

RESEARCH ARTICLE

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Evaluating Academic Competencies and Regional Awareness: A Quiz-Based Study of Inter Colleges in Baghpat District

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Abstract

This study reports on a large-scale, objective-type inter-college quiz conducted by the Syadwad Institute of Higher Education & Research across senior secondary institutions of Baghpat district, Uttar Pradesh. The quiz assessed participants across five domains — General Knowledge, English Language, Current Affairs, General Science, and Baghpat District Awareness — through 35 objective questions distributed evenly across the domains. Data from 2,609 class XII students drawn from 63 participating institutions were analysed after removing all personally identifiable information; the working sample for score-based analysis comprised 2,592 valid records. Descriptive and inferential statistics revealed a mean score of 13.77 out of 35 (39.4 percent), with wide variation across institutions and academic streams. Students enrolled in the science stream significantly outperformed their peers in arts/humanities and commerce (one-way ANOVA, $F = 55.68$, $p < .001$), while no meaningful difference emerged between male and female participants (independent-samples t-test, $t = -0.04$, $p = .971$). Only 8.5 percent of students crossed the 60 percent threshold, indicating substantial room for improvement in general awareness and regional civic knowledge among senior secondary students in the district. The findings are discussed in relation to curriculum design, gender parity in general-knowledge assessment, and the value of locally rooted awareness components in student evaluation. The paper concludes with recommendations for schools, district education authorities, and future quiz-based research initiatives.

Keywords: inter-college quiz; academic competency; regional awareness; Baghpat district; general knowledge assessment; stream-wise performance; gender and achievement

1. Introduction

Objective-type quizzes have long occupied a distinctive place in Indian school and college life, serving simultaneously as a pedagogical tool, a co-curricular event, and an informal barometer of what students actually retain once textbook learning is set aside. Unlike board examinations, which are confined to subject-specific syllabi, an inter-college general-knowledge quiz allows an institution to look across disciplinary boundaries and ask a more basic question: how well-informed are our students about the world they live in, the country they belong to, and the district in which their own school stands?

It was with this broader question in mind that the Syadwad Institute of Higher Education & Research organised a district-wide objective quiz for class XII students across senior secondary and inter colleges in Baghpat district during the 2025–26 academic session. The examination was deliberately structured around five domains — General Knowledge, English Language, Current Affairs, General Science, and Baghpat District Awareness — each contributing seven questions to a total of thirty-five. The inclusion of a dedicated regional-awareness component distinguishes this quiz from the more conventional general-knowledge tests that dominate the literature, and it is this local dimension, alongside the more familiar academic domains, that forms the empirical core of the present paper.

The exercise generated a substantial dataset spanning dozens of institutions, several academic streams, and both genders, offering a rare opportunity to examine district-level patterns of student awareness that rarely surface in aggregate examination statistics. This paper analyses that dataset — after removing all student-identifying information — to describe how senior secondary students across Baghpat performed, whether performance varied systematically by stream or gender, and which institutions and localities showed particular strengths or gaps. In doing so, it aims to contribute both a methodological template for future district-level quiz initiatives and a substantive, if modest, picture of general awareness among a cohort of rural and semi-urban Uttar Pradesh students.

2. Objectives of the Study

The study was guided by the following objectives:

1. To examine the overall performance of class XII students in a five-domain objective quiz conducted across inter colleges in Baghpat district.
2. To compare quiz performance across academic streams (Science, Commerce, Arts/Humanities, and others).
3. To examine whether gender is associated with differences in overall quiz performance.

4. To identify variation in institutional performance and participation across the participating colleges.
5. To draw implications for curriculum planning and future district-level assessment initiatives, with particular reference to regional civic awareness.

3. Review of Related Literature

Quizzes and short objective tests have been studied both as pedagogical interventions and as diagnostic instruments. Shafiq and Siddiquah (2011), working with graduate students, found that regular classroom quizzing improved subsequent examination performance and encouraged closer attention during instructional discussion, lending support to the use of quiz formats as a genuine measure — and not merely a recreational supplement — of student learning. At a broader psychological level, Li, Li, Wu and Zhen (2022) demonstrated that competitive academic activity does not translate into achievement in any simple, direct fashion; rather, its effects are mediated by learning anxiety and learning engagement, both of which can pull performance in opposite directions. This mediated relationship is a useful caution for any quiz-based study: raw scores reflect not only knowledge but also the emotional and motivational climate surrounding the competition itself.

A second strand of literature concerns stream-wise and gender-wise differences in academic performance among Indian secondary students. Using nationally representative data, Sahoo and Klasen (2021) documented a persistent gender gap in stream choice at the higher secondary level, with girls considerably less likely than boys to opt for science, even after controlling for prior academic performance — a pattern that has direct bearing on how any general-knowledge or science-inclusive quiz sample will be distributed by stream and gender. Complementing this, Kumar and Bansal (2017), studying government senior secondary schools in Punjab, found that female students in the science stream outperformed their male counterparts on academic indicators, while urban and English-medium students fared better than their rural and regional-medium peers. Ranjeeth, Latchoumi and Paul (2020) similarly reported that gender-based performance differences in higher secondary education are neither uniform nor easily predictable, varying instead with the specific parameters and context of measurement.

A smaller but growing body of work has examined civic and local-awareness dimensions of student knowledge, an area of direct relevance to the Baghpat District Awareness component of the present quiz. Kumari and Suman (2025), assessing environmental awareness among secondary students in Patna, found only moderate overall awareness, with especially weak knowledge of local environmental issues compared with generic textbook concepts — a pattern that anticipates the district-awareness gap reported later in this paper. More generally, the Central Board of Secondary Education's General Studies curriculum framework (2025) explicitly

argues that specialization at the senior secondary stage leaves students under-exposed to disciplines and civic content outside their chosen stream, and recommends multi-disciplinary general-studies instruction as a corrective. The present study can be read as an empirical illustration of exactly the gap this curricular argument anticipates, extended to include a regional civic dimension that is rarely assessed in standard board examinations.

4. Methodology

4.1 Research Design

The study adopts a descriptive, cross-sectional research design based on secondary analysis of institutional quiz records. Rather than being purpose-built for research, the dataset originated from an operational quiz conducted for educational and outreach purposes; its use here is retrospective and analytical.

4.2 Instrument

The quiz consisted of 35 objective-type (multiple-choice) questions distributed equally across five domains, with seven questions allotted to each: (i) General Knowledge, (ii) English Language, (iii) Current Affairs, (iv) General Science, and (v) Baghpat District Awareness. Each correctly answered question carried one mark, yielding a maximum attainable score of 35. The examination record supplied to the authors contained only the composite total obtained by each candidate rather than domain-wise sub-scores; the present analysis is therefore confined to total performance and its association with stream, gender, and institution, and does not permit domain-by-domain comparison. This is noted explicitly as a limitation in Section 7.

4.3 Participants and Sampling

Participants were class XII students drawn from senior secondary and inter colleges across Baghpat district and a small number of adjoining localities. The raw institutional record listed 2,609 student entries. After data cleaning (Section 4.4), valid total-mark records were available for 2,592 students spanning 62 institutions with at least one scored entry; a small number of additional schools appeared in the roster without a corresponding scored record and were retained only in the participation count. This corresponds closely to the approximately 58 institutions originally enlisted for the district initiative, the modest upward variation being attributable to individual schools being recorded under slightly different name variants or as separate campus entries in the original roster.

4.4 Data Preparation and Ethical Handling

The original institutional dataset contained student names, parental names, mobile numbers, and email addresses alongside academic fields. In keeping with standard research-ethics practice for secondary analysis of school records, all directly and indirectly identifying fields — student names, guardians' names, contact numbers, and email addresses — were permanently removed before any analysis was undertaken, and no such information appears anywhere in this paper or in the tables and figures below. Only four fields were retained for analysis: school name, academic stream, gender, and total marks obtained. School names are reported in aggregate form because institutional performance, unlike individual student performance, is standard and legitimate subject matter for educational research of this kind.

Data cleaning further involved (a) standardizing inconsistent school-name spellings and punctuation into unique institutional identifiers; (b) reconciling stream labels, which appeared in the raw file with considerable spelling and case variation (for example, "Bio", "BIOLOGY", "biology", and "bioloogy" were all treated as a single Biology category and subsumed, together with Mathematics and general Science entries, under a broader "Science" stream for comparative analysis); (c) correcting minor data-entry irregularities in the gender field; and (d) excluding 17 records with missing or out-of-range total marks from the score-based analysis while retaining them in participation counts.

4.5 Statistical Analysis

Descriptive statistics (mean, standard deviation, median, range) were computed for the full sample and for relevant subgroups. An independent-samples t-test compared mean scores of male and female participants. A one-way analysis of variance (ANOVA) compared mean scores across four broad stream categories (Science, Commerce, Arts/Humanities, and Vocational), excluding records with an unspecified stream. Institution-level means were computed for schools with at least ten scored participants, to avoid unstable estimates from very small samples. All analyses were conducted in Python using pandas and scipy, with a conventional significance threshold of $\alpha = .05$.

5. Results

5.1 Overall Performance

Across the 2,592 students with valid score records, the mean total score was 13.77 (SD = 4.55) out of a maximum of 35, equivalent to 39.4 percent. The median score was 13, and scores ranged from a minimum of 2 to a maximum of 31. Table 1 summarises these overall descriptive statistics.

Statistic	Value (out of 35)	Percentage Equivalent
N (valid records)	2,592	—
Mean	13.77	39.4%
Standard Deviation	4.55	—
Median	13.00	37.1%
Minimum	2.00	5.7%
Maximum	31.00	88.6%

Table 1. Overall descriptive statistics of quiz performance

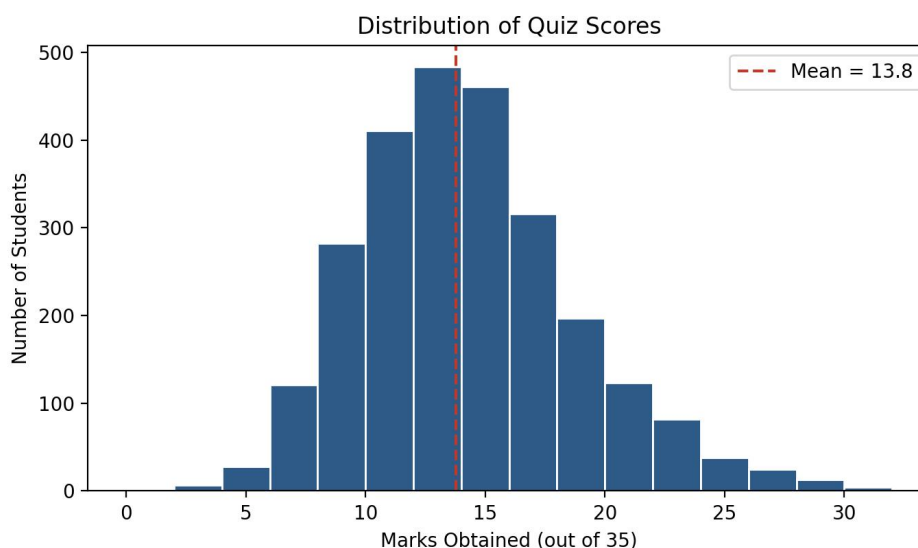


Figure 1. Distribution of total quiz scores among 2,592 participating students

As Figure 1 illustrates, the distribution of scores is right-skewed but broadly unimodal, clustering between roughly 8 and 18 marks. A four-band classification of performance — Below Average (under 40 percent), Average (40–59 percent), Good (60–79 percent), and Excellent (80 percent and above) — was applied to characterize the spread more intuitively (Figure 2). Just over half of all participants (51.4 percent) scored below 40 percent, and only 8.5 percent of students crossed the 60 percent mark, with a mere 0.7 percent achieving 80 percent or higher.

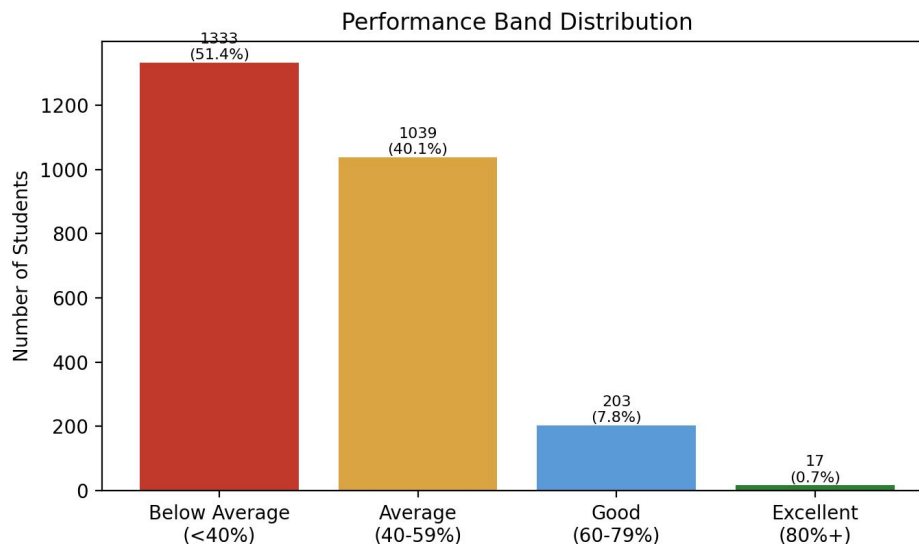


Figure 2. Distribution of students across performance bands

5.2 Performance by Academic Stream

Mean performance varied considerably by academic stream. Students enrolled in Science-related streams (combining General Science, Biology/PCB, and Mathematics/PCM entries) recorded the highest mean score ($M = 15.30$, $SD = 4.61$, $n = 965$), followed by Commerce ($M = 14.32$, $SD = 4.71$, $n = 118$) and Arts/Humanities ($M = 12.78$, $SD = 4.11$, $n = 1,000$). Students in the small Vocational category recorded the lowest mean score ($M = 9.50$, $SD = 3.00$, $n = 4$), though this subgroup is too small to interpret with confidence. A one-way ANOVA comparing the four specified stream categories (excluding 505 records with an unspecified stream) confirmed that these differences were statistically significant, $F(3, 2083) = 55.68$, $p < .001$.

Stream	n	Mean	SD
Science (General/Biology/Mathematics combined)	965	15.30	4.61
Commerce	118	14.32	4.71
Arts/Humanities	1,000	12.78	4.11
Vocational	4	9.50	3.00
Not specified in records	505	12.72	4.36

Table 2. Mean quiz scores by academic stream

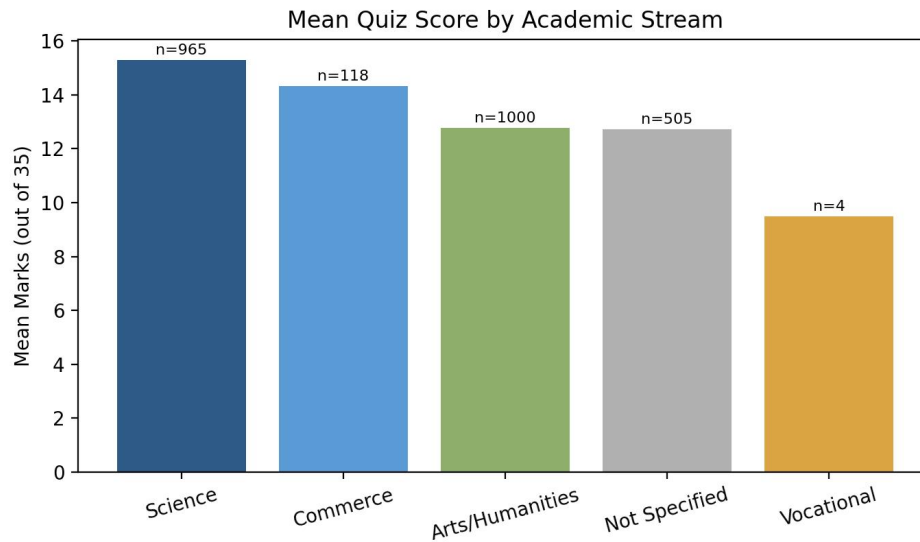


Figure 3. Mean quiz score by academic stream (error bars omitted; sample sizes shown above bars)

5.3 Performance by Gender

Of the 2,592 valid records, 1,403 (54.1 percent) were female and 1,189 (45.9 percent) were male. The mean score for female participants was 13.77 (SD = 4.57) and for male participants was 13.78 (SD = 4.52) — a negligible difference of 0.01 marks. An independent-samples t-test confirmed that this difference was not statistically significant, $t(2493.9) = -0.04$, $p = .971$, indicating that, unlike the stream-based pattern, overall quiz performance in this sample was essentially unrelated to gender.

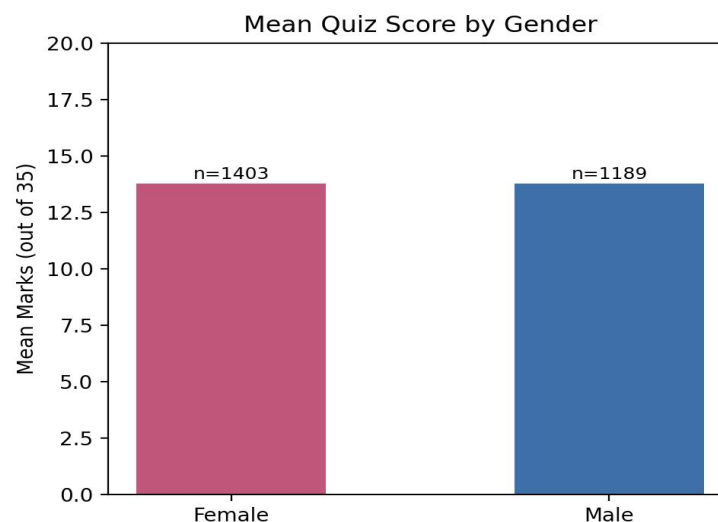


Figure 4. Mean quiz score by gender, with sample sizes shown above bars

5.4 Institutional Variation

Participation varied widely across the 62 institutions with scored entries, from a single participant to 218 participants from the single largest contributing school, with a mean of 41.8 students per institution. Restricting the comparison to institutions with at least ten scored participants (to avoid unstable small-sample estimates), mean institutional scores ranged from a low of 7.93 to a high of 26.33 out of 35 — a spread of roughly 18 marks between the strongest and weakest participating institutions. Table 3 lists the five highest- and five lowest-scoring institutions meeting this threshold.

Institution (anonymised rank)	n	Mean Score
Highest 1	24	26.33
Highest 2	24	25.17
Highest 3	26	17.08
Highest 4	123	16.92
Highest 5	17	16.71
Lowest 5	24	11.54
Lowest 4	41	10.17
Lowest 3	74	10.05
Lowest 2	11	8.82
Lowest 1	15	7.93

Table 3. Highest- and lowest-scoring institutions among colleges with 10 or more participants (institution names withheld here in the interest of even-handed presentation; full institutional table available from the corresponding author on request)

The magnitude of this institutional spread — considerably larger than the spread observed between streams or genders — suggests that school-level factors (teaching practice, access to current-affairs material, prior exposure to quiz-style assessment, or general school resourcing) may be a more powerful predictor of quiz performance than either stream or gender alone, though the present dataset cannot isolate which specific institutional factors are responsible.

6. Discussion

Three findings stand out from this analysis. First, overall performance was modest: an average score of just under 40 percent, with more than half the sample falling below 40 percent, suggests that general awareness — spanning national and international current affairs, basic science, English usage, and local district knowledge — remains an area of real weakness for a large share of class XII students in this district, even though these same students perform adequately within their specialized board examinations. This pattern is broadly consistent with the CBSE General Studies framework's (2025) observation that stream specialization at the

senior secondary stage can leave students under-exposed to content outside their chosen discipline, and it echoes Kumari and Suman's (2025) finding that secondary students often show only moderate awareness of locally relevant, non-textbook knowledge domains.

Second, the strong and statistically significant Science-stream advantage (Section 5.2) is worth examining critically rather than being read simply as evidence that science students are "more knowledgeable." Quiz content spanning General Science and Current Affairs may inherently favour students whose curriculum already emphasizes analytical and factual recall, and Science-stream students in Indian senior secondary education are frequently drawn from the same higher-performing, urban-leaning applicant pool identified by Kumar and Bansal (2017) in their Punjab-based comparison. The absence of any comparable gender gap is, in this light, a genuinely notable finding: whereas Sahoo and Klasen (2021) documented a substantial national-level gender gap in who enters the Science stream in the first place, no equivalent gap appeared here in performance once students of both genders sat the same general-knowledge instrument. This is consistent with the broader literature's caution that gender differences in Indian secondary education tend to concentrate in access and stream selection rather than in underlying general-knowledge competence (Ranjeeth et al., 2020).

Third, the scale of institutional variation — considerably larger than either the stream or gender effect — is arguably the most actionable finding for the organizing institute and for district education planners. Li, Li, Wu and Zhen's (2022) caution that competitive academic activity operates through mediating variables such as learning engagement and anxiety, rather than through any simple, direct channel, offers one plausible explanation: schools that routinely expose students to quiz-style, competitive assessment may cultivate greater comfort and engagement with this specific format, independent of underlying subject knowledge. Equally, more mundane explanations — differences in access to newspapers, television or internet-based current-affairs exposure, and variation in the depth of General Studies-type instruction across institutions — cannot be ruled out with the present data and merit dedicated follow-up study.

7. Limitations

1. The dataset provided only composite total scores; domain-wise sub-scores for General Knowledge, English, Current Affairs, Science, and Baghpat District Awareness were not available, preventing analysis of which specific domain(s) drove the low overall performance or the observed stream and institutional differences.
2. The study is cross-sectional and descriptive; it can identify associations (for example, between stream and score) but cannot establish causal mechanisms.
3. School location (city, town, or village) was not available as a distinct data field in the institutional record and could not be reliably separated from school names for a formal

urban–rural comparison; such analysis is left to future data collection that captures locality as an explicit field.

4. A modest proportion of stream entries (19.5 percent of valid records) were not specified in the original roster and were analyzed as a separate "Not Specified" category rather than being imputed, which may understate the true stream-wise pattern.
5. As with any single-event, non-standardized quiz, individual performance may be influenced by test-day factors (fatigue, unfamiliarity with the format, question ordering) that a repeated-measures design would help to average out.

8. Conclusion and Recommendations

This study analyzed data from a district-wide, five-domain objective quiz administered to 2,609 class XII students across 63 senior secondary and inter colleges in Baghpat district. Average performance was modest, at just under 40 percent of the maximum attainable score, with substantial variation across academic streams and, more strikingly, across participating institutions, while gender showed no meaningful association with overall performance. These findings suggest that general awareness — including the district-specific civic knowledge that this quiz uniquely assessed — deserves more deliberate curricular attention than it currently receives within a board-examination system oriented primarily toward stream-specific content.

On the basis of these findings, three recommendations follow. First, schools and district authorities may consider integrating regular, low-stakes general-knowledge and current-affairs sessions into the senior secondary timetable, irrespective of stream, given the CBSE General Studies framework's (2025) explicit endorsement of exactly this kind of multi-disciplinary exposure. Second, given the sizeable institutional gap identified in Section 5.4, targeted support — sample question banks, current-affairs bulletins, or teacher-training inputs — could usefully be directed toward the lower-performing institutions identified in this and future rounds of the quiz, rather than treating the district as a uniform population. Third, subsequent editions of the Syadwad quiz would benefit from recording domain-wise sub-scores and, where feasible, a locality field for each participating school, both of which would allow the kind of fine-grained analysis — particularly of the district-awareness component — that the present composite-score dataset could not support. Repeating the exercise annually with this additional data structure would allow the Institute to track whether general awareness among Baghpat's senior secondary students improves over time, and to identify which interventions are actually responsible for that improvement.

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