Perfect—thanks for the detailed answers! Based on your setup and goals, here is a **comprehensive guide** to developing a professional **Written Report** for your data science projects.

Comprehensive Guide: Freelance Data Science Written Report

Deliverable Goals

- Communicate findings clearly and persuasively.
- Demonstrate your technical expertise in a digestible way.
- Guide the reader toward data-driven decisions.

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1. Report Structure

Here's a structure tailored for a balanced, insight-rich, visual-forward report for a semi-technical audience:

1. Title Page

- Project title
- Your name / company / client
- Date

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2. Executive Summary (½ - 1 page)

- A non-technical summary of the problem, key findings, and recommended actions.
- Use bullet points or short paragraphs.

  Tip: Write this *last*, once you've done all the analysis.

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3. Introduction / Problem Statement

- Business context
- Goals and questions the project aims to answer
- Why it matters to the client

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4. Data Description

- **Data sources:** where the data came from (if public, link it)
- **Scope of data:** time range, size, features, granularity
- **Data dictionary (optional):** include in appendix or link to Markdown file

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5. Exploratory Data Analysis (EDA)

Break it down into logical sections, e.g.: - **Demographics Overview** - **Trends Over Time** - **Category Comparisons** - **Missing Data & Anomalies**

> **Each visualization should answer a question**
> **Each figure should be followed by a 2–3 sentence interpretation**: - *What do we see?* - *Why does it matter?* - *What could be causing it?*

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6. Feature Engineering (if applicable)

- Explain transformations and why you created specific features.
- Use examples: "Created `visit_rate_per_week` to normalize visit volume."

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7. Predictive Modeling

Structure by model stages: 1. **Objective:** What you're predicting, why it's valuable. 2. **Model(s) tried:** Algorithms tested, how chosen. 3. **Training/testing strategy:** Cross-validation, time-based splits, etc. 4. **Performance metrics:** Accuracy, AUC, RMSE, etc.—**explain what these mean for a non-technical reader**. 5. **Feature importance:** Visuals + explain *why those features matter*.

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8. Model Insights & Recommendations

- What do the model results suggest?
- Tie predictions back to the business question.
- Recommend concrete actions (if possible).

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9. Limitations & Assumptions

- Be honest and transparent about:
  - Data bias or incompleteness
  - Model limitations
  - Causal inference vs correlation

  This builds trust and shows professionalism.

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10. Conclusion / Next Steps

- Recap major takeaways
- Recommend further analysis, system integration, or stakeholder actions

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11. Appendices (Optional)

- Full model evaluation
- Alternate model results
- Data dictionaries or raw tables
- Code or repo link

Visual Best Practices

- Keep graphs clean and labeled (axes, legends, annotations).
- Use horizontal bar charts for ranked features.
- Line charts for time series; box plots for distributions.
- Highlight **anomalies**, **trends**, and **comparisons**.

- Use bold callouts or captions to highlight the story in each plot.

  Visual-first, but *insight-driven*—don't drop a plot without an interpretation.

Tools & Tips

- **Jupyter Notebooks:** Great for prototyping and visual output. Use `nbconvert` to export clean HTML/PDF versions (hide code if desired).
- **Google Docs/LibreOffice:** Ideal for collaborative writing or offline reports.
- **LaTeX:** Use for polished PDF reports with lots of math/stats.
- **Markdown + GitHub:** Ideal for versioning + showing work in public repos.

Checklist Before Delivery

Item
Executive Summary speaks to the business need
All plots include captions and interpretations
Metrics are explained for a semi-technical reader
Insights are clearly tied to project goals
Recommendations are practical and data-driven
Report is visual, scannable, and avoids jargon
Code and notebook are clean and reproducible
Appendix or GitHub links included (if needed)

Would you like a **template** in Markdown, Google Docs, or LaTeX to start your next report? I can generate one for you based on this structure.