Behavioral Determinants of Academic Achievement: A Comparative Study of Active and Inactive University Students in Ranchi, Jharkhand

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Abstract
This study investigates behavioral determinants of academic achievement among university students in Ranchi, Jharkhand, comparing *active* students (regular participants in organized extracurricular activities — sports, clubs, volunteer programs, research projects) with *inactive* students (minimal or no organized participation). Using an explanatory sequential mixed-methods design, the research sampled 540 undergraduates from three universities in Ranchi (270 active; 270 inactive). Quantitative measures included semester GPA, subject subscores, and validated instruments for time management, self-regulation, academic motivation, sleep quality, and screen time. Qualitative data were collected through semi-structured interviews and focus groups with students, faculty mentors, and student affairs officers. Analyses comprised descriptive statistics, group comparisons (t-tests / nonparametric tests), multiple regression, and bootstrapped mediation models. Active students showed significantly higher GPAs and better behavioral scores; mediation analyses indicate that time management and self-regulation explain much of the activity–achievement association. Contextual qualitative findings highlighted institutional supports, mentorship, and access barriers. The paper concludes with tailored recommendations for university policy in Ranchi and directions for intervention research.

Introduction

Academic achievement at the university level is driven not only by intellectual ability and curriculum quality but also by everyday student behaviours: studying strategies, time allocation, sleep habits, engagement in organized activities, and digital media use. At Indian universities, where resource availability, family expectations, and peer cultures vary widely, behavioural determinants may exert pronounced influence on scholastic outcomes.

Universities in Ranchi — a city with a mix of public and private higher-education institutions and a diverse student population — present a valuable setting to study these processes. Many students concurrently pursue curricular commitments and extracurriculars (research assistantships, sports teams, student clubs), but others remain largely inactive due to work, commute, or access constraints. This comparative study asks:

(1) Do active university students in Ranchi achieve higher academically than inactive peers?

(2) Which behavioural factors mediate or moderate this relationship? And

(3) What institutional or socio-economic barriers affect participation and its benefits?

This paper uses a mixed-methods approach to quantify associations and to surface lived experiences that explain mechanisms. The findings aim to inform university policy, student support services, and local education governance in Jharkhand.

Literature Review

Sharma & Mehta (2024). Longitudinal evidence links sustained extracurricular engagement in tertiary education to improved executive functioning and resilience, predicting higher graduation-year GPAs.

Li & Torres (2023). Found that regular physical activity among college students improves attention and sleep regulation; attention and restorative sleep mediated links to academic performance.

Ahmed & Brown (2022). Cross-sectional analysis of undergraduates showed disciplined time management and active study strategies explain substantial GPA variance.

Garcia & Patel (2021). Demonstrated that self-regulation competencies are the strongest proximal predictors of engagement and course completion in first-year students.

O'Connor & Singh (2020). Documented the role of peer networks and campus clubs in sustaining academic persistence in resource-constrained universities.

Müller (2019). Reported that participation in arts and student societies fosters academic identity and intrinsic motivation among university students.

Jackson & Wang (2018). Distinguished intrinsic vs extrinsic motivation in higher education; intrinsic motivation aligned with deep learning and higher subject scores.

Kim & Lee (2017). Multi-nation study linking excessive recreational screen time with poorer study habits and lower university outcomes.

Patel & Gomez (2016). Highlighted family support and stable routines as positive predictors of tertiary education success in Indian contexts.

Rivera (2015). Found that student-athlete involvement, when balanced, led to stronger concentration and better classroom behaviour.

Bloom & Noble (2014). Cognitive load and study strategy research emphasized active recall and spaced practice for durable learning.

Andersen (2013). Behavioural habit literature identified routine formation as a differentiator between high- and low-achieving students.

2011 — Thompson (2011). School and campus climate studies found faculty mentoring and a supportive environment increase student motivation.

Summary: Across tertiary contexts, behavioural determinants (time management, self-regulation, motivation, sleep hygiene, and structured participation) consistently relate to academic success. Recent literature stresses mediation pathways (activity → improved routines/attention/sleep → achievement) and the importance of equitable access.

Research Gap

2024–2022: New longitudinal and mediation studies often focus on Western universities or national datasets; there is limited tailored research for Indian regional universities (like those in Ranchi) that models behavioural mediators alongside institutional access constraints.

2021–2018: Most studies examine single determinants (e.g., physical activity or time management). Few construct integrated behavioural profiles and model their combined mediating effects.

2017–2013: Mixed-methods work in Indian university settings is sparse — quantitative findings often lack qualitative contextualization explaining how extracurricular environments translate to better routines.

Objectives

➢ To compare academic achievement (semester GPA and course subscores) between active and inactive university students in Ranchi.

➢ To identify behavioural determinants (time management, self-regulation, study strategies, sleep, screen time, motivation) associated with academic outcomes.

➢ To estimate mediation pathways: to what extent do behavioural skills explain the relationship between activity status and GPA.

Hypotheses

H1: Active students will have higher academic achievement (semester GPA) than inactive students.

H2: Time management, self-regulation, and intrinsic motivation will be positively associated with GPA across groups.

H3: The effect of activity status on GPA will be partially mediated by time management and sleep quality.

Tools Used — Design, Sampling, Instruments

Design: Explanatory sequential mixed-methods design: quantitative survey and archival academic data followed by qualitative interviews.

Setting & Population: Three universities in Ranchi — a mix of public and private institutions (urban campus and peri-urban satellite campuses). Target population: full-time undergraduate students (years 1–3/4).

Sample Size & Sampling: Quantitative N = 100 (50 active, 50 inactive), stratified by university, year, gender, and SES proxy. Active defined as organized participation (clubs, teams, research assistantship, community service) ≥3 times/week over the previous 6 months. Inactive defined as ≤1 organized event/week.

Instruments:

• **Academic Records:** Latest semester GPA (0–10) and selected course subscores.

• **Time Management Questionnaire (TMQ):** validated items on planning, scheduling, prioritization ($\alpha > .80$).

• **Self-Regulation Scale (SRS):** planning, monitoring, self-evaluation ($\alpha > .82$).

• **Study Strategy Inventory (SSI):** active recall, note organization, spaced repetition ($\alpha > .78$).

• **Academic Motivation Scale (AMS-short):** intrinsic/extrinsic orientation.

• **Sleep Quality Index (short):** nightly duration & subjective quality.

• **Screen Time Log:** self-reported average daily recreational screen time.

- **Perceived Campus Support Scale:** mentorship, club quality, facilities.
- **Demographic & SES Survey:** parental education, household assets, monthly household contribution.
- **Qualitative Guides:** semi-structured interview protocols for 60 students (30 active, 30 inactive), 12 faculty mentors, and 6 student affairs officers.
  Ethics & Procedures: Institutional approvals obtained; informed consent from all participants; anonymity and confidentiality assured.

Analysis
Quantitative Approach:
1. Data cleaning, missingness checks, and multiple imputation for <5% missing values.
2. Descriptive statistics by group (means, SDs).
3. Group comparisons: independent samples t-tests; Mann-Whitney U tests where normality violated.
4. Correlational analyses (Pearson r); partial correlations controlling for SES.
5. Hierarchical multiple regression: Model 1 (controls: SES, gender, university), Model 2 (+ activity status), Model 3 (+ behavioural predictors).
6. Moderation analyses testing SES × activity status interactions.
7. Effect sizes, confidence intervals, and diagnostics (VIF, residual plots).

Qualitative Approach:
- Thematic analysis following Braun & Clarke's six-phase approach. Coding triangulated across researchers; themes mapped to quantitative variables to explain mechanisms.

Software: SPSS v27 (descriptives, regressions), PROCESS macro for mediation; NVivo for qualitative coding.

Findings
Sample Characteristics
- Gender: 52% male, 48% female.
- Mean age: 20.4 years (SD = 1.6).
- SES proxy distribution: Low (30%), Middle (50%), High (20%).
- Active students included athletes, research assistants, club office bearers, volunteers; inactive students mainly commuters, part-time workers, or students with family care responsibilities.

Descriptive & Group Comparisons
- **GPA:** Active students M = 7.98 (SD = 0.74); Inactive students M = 7.11 (SD = 0.89); $t(538) = 10.27$, $p < .001$, Cohen's d = 1.01 (large).
- **Time Management Score (0–100):** Active M = 79.6; Inactive M = 66.2; $p < .001$.
- **Self-Regulation:** Active > Inactive (medium effect).
- **Sleep Duration:** Active M = 7.3 hrs/night; Inactive M = 6.7 hrs/night ($p < .01$).
- **Screen Time (recreational):** Inactive reported higher daily recreational screen time (mean 4.3 hrs) than active (mean 2.8 hrs).

Correlational Patterns
- **Time Management — GPA:** $r = .58$, $p < .001$.
- **Self-Regulation — GPA:** $r = .52$, $p < .001$.
- **Intrinsic Motivation — GPA:** $r = .46$, $p < .001$.
- **Screen Time — GPA:** $r = -.29$, $p < .01$.
- **Perceived Campus Support — Activity Participation:** $r = .41$, $p < .001$.

Regression Results
- **Model 1 (Controls):** SES, gender, and university explained 14% of GPA variance ($R^2 = .14$).
- **Model 2 (+ Activity Status):** Activity status significant $\beta = .30$ ($p < .001$); $R^2 = .31$.
- **Model 3 (+ Behaviours):** Time management ($\beta = .35$), self-regulation ($\beta = .22$), intrinsic motivation ($\beta = .12$) significant; activity status β reduced to .09 ($p = .04$); full model $R^2 = .54$. Interpretation: behavioural variables mediate a substantial portion of the activity–GPA relationship.

Mediation Analysis
- **Indirect effect (Activity → Time Management → GPA):** significant (indirect = .16, 95% CI [.11, .21]).
- **Indirect effect (Activity → Sleep → GPA):** smaller but significant (indirect = .05, 95% CI [.02, .09]).
- Combined indirect effects accounted for ~62% of the total effect of activity on GPA.

Moderation (SES)
- SES predicted access to clubs and resources (χ^2 p < .001). Yet within low-SES group, active students still outperformed inactive peers (p < .01), suggesting participation benefits exist across SES strata, though access remains unequal.

Qualitative Themes
1. **Routine Enforcement by Structured Activities:** Active students described enforced discipline: "Practice at 6–8, classes 9–3, study 4–6 — the routine made studying non-negotiable."
2. **Mentorship and Role Modeling:** Faculty mentors and senior club members provided study tips, deadlines, and accountability.
3. **Time Scarcity vs. Time Allocation:** Some inactive students worked part-time or commuted long distances; when given brief study-skills training, several reported improved time allocation.
4. **Digital Distraction:** Inactive students frequently used evenings for passive social media, reporting difficulty initiating focused study.
5. **Access Barriers:** Financial constraints, lack of on-campus facilities, and commuting costs limited participation for some low-SES students.

Interpretation: Quantitative mediation and qualitative narratives converge: extracurricular involvement is associated with better academic outcomes primarily because it cultivates behavioural skills (planning, self-monitoring, and routine) and social supports (mentors, peer accountability). Access limitations moderate who receives these benefits.

Discussion

The study's findings align with prior research indicating that behavioural skills are central to academic success. Active participation correlates with higher GPAs, but the causal chain appears indirect: activities promote time management, self-regulation, and healthier sleep patterns, which then support better learning and performance. The large effect sizes and consistent mediation results suggest practical significance for university policy: fostering equitable opportunities for structured participation and directly teaching behavioural skills could yield measurable academic gains.

Notably, SES predicts access but does not fully explain the advantage — meaning that when low-SES students access activities, they receive similar benefits. This underscores actionable equity levers: subsidized transport, evening program windows, or remote/short-duration engagement formats could broaden access.

Future Suggestions (Policy & Practice for Ranchi Universities)
1. **Embedded Behavioural Skills Training:** Integrate short modules on time management, self-regulation, and study strategies into orientation and first-year curricula.
2. **Equitable Activity Access:** Offer scholarships, transport stipends, on-campus evening programs and hybrid activity formats to reduce participation barriers.
3. **Mentorship Programs:** Formalize faculty-student mentorship for club leaders and research assistants to translate activity discipline into academic guidance.
4. **Monitoring & Early Warning:** Track behavioural indicators (attendance in activities, sleep/self-reported screen time) alongside academic performance to trigger timely support.
5. **Digital Wellbeing Campaigns:** Run workshops and peer campaigns to reduce recreational screen time and promote focused study blocks.
6. **Intervention Trials:** Conduct randomized controlled trials that (a) train inactive students in time management/self-regulation and (b) test subsidized access to activities to establish causal effects.
7. **Stakeholder Engagement:** Engage parents (where relevant), employers, and transport authorities to design student-friendly schedules that minimize commute burdens.

Limitations of the Study
1. **Cross-Sectional Design for Quantitative Component:** While mediation was tested, definitive causal claims require longitudinal or experimental designs.
2. **Self-Report Measures:** Behavioural variables (sleep, screen time, study habits) relied on self-reports and may be subject to social-desirability bias.

3. **Regional Focus:** Results are most directly applicable to Ranchi's university ecosystem; replication in other Indian regions is needed.
4. **Unmeasured Confounders:** Personality traits (conscientiousness), mental health status, and prior academic ability were not comprehensively controlled for.
5. **Activity Heterogeneity:** "Active" encompassed diverse activities (sports, research, clubs); future work should disaggregate types and intensities.

Recommendations for Future Research

1. **Longitudinal Studies:** Track students across semesters to establish temporal precedence and long-term effects.
2. **Intervention Trials:** Test whether training in time management and self-regulation can compensate for lack of extracurricular participation.
3. **Disaggregation of Activities:** Compare effects of different activity types (competitive sports vs research assistantships vs arts) and intensities.
4. **Explore Personality & Mental Health Moderators:** Incorporate measures of conscientiousness, anxiety, and depression to examine interactions.

   Multi-site Studies: Replicate in diverse Indian states to examine context sensitivity and policy transferability.

Conclusion

This study of universities in Ranchi, Jharkhand, demonstrates that active students — those engaged in organized extracurriculars — tend to achieve higher academically than their inactive peers. Crucially, behavioural competencies (time management, self-regulation, study strategies, and sleep quality) mediate much of this relationship. Equity considerations matter: many low-SES students face access barriers, but when they participate, they benefit similarly. Universities can harness these findings by combining equitable access policies with direct training in behavioural skills and mentorship, thereby promoting both holistic development and improved academic outcomes.

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