Build a Student Learning Visualization Report — 10 Tasks

Notes for SHS • Data Science • Topic 82 • All research examples are fictional

Use the complete synthetic data package. Present method, chart choice, fields, actual verified numerical results, accessible labels, appropriate caveats and your own written explanation.

Task 1 — Inspect the data

Required fields: Two tables linked by StudentCode

Verified reference: 240 profiles, 720 events, 12 derived weeks

Method and caution: Check unique IDs, missingness, date range, and one-to-many relation.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 2 — Bar comparison

Required fields: StudyLevel from profile data

Verified reference: A 120, B 72, C 48

Method and caution: Use a zero-baseline student-count bar; never count duplicated event-join rows.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 3 — Part-to-whole

Required fields: StudyLevel counts / 240

Verified reference: A 50%, B 30%, C 20%

Method and caution: A 100%-sum split supports pie or stacked bar; bar is better for precise comparison.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 4 — Weekly activity trend

Required fields: WeekStartDate vs TotalSessions

Verified reference: 45,51,56,60,57,63,70,54,64,68,62,70

Method and caution: Use line or columns, 12 ordered consecutive weeks; sum=720.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 5 — Score histogram

Required fields: AssessmentScore from profile rows

Verified reference: 240 numerical scores in 0-100 range

Method and caution: Document bins and avoid calling any shape precisely normal without evidence.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 6 — Score box plots

Required fields: Score grouped by StudyLevel

Verified reference: 120, 72 and 48 observations

Method and caution: State quartile algorithm and Tukey 1.5-IQR whisker convention.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 7 — Hours-score association

Required fields: WeeklyStudyHours paired with AssessmentScore

Verified reference: Pearson r≈0.4859

Method and caution: Use scatter; no causal assertion.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 8 — Category heatmap

Required fields: ResourceType x SubjectArea event counts

Verified reference: Cells from 720 events

Method and caution: Show color legend, directly labelled counts and correct denominators.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 9 — Repair misleading chart

Required fields: Same 120,72,48 values before and after

Verified reference: Correct y baseline starts at zero

Method and caution: Do not change data to manufacture the correction.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.

Task 10 — Write visual data story

Required fields: Four properly chosen chart types

Verified reference: Total profiles=240, activities=720, active in events=225

Method and caution: Discuss sources, aggregation, missingness, scale, accessibility and limits.

Extension: create the chart from the CSV, check any denominator, then write one defensible and one unsupported inference.