# UGC-NET Paper I Unit VII: Data Interpretation – Notes

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## 1. Sources and Acquisition of Data

| Primary data | Secondary data |
|---|---|
| Collected first-hand by the investigator for a specific purpose | Already collected and published by others |
| Original, specific and more reliable for the purpose | Cheaper and quicker, but may not exactly fit the purpose |
| Methods: observation, interview, questionnaire, schedule, experiment, survey | Sources: Census reports, NSO/NSS surveys, RBI bulletins, Economic Survey, journals, websites |

**Methods of data acquisition**

- **Census (complete enumeration):** every unit is studied. India's Census is decennial.
- **Sample survey:** a representative part is studied (e.g. NSS, PLFS, NFHS).
- **Administrative records:** data generated by government operations (birth registration, tax records).
- **Experiments and observation.**
- **Digital sources:** online platforms, sensors, transaction data (big data).

**Indian statistical bodies:** National Statistics Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI); Office of the Registrar General and Census Commissioner (Census); RBI (monetary and banking data).

## 2. Classification of Data

| Basis | Type | Example |
|---|---|---|
| Geographical (spatial) | By place | State-wise literacy |
| Chronological (temporal) | By time | Year-wise GDP |
| Qualitative | By attribute | Gender, religion, occupation |
| Quantitative | By magnitude | Income groups, age groups |

**Data by time and units**

- **Cross-sectional data:** many units at one point in time.
- **Time-series data:** one unit over several periods.
- **Panel (longitudinal) data:** the same units observed over time.

**Tabulation:** systematic arrangement of data in rows and columns. Parts of a table: table number, title, **stub** (row headings), **caption** (column headings), body, head-note, footnote and source.

## 3. Quantitative and Qualitative Data

| Quantitative | Qualitative |
|---|---|
| Numerical, measurable | Descriptive, categorical |
| Discrete (countable: number of students) or continuous (measurable: height) | Words, images, themes |
| Statistical analysis | Thematic, content or narrative analysis |

**Levels of measurement (S.S. Stevens, 1946)**

| Scale | Feature | Example |
|---|---|---|
| Nominal | Categories without order | Gender, blood group |
| Ordinal | Ordered categories, unequal gaps | Ranks, grades |
| Interval | Equal intervals, no true zero | Temperature in °C |
| Ratio | Equal intervals and a true zero | Income, weight, age |

## 4. Graphical Representation

| Chart | Best used for | Key features |
|---|---|---|
| Bar chart | Comparing categories | Bars of equal width with gaps; simple, multiple (grouped), sub-divided (stacked), percentage bars |
| Histogram | Frequency distribution of continuous data | Adjacent bars without gaps; area $\propto$ frequency |
| Pie chart | Parts of a whole | Total = 360°; angle = (value / total) × 360° |
| Line chart | Trends over time | Points joined by lines |
| Table chart | Exact values | Rows and columns |
| Frequency polygon | Comparing distributions | Joins mid-points of histogram tops |
| Ogive | Cumulative frequency | 'Less than' and 'more than' curves; median at their intersection |
| Scatter diagram | Relationship between two variables | Points plotted for each pair |

- Mode can be located graphically from a **histogram**; median from an **ogive**.
- 1% of a pie = 3.6°.

**Mapping of data**

- **Choropleth map:** areas shaded according to values (e.g. district-wise literacy).
- **Dot map:** dots show distribution and density.
- **Isopleth map:** lines join places of equal value (isotherms, isobars).
- **Flow map:** shows movement (migration, trade).
- **GIS (Geographic Information System):** digital mapping and spatial analysis.

## 5. Data Interpretation Techniques

- **Percentage change** = [(New − Old) / Old] × 100.
- **Percentage share** = (Part / Total) × 100.
- **Ratio** = A : B, simplified.
- **Average** = Sum / Number of items.
- **Growth over several years (CAGR)** = (End value / Start value)^(1/n) − 1.
- **Approximation:** round figures to save time; check option gaps first.
- **Read the units** (lakh, crore, million, %) and the base year carefully.
- In DI sets, compute common totals once and reuse them.

## 6. Data and Governance

Good data supports evidence-based policy, targeting of beneficiaries, transparency and accountability.

| Initiative | Purpose |
|---|---|
| National Data Sharing and Accessibility Policy (NDSAP), 2012 | Proactive sharing of non-sensitive government data |
| Open Government Data platform (data.gov.in) | Public access to government datasets |
| Aadhaar (UIDAI) | Unique digital identity for service delivery |
| Direct Benefit Transfer (DBT) | Subsidies paid directly into beneficiaries' bank accounts |
| Public Financial Management System (PFMS) | Tracking of public funds |
| Digital Personal Data Protection Act, 2023 | Protection of personal data and rights of individuals |
| Dashboards (e.g. PRAGATI, scheme dashboards) | Real-time monitoring of programmes |

**Big data** is characterised by the 'V's: volume, velocity and variety (often also veracity and value).

**Concerns:** privacy, data security, quality and timeliness of data, digital divide, and misuse of data.