical simulations to map out the mechanical friction and value conflicts that emerge in multicultural and heterogeneous communities, showing how interaction rates and value distances influence long-term social cohesion. Beyond simply modeling passive conflict, the research team transitioned into proactive, algorithmic solutions to address these societal tensions. In twin studies, Sahani and Karna (2025) and Sahani and Sah (2025) applied numerical optimization techniques directly to cultural education programs. These frameworks treat policy implementation as a multi-variable balancing act, using algorithms to optimize resource allocation, maximize demographic reach, and maximize cultural engagement within tight budgetary constraints. Taken together, Sahani's body of work outlines a clear methodological progression: moving from

basic differential modeling of policy outcomes to simulating complex inter-group dynamics, and ultimately delivering numerical decision-support tools for policymakers navigating multicultural environments.

Research gap

Existing Nepalese studies have examined enrollment trends, individual-campus dropout, student retention and migration, but these strands are often separated. Recent studies on Baneshwor Multiple Campus, Kailali Multiple Campus, Myagdi Multiple Campus, Marsyangdi Multiple Campus, Surkhet Multiple Campus and Far Western University provide valuable local evidence, yet campus-level findings cannot automatically be generalized to the national system [D1–D10]. This study addresses the gap by placing enrollment, graduate output and non-completion within one mathematical and statistical narrative and by combining national time-series evidence with campus-level explanatory studies.

Objectives and Research Questions

General objective

To analyze the trends, relationships and structural patterns of enrollment, graduation and dropout/non-completion in Nepalese higher education using mathematical and statistical methods.

Specific objectives

1. To quantify the growth and fluctuation of higher-education enrollment in Nepal.

2. To examine changes in female participation and selected capacity ratios.

3. To analyze graduate output and distinguish annual output indicators from true cohort graduation rates.

4. To synthesize evidence on dropout and non-completion and identify major explanatory factors.

5. To apply descriptive statistics, percentage change, compound annual growth, ratios, correlation and linear trend estimation.

6. To formulate evidence-based policy measures aimed at improving persistence and timely completion.

Research questions

1. How has higher-education enrollment changed over the study period?

2. Has the expansion of enrollment been matched by comparable growth in graduate output?

3. What patterns are visible in the annual graduate-to-enrollment ratio?

4. What institutional, socioeconomic and academic factors are associated with dropout in Nepal?

5. What statistical indicators can support a more useful national monitoring framework?

Conceptual and Theoretical Framework

Human-capital perspective

The human-capital approach views education as an investment that can increase knowledge, productivity and future earnings. From this perspective, enrollment represents investment initiation, graduation represents successful accumulation of a recognized qualification, and dropout represents an interrupted investment process. The framework does not imply that every non-completion is socially wasteful—students may leave because they obtain employment, transfer institutions or pursue a different educational route—but it emphasizes the economic cost of ineffective educational pathways.

Student persistence and integration

Tinto's model of student departure emphasizes academic and social integration as major influences on persistence. Later research has shown that financial conditions, academic preparation, institutional environment, expectations and labor-market opportunities also shape persistence. For Nepal, this perspective is particularly relevant because recent campus studies identify academic difficulty, weak attendance, insufficient support, financial hardship, employment and migration as overlapping influences [D2, D3, D6, D8].

Institutional-capacity perspective

Enrollment expansion places pressure on teachers, classrooms, laboratories, examinations, student services and administrative systems. UGC data indicate that from 2016/17 to 2023/24 enrollment increased by about 70.55%, while the number of teachers reported in the comparable national series rose from 9,299 to 12,082. The resulting student-to-teacher ratio increased from about 39.92 to 52.40 students per teacher in the

simple national ratio used here. This does not prove causality, especially because teacher reporting is not identical across campus types, but it is a useful capacity warning indicator.

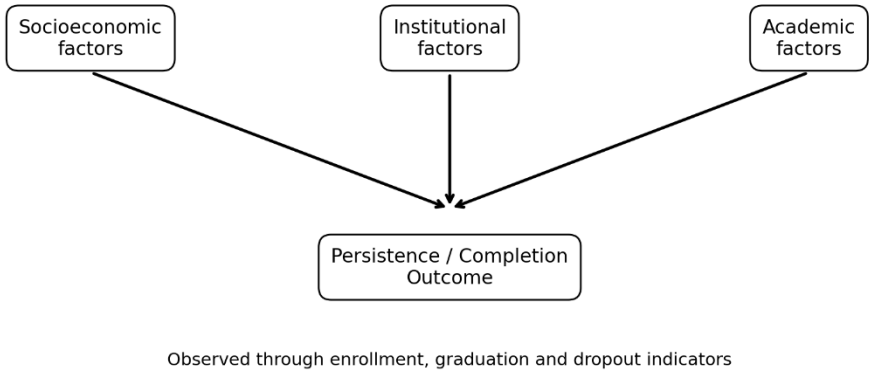


Figure 2. Analytical framework linking socioeconomic, institutional and academic factors to persistence and completion outcomes.

Mathematical representation

Let E_t denote enrollment in year t, G_t graduate output, C_t the number of campuses, T_t teachers, and F_t female enrollment. The study uses the following indicators:

- Annual enrollment growth: g_t = [(E_t − E_{t−1}) / E_{t−1}] × 100.
- Compound annual growth rate: CAGR = (E_T / E_0)^(1/n) − 1.
- Female enrollment share: S_F,t = (F_t / E_t) × 100.
- Graduate-to-enrollment output ratio: R_G,t = (G_t / E_t) × 100.
- Students per campus: SPC_t = E_t / C_t.
- Students per teacher: SPT_t = E_t / T_t.
- Linear trend model: E_t = a + bt + ε_t.
- Pearson correlation: r = cov(E,G) / (σ_E σ_G).

These measures are deliberately modest. The paper does not label R_G,t as a graduation probability. A true completion rate requires cohort tracking, which is a priority for future national data development.

Data and Methodology

Research design

The study adopts a quantitative, descriptive and analytical research design based primarily on secondary data. The principal national source is the UGC Higher Education Management Information System (HEMIS/EMIS) reporting framework. Additional sources include the Ministry of Finance Economic Survey, NSO statistical publications and census material, UNESCO UIS, World Bank and ADB reports, and recent peer-reviewed studies on Nepalese higher education. The design is appropriate because the research questions concern national trends rather than individual psychological prediction.

Core national dataset

Table 1. National higher-education indicators used in the principal time-series analysis. Source: UGC, Report of Higher Education 2023/24

Academic year	Enrollment	Female	Graduates	Campuses	Teachers
2016/17	371,184	195,133	90,922	1,408	9,299
2017/18	423,996	222,981	88,115	1,425	9,269
2018/19	441,819	229,961	84,510	1,432	9,269
2019/20	466,828	247,370	79,541	1,437	11,748
2020/21	460,826	242,103	37,619	1,440	11,031
2021/22	579,448	319,337	88,902	1,455	10,916
2023/24	633,053	358,140	97,564	1,432	12,082

The UGC report presents the sequence 2016/17–2023/24 but does not provide a comparable national observation for 2022/23 in the same trend table. Accordingly, the main statistical series preserves the published observations rather than inventing an interpolated value. Where current 2024/25 and 2025/26 figures are discussed, they are treated as a separate recent-context series because reporting scope and publication timing differ.

Statistical procedures

1. Descriptive comparison of levels and shares.
2. Year-on-year percentage change.
3. Compound annual growth rate.
4. Graduate-output-to-enrollment ratio.
5. Capacity ratios per campus and per teacher.

6. Least-squares linear trend estimation.
7. Pearson correlation between annual enrollment and graduate output.
8. Interpretive triangulation with campus-level dropout studies.

Data-quality and interpretation rules

- National annual enrollment is treated as a stock, not a count of new entrants.
- Graduate output is treated as an annual flow of qualifications/out-turn.
- Dropout is interpreted as non-completion and is not estimated by simply subtracting graduates from enrollment.
- Changes around COVID-19 are interpreted cautiously because academic calendars, examinations and reporting schedules were disrupted.
- Local case-study dropout rates are used as explanatory evidence rather than national estimates.
- Reported current figures from later surveys are kept separate from the harmonized historical series.

Enrollment Trends and Mathematical Analysis

Long-run expansion

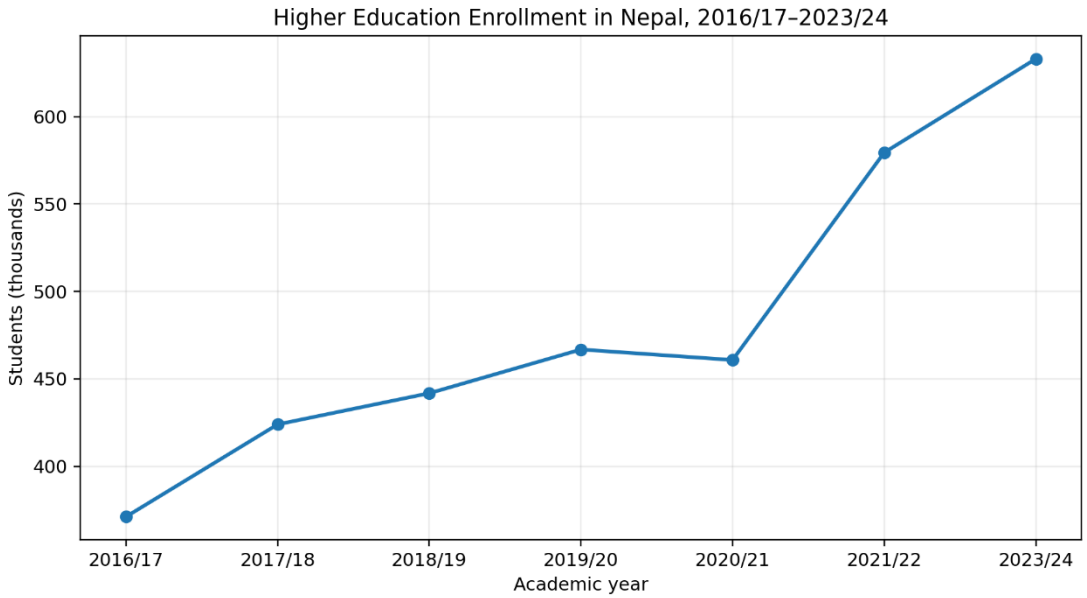


Figure 3. National higher-education enrollment, 2016/17–2023/24.

Enrollment increased from 371,184 students in 2016/17 to 633,053 in 2023/24. The absolute increase was 261,869 students, equivalent to 70.55%. The estimated compound annual growth rate over the seven-year interval is approximately 7.92% per year. This is a substantial expansion and confirms that the national higher-education system has become considerably larger in a relatively short period [E1, E6, E9].

The trend was not monotonic. Enrollment rose from 371,184 to 466,828 between 2016/17 and 2019/20, then declined slightly to 460,826 in 2020/21, before increasing sharply to 579,448 in 2021/22 and 633,053 in 2023/24. The 2020/21 decline of approximately 1.29% contrasts with a rebound of approximately 25.74% in 2021/22. These movements are consistent with the disruption of the COVID-19 period and subsequent normalization, although annual stock figures cannot isolate the mechanism.

Recent enrollment context

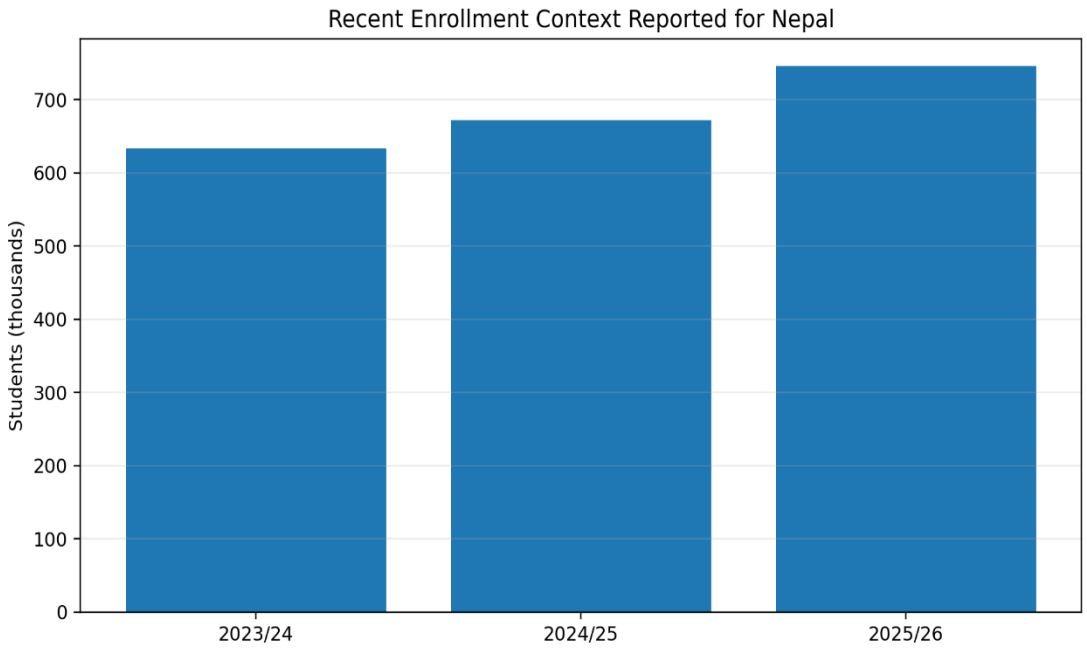


Figure 4. Recent enrollment context using later reported national figures; these are shown separately from the harmonized UGC trend series.

Later national reporting indicates that higher-education enrollment rose further to approximately 672,489 in 2024/25 and 745,770 in 2025/26. These later values reinforce the broad conclusion of continued expansion, while also illustrating why annual administrative data must be accompanied by clear definitions and consistent reporting periods. The 2026 reporting also notes that management-related programs account for a very large share of enrollment and that general disciplines remain much larger than technical fields.

Gender trend

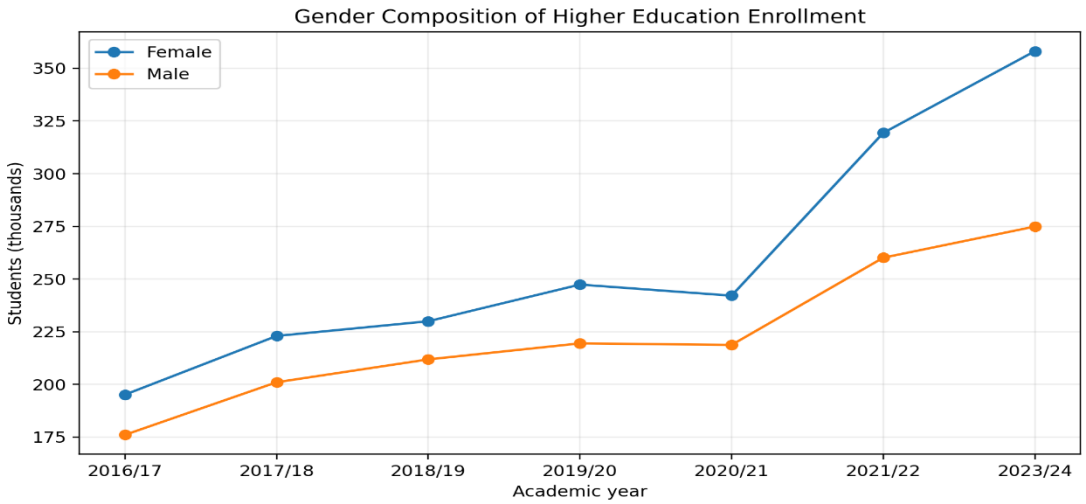


Figure 5. Female and male enrollment reconstructed from UGC national totals.

Female enrollment increased from 195,133 in 2016/17 to 358,140 in 2023/24. The female share therefore rose from 52.57% to 56.57%, a gain of about four percentage points. This is an important structural change: expansion has not merely increased the number of students but has also coincided with stronger female participation in the national higher-education stock [E1, E10].

Gender parity at the aggregate level should nevertheless not be interpreted as universal equality. National averages can conceal differences by province, field of study, socioeconomic background, institution type and level of study. NSO census evidence also shows that educational attainment varies strongly with wealth, geography and gender, reinforcing the need for disaggregated analysis.

Institutional concentration and distribution

In 2023/24, TU alone enrolled 491,299 students, equal to 77.61% of the national total. Purbanchal University enrolled 39,780, Pokhara University 35,200, Kathmandu University 21,053 and Far-Western University 19,356. The concentration is historically rooted in TU's nationwide affiliated-campus structure, but it also indicates that national averages are heavily influenced by one institution [E1, E8].

Table 2. Concentration of national higher-education enrollment in 2023/24

Institution	Students (2023/24)	Share
Tribhuvan University	491,299	77.61%
Purbanchal University	39,780	6.28%

Institution	Students (2023/24)	Share
Pokhara University	35,200	5.56%
Kathmandu University	21,053	3.33%
Far-Western University	19,356	3.06%
Other institutions	26,365	4.16%
National total	633,053	100.00%

Mathematical trend model

A least-squares linear trend fitted to the seven reported observations gives a positive slope of approximately 39,840 students per observed time step. The model is useful as a descriptive baseline, but it should not be interpreted as a forecast because the series contains a pandemic-era disturbance and an omitted 2022/23 observation in the published UGC trend table.

Table 3. Actual enrollment and fitted linear trend values

Year	Actual enrollment	Linear trend estimate
2016/17	371,184	362,931
2017/18	423,996	402,771
2018/19	441,819	442,611
2019/20	466,828	482,451
2020/21	460,826	522,291
2021/22	579,448	562,130
2023/24	633,053	601,970

The main mathematical conclusion is therefore one of sustained expansion with short-term volatility. The expansion is strong enough that policy attention must shift from capacity creation alone toward the quality and efficiency with which institutions convert students into graduates.

Enrollment interpretation

- Access has expanded substantially.
- Female participation has increased faster than total enrollment in absolute terms.
- National enrollment is highly concentrated in TU.
- COVID-19 introduced a visible temporary disruption.

● Current figures suggest continued expansion, but comparability across reporting years must be checked.

● Enrollment growth by itself does not demonstrate improved completion or learning quality.

Graduation Trends and Completion Analysis

Graduate output

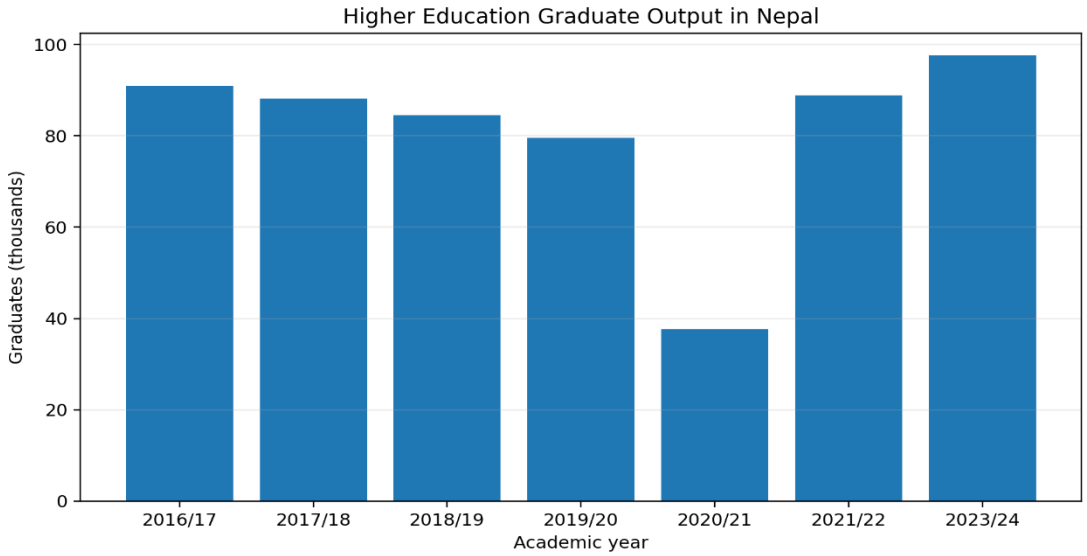


Figure 6. Annual higher-education graduate output/out-turn.

Graduate output moved differently from enrollment. It declined from 90,922 graduates in 2016/17 to 79,541 in 2019/20 and then fell sharply to 37,619 in 2020/21. It recovered to 88,902 in 2021/22 and reached 97,564 in 2023/24. The 2020/21 observation is therefore a major break in the series and should be interpreted in the context of pandemic-related academic disruption, examination delays and administrative backlogs [E1, E11].

The recovery by 2023/24 is important because graduate output exceeded the 2016/17 level. However, the increase in output should not be read as evidence that every enrolled cohort is graduating on time. Annual output can rise because delayed cohorts are finally graduating, because cohort sizes differ, or because institutions change examination and academic-calendar arrangements.

Graduate-to-enrollment output ratio

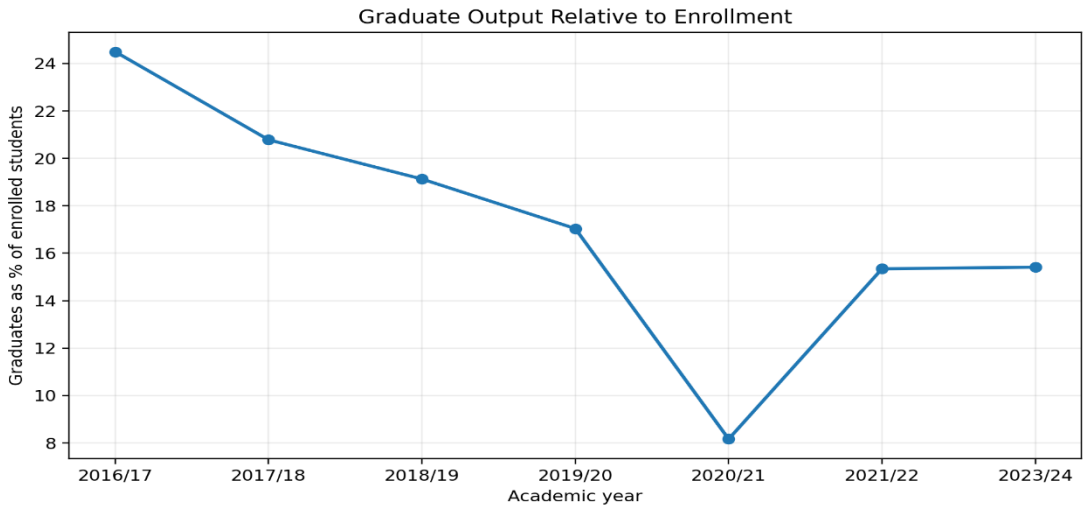


Figure 7. Annual graduate output as a percentage of the enrollment stock. This is an output ratio, not a cohort graduation rate

The graduate-to-enrollment ratio declined from 24.50% in 2016/17 to 17.04% in 2019/20, reached a low of 8.16% in 2020/21, and recovered to 15.41% in 2023/24. The ratio is informative because it compares annual qualification production with the size of the student stock, but its interpretation must remain cautious.

The decline before the pandemic suggests that enrollment was expanding faster than annual graduate output. Such a pattern can occur when new admissions grow, when students take longer to graduate, or when examination and academic calendars become delayed. The pandemic shock then widened the gap dramatically, after which output recovered.

Why a true graduation rate cannot be calculated from these aggregates

A cohort graduation rate requires the following structure: identify a cohort of entrants in year t, observe the same students through subsequent years, and determine the proportion that graduates within a specified period. The national annual totals used here do not provide that student-level linkage. Therefore, the ratio G_t/E_t should be described as an annual graduate-output-to-enrollment ratio. This distinction prevents a common statistical error in which the annual graduate count is divided by the same-year enrollment stock and interpreted as the probability of graduation.

Graduate concentration

In 2023/24, TU produced 74,149 graduates, approximately 76% of national graduate output. Pokhara University produced 7,651 graduates and Purbanchal University 7,856, while Kathmandu University produced about 3,077. The concentration of graduate production broadly follows the concentration of enrollment, but output shares are not identical to enrollment shares. This is a useful starting point for comparative efficiency analysis across institutions, provided that level and program mix are controlled [E8].

Program duration, academic calendars and delayed completion

Completion is affected not only by student ability but also by institutional time. When admission, teaching, examinations and results are delayed, students can remain formally enrolled for longer periods. UGC and policy documents have repeatedly identified academic-calendar problems as a challenge in Nepalese higher education. From a statistical perspective, this produces a stock-flow distortion: students accumulate in the enrollment stock while the graduation flow is delayed.

A useful future indicator is the median time-to-degree by program and university. If the nominal program duration is four years but a substantial share of graduates completes in five, six or more years, the institution is generating qualifications but with lower time efficiency. Such a measure would complement graduation rates and would be more informative than enrollment alone.

Capacity ratios

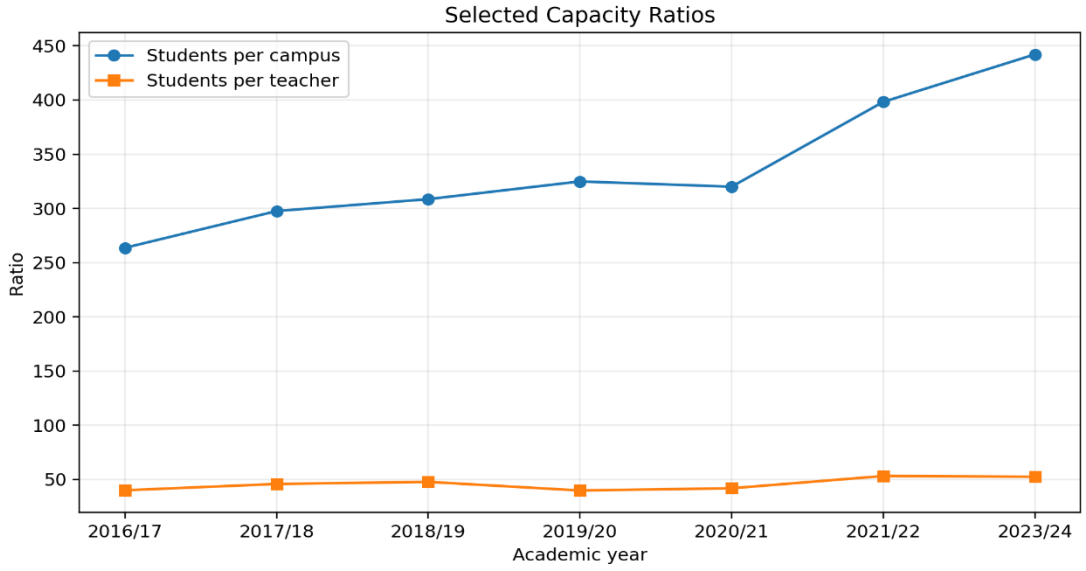


Figure 8. Students per campus and students per teacher in the harmonized national series.

The simple students-per-campus ratio increased from about 264 students per campus in 2016/17 to about 442 in 2023/24. The students-per-teacher ratio increased from about 39.9 to 52.4 in the same series. These ratios should not be interpreted as actual classroom ratios because campus types and reporting coverage differ. Nevertheless, they show that the system's student stock has expanded substantially relative to several basic capacity measures.

Graduation efficiency as a system problem

- Expansion without timely completion increases the duration of resource use.
- Delayed completion can reduce labor-market entry and increase the private cost of study.
- Low graduate output can weaken the return on public and household educational investment.
- Program-level differences matter; national averages can hide high-performing and low-performing fields.
- Completion policy should combine academic support, institutional reform and financial measures.

Dropout and Non-Completion Analysis

Defining dropout

Dropout refers here to leaving a program or institution without completing the intended qualification and without a documented transfer that preserves the educational pathway. Because Nepal's national administrative data are not yet organized as a fully longitudinal student-level dataset, a single national dropout rate cannot be derived reliably from the annual enrollment and graduate totals. This paper therefore uses published campus studies and national policy evidence to explain the mechanisms of non-completion, while avoiding an invented national percentage.

Evidence from Nepalese campus studies

Recent Nepalese studies show that dropout is multifactorial. A Baneshwor Multiple Campus study found foreign migration to be a prominent influence and identified social and economic pressures as important. A Kailali Multiple Campus study reported more frequent dropout in general programs such as BBS, BA and B.Ed. than in several

professional programs and identified weak economic conditions and preparation for migration abroad as major issues. Studies from Myagdi, Marsyangdi and Surkhet similarly point to combinations of financial constraints, academic difficulty, institutional support, family responsibilities, employment and migration [D1–D10].

Table 4. Recent Nepalese evidence on higher-education dropout/non-completion

Evidence source	Main setting	Key factors reported
Kafle (2024)	Baneshwor Multiple Campus	Migration, socioeconomic pressure, retention
Madai et al. (2025)	Kailali Multiple Campus	Economic hardship, migration, program differences
Ghimire (2024)	Myagdi Multiple Campus	Personal, institutional, socioeconomic factors
Neupane (2024)	Marsyangdi Multiple Campus	Finance, institutional weakness, employment, migration
Dhungana (2025)	Myanglung Campus	Academic performance, attendance, support, family finance
Acharya (2026)	Surkhet Multiple Campus	Finance, academic preparedness, crisis, institutional factors
Sapkota et al. (2025)	Far Western University	Economic factors, employment, academic difficulty, marriage
Joshi & Chand (2026)	Nepalese universities	Migration, academic failure, finance, family, curriculum

Financial factors

Financial hardship appears repeatedly across Nepalese studies. Students may need to work, may be unable to pay fees and transport costs, or may perceive immediate employment as more valuable than continuing a degree. The economic decision is especially important where a degree requires several additional years before generating income. From a human-capital perspective, dropout can therefore reflect a change in perceived opportunity cost rather than simple academic failure.

Migration and foreign study

Outward migration is an important contextual factor in Nepal. Large numbers of students obtain no-objection certificates for study abroad, and campus studies report foreign employment or overseas education as a reason for leaving domestic programs. However, migration is both a cause and a symptom: students may leave because overseas opportunities are attractive, while dissatisfaction with domestic academic quality, delayed calendars or limited employment prospects may increase the attractiveness of leaving [D1, D8, D10].

Academic factors

Academic preparedness, examination performance, irregular attendance and difficulty coping with course requirements are repeatedly associated with non-completion. These factors suggest that retention interventions should begin early rather than waiting until a student is formally classified as a dropout. Academic advising, diagnostic assessment, bridge courses, tutoring and timely feedback can reduce the probability that early academic problems become irreversible.

Institutional factors

Institutional support influences persistence through teaching quality, counseling, academic advising, examination schedules, feedback, communication, infrastructure and perceived relevance of programs. A student who is academically capable may still leave if the institutional environment provides little support or if the expected qualification does not appear to improve employment prospects. Recent research on retention in community campuses finds that perceived quality education is strongly connected to retention [D11].

Family and social factors

Family responsibilities, marriage, caregiving, household finance and social expectations can interrupt study. These factors interact with gender, location and economic status, meaning that dropout should not be treated as a purely individual choice. Retention policy should therefore include flexible scheduling, financial assistance, counseling and re-entry pathways rather than relying only on motivational messages.

A statistical warning: dropout is not enrollment minus graduation

It is tempting to calculate dropout as $1 - G_t/E_t$. This would be statistically invalid because enrollment and graduation refer to different student cohorts and different time points. A correct cohort dropout estimate requires an identity such as:

Cohort non-completion = 1 − (graduates within the defined follow-up period / original cohort entrants), adjusted for documented transfers and other exits.

Until student-level longitudinal data are available, Nepal should publish a transparent set of cohort indicators by university, program, gender, province and socioeconomic category. This would allow dropout to be measured directly rather than inferred from aggregate stocks and flows.

Proposed national early-warning model

A practical monitoring model could assign a persistence-risk score using attendance, first-year examination performance, fee arrears, credit accumulation, repeated course failures and interruption of registration. The purpose would not be to punish students but to trigger timely support. A simple logistic model could estimate the probability of non-completion:

$$\text{logit}(P(\text{Dropout})) = \beta 0 + \beta 1(\text{Academic risk}) + \beta 2(\text{Financial risk}) + \beta 3(\text{Attendance}) + \beta 4(\text{Program load}) + \beta 5(\text{Institutional support}) + \beta 6(\text{Migration intention}).$$

Such a model should be validated locally, audited for fairness and used only as a support mechanism. It would complement—not replace—human academic advising.

Integrated Statistical Findings

Summary indicators

Table 5. Key mathematical comparisons across the principal series

Indicator	2016/17	2023/24	Change / interpretation
Enrollment	371,184	633,053	+70.55%
Female enrollment	195,133	358,140	+83.55%
Female share	52.57%	56.57%	+4.00 percentage points
Graduate output	90,922	97,564	+7.30%
Graduate/enrollment ratio	24.50%	15.41%	Lower annual output relative to stock
Campuses	1,408	1,432	+1.70%
Teachers	9,299	12,082	+29.93%
Students/campus	263.6	442.1	Higher concentration of students
Students/teacher	39.9	52.4	Higher pressure indicator

Correlation between enrollment and graduate output

The Pearson correlation between the seven observed enrollment values and graduate-output values is approximately $r = 0.234$. This is a positive but weak-to-moderate association in this small, disrupted time series. The result illustrates an important point: more students in the system do not automatically produce a proportionally larger annual graduate flow. Completion timing, academic calendars, cohort size and institutional delays intervene between enrollment and graduation.

Growth decomposition

Enrollment growth was much faster than graduate-output growth across the endpoints: approximately 70.55% versus 7.30%. This gap is not itself a dropout estimate, but it is a warning that system expansion has been accompanied by a larger student stock than the annual output flow alone would suggest. The difference is especially pronounced when the pandemic-era graduate shock is considered.

Why the indicators must be read together

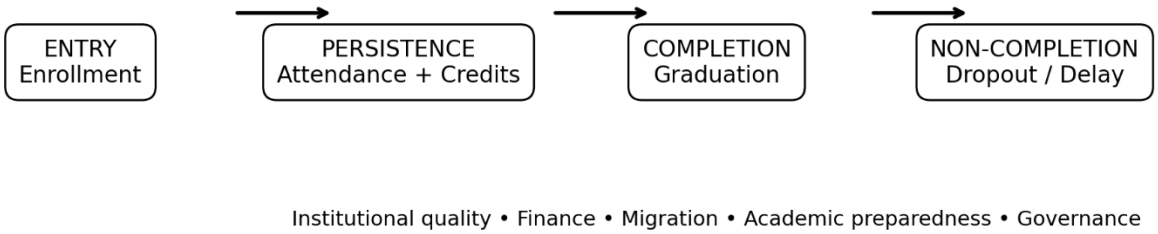


Figure 9. The three indicators are linked but not interchangeable.

Enrollment answers an access question: how many students are in the system? Graduation answers an output question: how many qualifications are produced? Dropout answers a persistence question: how many students leave the intended pathway without completion? A strong higher-education system should monitor all three, together with time-to-degree, learning outcomes, employment outcomes and equity indicators.

Discussion

Expansion has been real but uneven

The statistical evidence confirms substantial expansion. The national student stock grew by more than 260,000 between 2016/17 and 2023/24. Female participation expanded strongly, and the system now contains a larger institutional network than a decade ago. These are significant achievements for access and social participation.

Yet the distribution of students remains highly concentrated. TU's dominance means that national averages can hide the conditions of smaller universities and campuses. At the same time, recent policy documents and studies identify campuses with very low student numbers, raising questions about institutional sustainability and resource allocation.

Thus, Nepal faces a dual problem: overcrowding or heavy load in some institutions and under-utilization in others.

Completion has not expanded proportionately

The most striking statistical finding is the divergence between enrollment and graduate output. Enrollment rose strongly while graduate output fluctuated and the graduate-to-enrollment ratio remained below its 2016/17 level in 2023/24. This suggests that access expansion has not automatically translated into faster completion.

Several mechanisms may explain the divergence: students may take longer to complete; new cohorts may be entering faster than old cohorts graduate; academic calendars may delay examinations; and some students may leave domestic institutions for work or foreign study. Because the present dataset cannot identify the same student across years, these mechanisms cannot be separated statistically at the national level.

COVID-19 as a structural shock

The 2020/21 graduate-output collapse is unusually large relative to the surrounding observations. The enrollment stock, by contrast, declined only slightly. This contrast is consistent with a stock-flow shock: students remained in the system while the production of qualifications was delayed. The recovery in subsequent years further supports the interpretation that at least part of the decline was a timing effect rather than permanent disappearance of students.

The dropout problem is systemic

Campus-level evidence shows that dropout is not caused by one variable. Financial hardship, academic performance, attendance, institutional support, employment, migration and family conditions repeatedly appear together. This is consistent with international persistence literature, which treats student departure as a process involving the interaction of individual, institutional and economic factors.

Policy Implications

Build a national longitudinal student database

Nepal's most important statistical reform should be the transition from institution-level annual aggregates toward privacy-protected longitudinal student records. Each student should have a secure education identifier that permits the system to track entry, credit accumulation, interruption, transfer, graduation and re-entry without exposing personally

identifying information in public datasets. This would make genuine cohort graduation, retention and dropout rates measurable.

Introduce a national completion dashboard

- First-year retention rate.
- Second-year retention rate.
- On-time graduation rate.
- Median time-to-degree.
- Program completion rate.
- Documented transfer rate.
- Stop-out and re-entry rate.
- Graduate employment or further-study rate.
- Gender, province and socioeconomic gaps.

Early academic support

Universities should identify students with low attendance, repeated course failures or low credit accumulation during the first year. Rather than waiting for final examinations, institutions can provide tutoring, mentoring, bridge courses and academic advising. International retention evidence indicates that early integration and information support are more useful than generic retention campaigns.

Financial support and flexible study

Scholarships and need-based assistance should be better targeted toward students at high risk of interruption. Flexible payment schedules, part-time study, evening or blended options, and structured re-entry pathways could reduce the need to choose between earning and studying.

Reform academic calendars

Predictable academic calendars are a completion policy. Universities should publish binding annual schedules for admission, teaching, examinations and results, monitor delays publicly and link institutional performance reviews to calendar reliability. Reducing administrative delay can improve the graduate flow without requiring an equivalent expansion of physical infrastructure.

Strengthen program relevance and labor-market alignment

Recent Nepalese dropout studies repeatedly mention weak perceived value, employment pressure and migration. Programs should therefore be reviewed for practical relevance, internship opportunities, industry collaboration and employability skills. The goal is not to eliminate general education, but to ensure that students can see credible pathways from study to further education, employment or entrepreneurship.

Rebalance the institutional system

The concentration of students in TU and the existence of campuses with very small enrollments suggest a need for more rational institutional planning. Program duplication, geographic access, faculty availability, laboratory capacity and student demand should be considered before establishing or continuing programs. Provincial universities can play a larger role if they develop distinctive academic strengths rather than reproducing identical programs.

Improve technical and professional participation

Recent national reporting shows a strong concentration in management and other general disciplines, while technical fields account for a smaller share. Policy should focus on quality and labor-market demand rather than simply increasing technical seats. Where technical programs are genuinely needed, scholarships, laboratories, faculty development and industry partnerships can make them more attractive and sustainable.

Use evidence for performance-based financing

UGC funding can increasingly reward measurable outcomes such as timely graduation, student retention, quality assurance, research productivity and graduate employability. Performance indicators should be adjusted for institutional mission and student composition so that institutions serving disadvantaged populations are not unfairly penalized.

A five-year statistical reform roadmap

Table 6. Proposed five-year higher-education data and retention roadmap

Year	Priority	Expected output
Year 1	Standardize definitions	Common enrollment, dropout and graduation definitions
Year 2	Student identifiers	Longitudinal tracking architecture
Year 3	Early-warning pilots	Retention dashboards in selected universities
Year 4	Cohort reporting	National cohort completion and time-to-degree indicators
Year 5	Performance integration	Funding and quality assurance linked to outcomes

Limitations

- The principal national series is administrative and aggregate; it does not identify individual student pathways.
- The published trend table omits a directly comparable 2022/23 national observation, so the main analysis does not interpolate one.
- Graduate-to-enrollment ratios are not cohort graduation rates.
- Campus-level dropout studies vary in sample, design, program and period and therefore cannot be pooled into a national dropout estimate.
- Teacher reporting and campus-type coverage may differ, so students-per-teacher ratios are indicative rather than classroom staffing measures.
- Current 2024/25 and 2025/26 enrollment figures are presented as separate context because reporting scope and publication timing differ from the harmonized historical series.
- Correlation does not establish causation.

Conclusion

This study demonstrates that the central story of Nepalese higher education is not simply expansion; it is expansion accompanied by a difficult conversion problem. Enrollment has increased dramatically, female participation has strengthened, and the institutional system has diversified. However, graduate output has been volatile and the annual graduate-to-enrollment ratio in 2023/24 remained below its 2016/17 level. At the same time, Nepalese campus studies consistently identify financial pressure, academic difficulty, weak institutional support, employment opportunities, migration and family responsibilities as contributors to non-completion.

The evidence therefore supports a shift in policy emphasis from counting students to tracking educational trajectories. Nepal needs to know not only how many students enter higher education, but how many remain, how long they take, why they leave, whether they return, and what they do after graduation. A national longitudinal student-data system would transform the country's ability to answer these questions.

Mathematically, the system can be understood as a sequence of stocks and flows: enrollment is the student stock, graduation is an output flow, and dropout is one of several exit pathways. The statistical lesson is straightforward: these quantities cannot be substituted for one another. Better policy requires direct cohort measurement, transparent definitions and consistent reporting.

Ultimately, the quality of Nepalese higher education should be judged not by enrollment growth alone but by whether students—especially those facing financial, geographic or academic disadvantage—can complete relevant programs within reasonable time and move successfully into employment, further study and civic life. The country's next phase of higher-education reform should therefore place retention, timely completion, equity, relevance and evidence-based management at the center of the system.

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