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*Teaching Activity*

# Introducing Data Analytics and AI Collaboration to Novice Students: An Assignment Using Real Business Data

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## Hook

"How do you teach data analytics and AI collaboration together in introductory IS courses? This assignment shows students developing both competencies simultaneously through real world business scenarios."

## Abstract

Information systems instructors face the challenge of teaching both data analytics and artificial intelligence (AI) collaboration to novice students in introductory courses where students have limited experience with either tool. Mostly, these skills are taught separately, leaving students unprepared for modern workplaces where data analysis and AI collaboration happen together as standard business operations.

This assignment provides a structured multi-stage assignment to apply both foundational data analytics and AI collaboration skills through a real-world business scenario. Students assume the role of junior analysts at Starbucks Corporation directed to find stakeholder focused data insights. They work with nutritional data for beverages to develop actionable insights while learning to collaborate with large language models as analytical assistants. The assignment is designed for introductory IS courses where students have basic familiarity with visualization tools and AI platforms from earlier course modules.

The four-stage assignment structure leads students through data exploration, dashboard creation in Tableau, AI supported revision and reflective analysis. The business context requires students to move from exploring their own interests in the dataset to developing insights that serve specific organizational stakeholders such as Marketing or Nutrition Policy teams.

Assignment adoption across course sections demonstrate that novice students gain both analytical thinking and AI collaboration skills through the assignment. Student reflections indicate a shift in learning from a focus on completing tasks toward a more iterative and reflective approach to analytical work. The assignment contributes to IS education by demonstrating that both analytical reasoning and collaborative engagement with AI can be developed through structured, experiential learning.

**Keywords:** Data Analytics Education, AI Collaboration, Generative AI, Introductory Information Systems Courses, Data Visualization

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# Introducing Data Analytics and AI Collaboration to Novice Students: An Assignment Using Real Business Data

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## 1. INTRODUCTION

The business world has changed dramatically. Organizations now generate massive amounts of data and artificial intelligence (AI) tools have become commonplace in workplace analytics. The U.S. Bureau of Labor Statistics projects that data scientist roles will grow 36% from 2023 to 2033, with over 113,000 new positions expected (U.S. Bureau of Labor Statistics, 2024). At the same time, a 2024 McKinsey survey found that 65 percent of organizations regularly use generative AI tools for business functions, including data analysis (Singla et al., 2024). This creates a clear need in industry for both these skills. Business graduates must understand both basic data analytics and how to work with AI tools effectively.

Most students entering information systems (IS) courses have little experience with either data analytics or AI collaboration. They may have never worked with a dataset or used tools like Copilot or Chatgpt for analytical tasks. Traditional introductory courses often treat these skills separately, if they address AI at all. This leaves a significant gap in preparing students for modern workplaces where data analysis and AI collaboration happen together as part of normal business operations.

Students must learn to explore data, identify patterns and create visualizations while also learning to use AI tools as analytical assistants. The key challenge is teaching these skills simultaneously without overwhelming novice learners. Students need to develop their own analytical thinking while learning to collaborate with AI tools effectively and critically.

The assignment described in this paper addresses this challenge through a series of structured tasks that introduces students to data analytics using real business data while teaching them to collaborate with AI tools. Students work with Starbucks beverage nutritional data to apply the data analytics process from data exploration through dashboard creation to insight refinement. During this process, they use large language models (LLMs) to get feedback and improve their work. The assignment assumes students have prior exposure to both data visualization concepts and LLMs through introductory IS coursework. Although implemented using Tableau, the assignment structure can be adapted to other visualization platforms depending on course context and instructor goals. The assignment focuses on applying these existing skills to business analytics scenarios.

This approach fills an important gap in current IS education. Students often encounter AI tools informally without guidance on appropriate professional use. The assignment provides an opportunity to engage with an AI tool meaningfully within a data analytics scenario. Students are exposed to both the capabilities and limitations of AI assistance while developing basic data analysis skills. This prepares them for the AI integrated analytical environments they will encounter in their careers.

The assignment contributes to IS education by offering a practical framework that instructors can implement immediately. The four-stage structure provides clear guidance for applying both data analytics concepts and AI collaboration skills to a real-world business scenario. The familiar Starbucks business context allows students to focus on learning analytical concepts and AI collaboration without being distracted by unfamiliar domains.

The learning outcomes of the assignment show that students successfully develop both analytical thinking and AI collaboration skills. They gain confidence working with data, learn to create effective visualizations and understand how AI tools may be used as analytical assistants rather than replacements for critical thinking. These combined competencies prepare students for the data driven, AI enhanced business environments they will enter upon graduation. It responds to an urgent need in undergraduate business education where collaboration with AI is increasingly becoming an expected skill across data analytics and other functional domains.

First this paper describes current challenges in teaching data analytics to novice students and examines emerging practices for AI integration in

business education. Second, it describes the four-stage assignment structure, including the business context, dataset design and specific learning activities at each stage. Third, it presents student learning outcomes and reflections that demonstrate how the assignment develops both analytical thinking and AI collaboration skills. Finally, it provides implementation guidance and teaching notes to help instructors adapt the assignment for their own courses. This paper presents the assignment as both a teaching activity (for instructors) and a complete student handout (Appendix A), offering a structure that is practical and easy to adopt.

## 2. LITERATURE REVIEW

### Challenges in Introductory Data Analytics Education

Today, instructors face challenges in engaging novice students with data analytics. Traditional approaches often emphasize statistical theory over practical application. This can be overwhelming or frustrating to students who lack prior experience with datasets (Campos et al., 2012). Experiential learning can be a response to this challenge which can be a means of engaging with data early in the data analytics learning process. The National Academies (2018) suggest experiential learning approaches, which involve direct interaction with data, are effective in preparing students before introducing complex analytical concepts.

Knaflic (2015) argues that effective data visualization education must begin with hands on practice rather than theoretical frameworks. Kolb's (2014) experiential learning theory reinforces this view and highlights the role of experience in the development of analytical skills. However, most business students enter analytics courses with limited mathematical preparation and very limited experience working with real datasets (Diamant, 2024; Stratopoulos et al., 2019). Few (2012) emphasizes the importance of real-world business contexts in education, noting that students engage more effectively when they understand how analytical work serves organizational needs.

### AI Integration in Business Education

The integration of large language models into educational settings has gained considerable attention recently. Still, research on effective implementation remains limited. Mollick and Mollick (2023) found that AI tools can enhance learning when used as collaborative partners rather than replacement technologies. Van Allen and Katz (2023) call for strategies that encourage students to engage in the evaluation of AI generated output rather than passive acceptance of AI suggestions.

However, Zawacki-Richter et al. (2019) and Tan et al. (2024) note that most educational AI research focuses on preventing misuse rather than teaching appropriate business use cases. This creates a gap between student informal AI use and workplace expectations. As a result, practical guidance for integrating AI into business analytics education remains limited.

### Data Visualization and Iterative Learning

Developing effective data visualizations as part of the analytics process requires students to build both technical proficiency and visual literacy. Design thinking offers a helpful foundation by encouraging students to think intentionally about how data is presented, not just how it is processed (Krekhov, Michalski, & Krüger, 2019). Few (2012) emphasizes that strong visualizations depend on understanding both the capabilities of the tools and the principles of clear communication. Yet students often focus more on technical execution. They overlook the importance of clearly conveying analytical meaning. Diamant (2024) observes that this can result in polished visuals or models that appear sophisticated but fail to convey meaningful insights or support sound business understanding.

Helping students learn to communicate through data takes time, iteration and feedback. The design education literature points to the importance of formative and iterative feedback (Joshi et al., 2021). Delivering that kind of support at scale remains a major challenge in most classroom settings (Jamal & Renzella 2024). Within this assignment, iteration is supported through cycles of feedback generated by AI tools. Students first create a visualization, receive structured commentary on clarity and design, and then revise their work in response. This process enables multiple rounds of refinement without placing an undue grading burden on the instructor. Faculty oversight is still part of the process as the professor monitors progress and offers targeted feedback at key points in the process. AI tools offer a potential way forward by providing structured and timely feedback on both visual and communication elements of assignments. This remains a promising and developing area of practice with growing relevance as instructors look for practical ways to support student learning in data storytelling.

As the literature discussion above suggests, there are several tensions that impact learning basic analytics skills and AI collaboration at the introductory level in IS business education. Most analytics education efforts within IS programs are concentrated in specialized or graduate level courses. Limited attention is given to how novice business students begin developing analytical skills in general education settings. This makes it difficult to align foundational IS skill development with industry expectations. (Lyytinen, Topi, & Tang, 2023). At the same time, most current research on AI integration has focused on tools or technical adoption without considering how these technologies influence the learning process (Zawacki-Richter et al., 2019). In addition, no previous studies have examined approaches for introducing data analytics and AI collaboration simultaneously to novice students.

This assignment responds directly to these tensions by offering a structured, experiential approach that supports both data analysis and AI collaboration in an introductory IS course setting. By engaging students with real world business data and guiding them through the process of interpreting, visualizing and refining their work, the assignment offers a practical model for integrating AI meaningfully into early stage analytics education.

## 3. ASSIGNMENT DETAILS - THE STARBUCKS ANALYTICS CHALLENGE

Students take on the role of junior analysts on Starbucks Corporation's Consumer Insights Team to work on this assignment. This business context provides familiar reference points while engaging students with realistic analytical challenges that are similar to professional data analysis workflows. Instructors can find the complete student assignment description, which serves as a ready to distribute assignment handout in Appendix A.

### Business Context and Stakeholder Framework

The assignment establishes a realistic business problem centered on leadership concerns about beverage nutritional content and the need for clearer insights to support strategic decisions. Students must develop analytical insights that serve one or more cross functional stakeholder groups in Marketing, Product Development and Nutrition Policy. Each group has distinct priorities and decision-making contexts. This forces students to move beyond general data exploration toward insights that serve specific audiences.

Marketing teams require insights that support consumer communication strategies, competitive positioning and customer segment targeting. Product Development may focus on ingredient alternatives or new product concepts. Nutrition Policy teams may address regulatory compliance, transparency requirements and corporate wellness initiatives. This stakeholder diversity helps students understand that effective analysis requires consideration of organizational needs rather than just technical patterns. Focusing on the organizational context helps in developing students' analytical maturity. The data set used in the assignment allows for business relevant analysis that is stakeholder focused.

### Dataset Design and Educational Value

The Starbucks beverage dataset was adapted from a Kaggle dataset on nutrition facts for Starbucks menu items. All nutritional information is standardized to 12oz serving sizes, enabling meaningful comparisons across beverage types and preparation methods. The dataset includes beverage category, name, preparation method, calories, fats, carbohydrates, protein, vitamins and caffeine content. This comprehensive nutritional data supports analysis from different stakeholder perspectives while providing a real-world business context for student learning. Appendix A also presents the dataset variables and sample data. An Excel file with the full dataset is also provided.

The data structure encourages students to explore relationships between customized beverage choices and nutritional outcomes, identify healthier alternatives within product categories and understand how ingredient substitutions affect overall nutritional profiles. The data fields support meaningful analysis while being simple and straight forward to students with little to no data analysis experience.

Students approach the dataset with varying skill levels and analytics experience. Some begin with personal relevance and consumer concerns, while others immediately identify business implications or technical patterns. This diversity provides rich material for student peer learning. It also suggests that effective analytical thinking can come from multiple starting points. Students work with this dataset through a structured four stage process that builds analytical and AI collaboration skills progressively. Although formal peer feedback was not incorporated in the current design, the variety of student approaches suggests potential for future iterations to

integrate group interaction as a means of enhancing collaborative learning.

**Four Stage Learning Process**

The assignment progresses through four stages, with each stage building on the last to guide students toward the development of meaningful analytical insights. Along the way, students are exposed to the analytics process with an AI collaboration aspect in a structured manner that is similar to professional practice.

**Stage 1: Data Exploration and Problem Framing**

The first stage requires students to conduct initial data exploration and identify an interesting analytical question(s) that is relevant to the stakeholder group(s). This stage emphasizes critical thinking about stakeholder needs rather than technical execution.

**Stage 2: Dashboard Development and Insight Visualization**

The second stage focuses on transforming the results of data analysis and exploration into clear, professional visualizations using a data visualization tool such as Tableau. Students demonstrate technical skills in dashboard creation and data storytelling skills while maintaining focus on stakeholder needs identified in Stage 1.

Students often begin with an "everything is important" approach, attempting to include all available data in their visualizations. However, the constraint of fitting effectively on one screen forces difficult choices on analytical focus and prioritizing key data results. This constraint encourages more intentional design choices and greater sensitivity and awareness of audience needs in data visualization.

**Stage 3: AI Supported Analysis Refinement**

The third stage introduces structured interaction with large language models to obtain feedback and refine both visualizations and analytical insights. Through the assignment, students develop the ability to critically evaluate AI generated suggestions, use emerging technologies responsibly and engage in collaborative improvement of their analytical work. Rather than substituting for human judgment, the interaction with AI supports deeper reflection. It increases students' awareness of how they communicate insights through data.

**Stage 4: Reflection and Analytical Process Analysis**

In the final stage, students are asked to reflect on their overall learning experience and assess how AI contributed to their development of analytical thinking and insight generation. This stage develops metacognitive awareness about data analysis thinking and prepares students for ongoing learning in rapidly evolving technological environments.

This stage helps students reflect on their learning experiences that shape their growth as emerging analysts. Many described a meaningful shift in mindset. Rather than focusing solely on task completion, they began to appreciate the value of revision and iterative improvement as integral to the analytical process. This four-stage learning process requires careful timing and course integration to ensure students can apply their existing tool knowledge effectively.

**Course Integration and Timeline**

The assignment has been successfully implemented in two undergraduate introductory information systems course sections focused on business applications of technology. This assignment is most effective when scheduled after students have gained initial exposure to tools like Tableau and AI platforms earlier in the course. It then offers a meaningful opportunity to apply those foundational skills in an integrated business analytics scenario.

Table one summarizes the timeline for the four stages of the assignment along with the tasks, learning objectives and expected outcomes.

| Week | Stage | Task | Learning Purpose | Expected Outcome |
|---|---|---|---|---|
| 1 | Part 1 | Explore Starbucks dataset, identify a story | Learn problem framing, data exploration and question formulation | Clear research question and narrative focus |
| 2-3 | Part 2 | Create Tableau dashboard | Practice visualization, narrative development and tool fluency | Clear dashboard aligned to a central insight or theme |
| 4 | Part 3 | Revise dashboard and story using LLM feedback | Develop iteration skills and stakeholder framing awareness | Improve visual clarity and communication effectiveness |
| 5 | Part 4 | Reflect on AI's role in shaping insights and revisions | Build metacognitive thinking and ethical awareness in AI use | Insightful written reflection and learning |

**Table One: Timeline for the four-part assignment**

The modular design also enables instructors to emphasize either analytics fundamentals or AI

collaboration based on course objectives. A key component of successful implementation involves establishing clear guidelines for appropriate AI use throughout the assignment.

The structured use of AI in this assignment supports both academic integrity and responsible professional practice. Students were required to submit transcripts of their AI interactions, creating transparency and allowing the instructor to evaluate the purpose and quality of their AI collaboration.

Clear guidelines emphasized that AI could be used for feedback, alternative perspectives, and design suggestions, but that students remained responsible for all analytical decisions and interpretations. Class time was also used to discuss how AI can function as a collaborator rather than a shortcut.

To support this process, Appendix B provides a categorized prompt bank with example prompts to help students improve visual design, explore alternative approaches, and clarify their thinking. These resources encouraged students to use AI more intentionally by asking productive questions rather than relying on generic requests for help. Together, these guidelines reinforced the idea that AI should support, not replace, human analysis.

**Assessment Approach**
Student work was evaluated across four components including quality of analytical insights, effectiveness of dashboard design, extent of AI collaboration and depth of reflective analysis. This structure supports both technical skill development and critical thinking through deliverables at each stage.

Each stage was assessed using criteria aligned with the learning goals for that part of the assignment. The criteria and point values for all four deliverables are included in Appendix A. Taken together, these stage level criteria served as the grading rubric for the assignment as a whole. Stronger submissions showed clear insight development, thoughtful dashboard design, purposeful use of AI, and meaningful reflection on the learning process.

The reflection component played an important role in encouraging students to examine how their thinking evolved over time and how AI influenced their process. Most students showed clear awareness of this progression, making the reflection a valuable learning consolidation tool.

## 4. STUDENT LEARNING AND OUTCOMES

Student reflections offer valuable insights into how the assignment influenced learning across the four stages. Student voices reveal not only skill development but also shifts in analytical thinking, metacognitive awareness and professional readiness. These reflections show how the assignment develops both analytical and AI collaboration skills at the same time. Appendix D provides an example of one student's progression from Part 2 (i.e., initial dashboard development) through AI supported revision in Part 3. It shows the iterative improvement process and gradual development of business focused analytical thinking.

**Analytical Growth and Problem Framing**
Students showed meaningful growth in their approach to data analysis. Some moved from surface level pattern recognition toward more thoughtful problem framing and increased attention to stakeholder perspectives. Most students reported that the structured tasks helped them develop more focused analytical thinking. As one student noted, "I chose to analyze beverage types based on cholesterol instead of focusing on something broad like calories. That's a change I made after AI looked at my visualization." This progression from broad, unfocused exploration to targeted, business relevant analysis shows the assignment can help increase analytical maturity.

**Design Thinking and Iterative Improvement**
One of the more important learning outcomes was students' growing awareness of design and the value of revision. Many students had little experience revising analytical work in a structured way. The AI supported feedback process encouraged them to look again at their dashboards, rethink their design choices, and improve how they presented data. As a result, students began to see dashboard development as an iterative process rather than a onetime task.

The iterative nature of the assignment proved informative for students who previously approached analytical work as a onetime submission process. A particularly revealing reflection stated, "I usually submit and forget it, but using AI made me go back and really think through the story." This shift from completion oriented to revision-oriented thinking represents an important change in analytical mindset that extends beyond individual assignments to professional skill development.

Students also developed an appreciation for the complexity of effective visual communication. One student noted, "AI really helped me organize my thoughts better. It also gave advice on how to declutter my dashboard and make it clearer and easier by suggesting things like getting rid of grid lines and fixing titles." This recognition shows understanding of design principles and audience considerations.

**AI Integration and Critical Evaluation**
Students also developed thoughtful approaches to using AI feedback while maintaining control over their analytical decisions. Many students found AI most helpful for gaining fresh perspective on their work. One student noted, "The LLM gave a unbiased perspective from an outside source that allowed me to make my visualization overall improve." This shows students' ability to selectively apply suggestions while keeping ownership of their conclusions.

Another student reflected, "I was honestly shocked with the number of helpful suggestions it gave and how it seemed to understand what my goal for the dashboard was." Students also recognized AI limitations. One reflected, "Sometimes the AI suggestions were too generic for my specific stakeholder focus." This awareness shows students learned to evaluate AI feedback contextually rather than accepting all suggestions.

**Professional Preparation and Metacognitive Awareness**
The reflection component produced evidence of metacognitive development with students showing awareness of their own learning process and analytical development. Students often described how the experience changed their understanding of analytical work itself.

Students developed understanding of the iterative nature of analytical work and its broader applications. One student reflected, "This experience helped me learn how to break down a data set and to tell a story about a data set. It taught me how to tell a story using visualizations in a manner that is clean and concise."

Students also connected their learning experience to professional contexts and future applications. Many students described how the experience prepared them for professional analytical work. One reflection stated, "I was able to experience a sort of life as a business analyst and what the everyday job could involve." This awareness of professional roles represents preparation for evolving workplace environments and expectations.

## 5. TEACHING NOTES AND IMPLEMENTATION GUIDANCE

**Instructor Preparation and Setup**
This assignment is intended to be implemented after students have already had introductory exposure to a data visualization tool such as Tableau and to current AI tools. Rather than functioning as a tutorial on Tableau itself, the activity is designed to help students apply previously learned visualization skills in a business analytics context while also learning how to collaborate thoughtfully with AI. In preparation for the assignment, instructors should provide the cleaned Starbucks dataset, ensure that students have access to a visualization platform and an approved AI tool, and share AI prompting guidelines. If students need additional support with Tableau, instructors may provide basic tutorial resources or cover those concepts earlier in the course. Institutional policies regarding AI use should also be reviewed in advance to ensure that all students can participate appropriately. Appendix C contains a quick implementation guide that can be used along with the guidance provided in this section.

**Managing the Dual Learning Challenge**
Students often find the combination of data analytics and AI collaboration overwhelming at first. Instructors can help by breaking the assignment into smaller parts and reminding students that experimentation, revision and learning from mistakes are expected. The business context helps reduce cognitive load by giving students a familiar, everyday setting. At the same time, students need regular reminders to focus on stakeholder needs and practical insight development rather than technical sophistication alone.

**Supporting Student Development**
Students often struggle to move from finding patterns in the data to developing business relevant insights. Instructors can support this process by providing examples of analytical questions that connect to stakeholder needs. It is also helpful to show students the difference between describing what the data shows and developing insights that can support decision making. Encouraging students to think about audience needs, rather than only focusing on the available data, can further strengthen their work.

**AI Integration Best Practices**

This support is especially important when students begin working with AI. Clear guidelines should explain that AI can be used for feedback, alternative perspectives and design suggestions, but that all analytical insights and final decisions must reflect the student's own thinking. The transcript requirement helps create transparency. It allows the instructor to evaluate the quality and purpose of the AI interaction, and gives students a way to reflect on how they used the tool. Instructors should introduce the AI prompt bank in Appendix B during the transition to Stage 3, since students often struggle at first to write effective prompts. Showing one or two examples from the prompt bank can help students see the difference between detailed questions and general requests for feedback.

**Assessment and Feedback**

Assessment should focus on student learning and progress rather than technical perfection alone. The reflection is especially useful because it provides insight into student learning that may not be fully visible in the technical deliverables. If time allows, peer feedback sessions can also be helpful, especially during dashboard review, because students can learn from seeing different approaches. Evaluation of AI collaboration should consider both the quality of student prompts and how thoughtfully students reviewed and used AI suggestions. Evidence of this can be seen in the AI transcript, the revised dashboard and the reflection.

## 6. CONCLUSION

This assignment addresses an important need in undergraduate business education by providing a practical means for introducing both data analytics fundamentals and AI collaboration skills to novice students. The four-stage assignment structure successfully helps apply technical skills while building the critical thinking abilities students need to do analytical work in AI integrated business environments.

The assignment works by combining a practical business context with structured technology interaction and reflective learning processes. Students work with real world business data while learning to collaborate with AI tools as analytical assistants rather than relying on them to replace human judgement or insight.

The focus on both analytics and AI collaboration responds to evolving workplace expectations where both skills are increasingly becoming a standard. Students enter the workforce better prepared for AI integrated environments equipped with strong foundational skills in data analysis and insight communication.

The assignment contributes to information systems education by demonstrating that introductory students can successfully develop both analytical and AI collaboration capabilities when given proper structure and real business contexts. Future development could explore integration with advanced analytics concepts, expansion to team based analytical projects or adaptation for graduate level applications.

The assignment represents a timely response to the challenge of preparing students for data rich business environments while introducing them to appropriate AI collaboration. By providing students experience applying both skills in working with a dataset, the assignment offers a practical solution for IS instructors seeking to prepare students for the technological landscape they will encounter upon graduation.

## 7. REFERENCES

Campos, C. R., Jacobini, O. R., Lorenzetti, M. L., Wodewotzki, M. L. L., & Ferreira, D. H. L. (2012). Social-political interfaces in teaching statistics. In C. Batanero, G. Burrill, & C. Reading (Eds.), *Proceedings of the Eighth International Conference on Teaching Statistics (ICOTS8)* (pp. [page numbers]). International Statistical Institute. http://cerme8.metu.edu.tr/wgpapers/WG10/WG10_Campos.pdf.

Diamant, A. (2024). Introducing prescriptive and predictive analytics to MBA students with Microsoft Excel. *INFORMS Transactions on Education*, *24*(2), 152-174. https://doi.org/10.1287/ited.2023.0286.

Few, S. (2012). *Show me the numbers: Designing tables and graphs to enlighten* (2nd ed.). Analytics Press.

Jamal, R., & Renzella, J. (2024). Enhancing Formative Feedback at Scale with the Intelligent Feedback Assistant. Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 2. https://doi.org/10.1145/3626253.3635482.

Joshi, R., Ghosh, S., Simileysky, A., & Bhanot, M. (2021). Structuring Formative Feedback in an Online Graphics Design Course in BME. Biomedical Engineering Education, 1, 325 - 333. https://doi.org/10.1007/s43683-021-00046-z.

Knaflic, C. N. (2015). *Storytelling with data: A data visualization guide for business professionals*. John Wiley & Sons.

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT press.

Lyytinen, K., Topi, H., & Tang, J. (2023). MaCuDE IS task force phase II report: views of industry leaders on Big Data analytics and AI. *Communications of the Association for Information Systems*, *52*(1), 429-464. https://doi.org/10.17705/1CAIS.05217.

Mollick, E., & Mollick, L. (2023). Assigning AI: Seven approaches for students, with prompts. *arXiv preprint arXiv:2306.10052,* https://doi.org/10.48550/arXiv.2306.10052

National Academies of Sciences, Engineering and Medicine. (2018). *Data science for undergraduates: Opportunities and options*. The National Academies Press. https://doi.org/10.17226/25104.

Singla, A., Sukharevsky, A., Yee, L., Chui, M., & Hall, B. (2024, May). *The state of AI in early 2024: Gen AI adoption spikes and starts to generate value*. McKinsey & Company. https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-2024.

Stratopoulos, T. C., & Vanden Bosch, N. (2019, December 12). A first-year data analytics course for accounting students. https://doi.org/10.2139/ssrn.3618697.

U.S. Bureau of Labor Statistics. (2024). *Occupational outlook handbook: Data scientists*. https://www.bls.gov/ooh/math/data-scientists.htm.

Van Allen, J., & Katz, S. (2023). Viewing open education within the Technological, Pedagogical, Content Framework: illustrating educator knowledge, skills and dispositions. *Research in Learning Technology*, *31*. https://doi.org/10.25304/rlt.v31.2829.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education, 16*, Article 39. https://doi.org/10.1186/s41239-019-0171-0 .

## APPENDIX A
## Student Assignment Instructions (Handout)

This appendix provides the complete student assignment description for the Starbucks Analytics Challenge described in the main manuscript. Instructors can use this material directly as a student handout or adapt it for their specific course context. The assignment implements the four-stage learning progression outlined in Section 3 of the main manuscript.

### Data to Dashboard: A Starbucks Analytics Challenge

Background
You have just been hired as a junior analyst on Starbucks Corporation's Consumer Insights Team. The company leadership has expressed growing concerns about the nutritional content of their beverage menu, particularly regarding sugar, calories and caffeine levels across different drink categories and customizations.

A cross functional team comprising members from Marketing, Product Development and Nutrition Policy has requested clearer insights about the current beverage portfolio. They need data driven insights to support upcoming decisions about menu positioning, health focused marketing campaigns and/or potential product reformulations.

The Challenge
Your supervisor has tasked you with analyzing Starbucks' beverage nutritional data and creating a dashboard that communicates actionable insights to one or more of these internal stakeholders in the cross functional team.

Assignment Overview

| Stage/Part | Deliverable | Timeline | Points |
|---|---|---|---|
| 1 | Data exploration summary | Week 1 | 10 |
| 2 | Tableau dashboard | Weeks 2-3 | 20 |
| 3 | AI revised dashboard | Week 4 | 30 |
| 4 | Reflection essay | Week 5 | 10 |

Deliverables: Always use clear file naming conventions: LastName_FirstName_PartNumber_FileName

### Stage 1: Data Exploration and Story Identification

Deliverable: One-page summary identifying your analytical focus
Timeline: Week 1; Points: 10

Explore the Starbucks dataset (more details provided later). The dataset includes details like calories, fat content, caffeine and sugar levels for various Starbucks drinks. Download the data and review all the fields (e.g., "Calories," "Total Fat," "Sugars," "Caffeine"). Spend a few minutes exploring the data and thinking about what aspects might be interesting to compare. You can use either Excel or Tableau to do this exploration.

What story do you want to tell members of the stakeholder team? Consider what patterns, comparisons or insights would be most valuable for business decision making. Write a brief summary of your observations from this initial data exploration (one paragraph) and include these insights in your submission.

Your submission should include:
- The specific question or story angle you will pursue
- Brief explanation of why this focus is relevant to the stakeholder team
- Any initial observations about the data that support your chosen direction
- Identification of your primary stakeholder audience (Marketing, Product Development and/or Nutrition Policy)

Assessment Criteria:
- Question Focus (3 pts): Clear, specific question with business relevance
- Stakeholder Relevance (3 pts): Demonstrates understanding of stakeholder needs and business context
- Data Observations (3 pts): Shows evidence of data exploration
- Communication Quality (1 pt): Professional writing and formatting

**Stage 2: Visualization Development (i.e., Dashboard)**

Deliverable: Tableau dashboard with 2-4 visualizations and insight summary
Timeline: Weeks 2-3; Points: 20

a) Use Tableau to create between 2 and 4 visualizations (e.g., charts, graphs) that help communicate interesting insights from the data. Make sure that the visualizations fit on one screen, like a dashboard and that the text is legible. Come up with a main objective or theme for your dashboard and make it your title. What are you trying to show with your visualizations?

b) What story are you trying to tell?
Write a paragraph explaining the insights or story your visualizations are trying to communicate. Why did you choose these particular aspects of the data to visualize?

Requirements:
- 2-4 related visualizations that support your central story
- One paragraph insight summary explaining your key findings
- Layout that fits on one screen

Assessment Criteria:
- Visualization Design and Insights (8 pts): Effective charts with meaningful insights
- Overall Layout and Presentation (4 pts): Professional, one screen design
- Storytelling and Explanation (6 pts): Clear narrative connecting visualizations
- Complete Submission (2 pts): All deliverables submitted as instructed

Submission Format:
- Tableau workbook file (.twbx)
- PDF export/screen shot of dashboard
- One paragraph insight summary (Word document or PDF)

**Stage 3: AI Supported Revision**

Deliverable: Revised dashboard, AI transcript and updated insights
Timeline: Week 4; Points: 30

Use a LLM (a large language model such as Chatgpt, Claude or Copilot) to obtain feedback on your dashboard and insights. Apply this feedback to improve your work.

The Process:
a) Ask the LLM for feedback - Use an AI tool to help you review or enhance your visualizations. Ask the LLM questions like:
"How can I improve my visualizations of Starbucks data?"
"What interesting trends can I show using this data?"

b) Record the conversation with the LLM - Copy and paste the LLM prompts you used and the responses you received. You will submit this along with your visuals and write up.

c) Refine your visuals and story - Based on the LLM's feedback, revise your visualizations. Make sure the visualizations fit on one screen and that it has a main theme or objective (e.g., dashboard title and other relevant text) for your intended audience.

Write a paragraph explaining the insights or story your visualizations are trying to communicate. Why did you choose these particular aspects of the data to visualize?

Assessment Criteria:

- LLM Interaction and Documentation (9 pts): Evidence of thoughtful AI engagement with complete transcripts
- Revised Visualization Design and Insights (9 pts): Meaningful improvements based on feedback
- Storytelling Explanation (9 pts): Revised narrative with discussion of changes based on AI interaction
- Complete Submission (3 pts): All deliverables submitted as instructed

Submission Requirements:

- Original dashboard (Stage 2 version) – Screenshot or PDF
- Revised dashboard incorporating AI feedback - Tableau file and PDF/Screenshot
- Complete transcript of your AI interaction (prompts and responses)
- Updated insight paragraph reflecting your revisions

**Stage 4: Reflection and Analysis**

Deliverable: Reflection essay (500-750 words)
Timeline: Week 5; Points: 10

Reflect on your analytical process and the role of AI in shaping your work. Consider these questions:

- How did using AI feedback influence your thinking about the data story?
- What did you learn about effective data communication through this process?
- How did the iterative revision process affect the quality of your final insights?
- What are the benefits and limitations of using AI for analytical feedback?
- How might this experience apply to real world business analytics scenarios?

Assessment Criteria:

- Critical Reflection: (9 pts): Reflection on AI Use, learning insights and professional application
- Writing Quality (1 pt): Clear, professional writing within word count requirements

**Data Set Information**

You will work with an Excel dataset (click here for link to data set) containing nutritional information for Starbucks beverages. All nutritional information for drinks is for a 12oz serving size. Current research states that adults should consume no more than 30% of their calories in the form of fat, they need about 50 grams (women) or 63 grams (men) of protein daily and should provide for the remainder of their caloric intake with complex carbohydrates. One gram of fat contains 9 calories and carbohydrates and proteins contain 4 calories per gram. A "good" diet should also contain 20-35 grams of dietary fiber.

The data includes the following key variables:

| | |
|---|---|
| Beverage category | Cholesterol (mg) |
| Beverage (Name) | Dietary Fiber (g) |
| Beverage prep | Sugars (g) |
| Calories | Protein (g) |
| Total Fat (g) | Vitamin A (% DV) |
| Trans Fat (g) | Vitamin C (% DV) |
| Saturated Fat (g) | Calcium (% DV) |
| Sodium (mg) | Iron (% DV) |
| Total Carbohydrates (g) | Caffeine (mg) |

The following is 5 sample rows from the dataset.

| Beverage_category | Beverage | Beverage_prep | Calories | Total Fat (g) | Trans Fat (g) | Saturated Fat (g) | Sodium (mg) | Total Carbohydrates (g) | Cholesterol (mg) | Dietary Fibre (g) | Sugars (g) | Protein (g) | Vitamin A (% DV) | Vitamin C (% DV) | Calcium (% DV) | Iron (% DV) | Caffeine (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coffee | Brewed Coffee | Short | 3 | 0.1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 175 |
| Coffee | Brewed Coffee | Tall | 4 | 0.1 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 260 |
| Coffee | Brewed Coffee | Grande | 5 | 0.1 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 330 |
| Coffee | Brewed Coffee | Venti | 5 | 0.1 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 0 | 0.02 | 0 | 410 |
| Classic Espresso Drinks | CaffÃ¨ Latte | Short Nonfat Milk | 70 | 0.1 | 0.1 | 0 | 5 | 75 | 10 | 0 | 9 | 6 | 0.1 | 0 | 0.2 | 0 | 75 |

## Stakeholder Profiles

Consider how your analysis might serve one or more of these audiences when crafting your story and recommendations:

Marketing Team: Interested in consumer facing messaging about healthier options, competitive positioning and customer segment targeting.

Product Development: Focused on reformulation opportunities, ingredient alternatives and new product concepts.

Nutrition Policy: Concerned with meeting regulatory requirements, transparency in nutritional information and supporting corporate wellness initiatives.

## Academic Integrity Note

While you are encouraged to use AI tools for feedback and revision, all analytical thinking, interpretation and final insights must be your own work. Document all AI interactions transparently and critically evaluate suggestions rather than unconditionally accepting them.
*This assignment is designed to simulate real world business analytics scenarios while developing your skills in data analysis and storytelling, iterative improvement and responsible AI use. Approach each stage thoughtfully and use the stakeholder context to guide your analytical choices.*

## APPENDIX B
## AI Prompt Bank

Students may struggle with formulating useful prompts when engaging with large language models. This prompt bank provides categorized options to help students engage more effectively with AI tools during Stage 3 of the assignment. Instructors should introduce these prompts or discuss examples in class as students begin working on their AI supported revisions.

Students can adapt these prompts to their specific dashboard context and use them with any approved AI platform (Chatgpt, Claude, Copilot or other tools). The key is asking specific questions that provide context rather than generic requests for help.

Dashboard Design and Layout Feedback

- "I've created a dashboard about [your topic]. How can I improve the layout and visual clarity?"
- "What are the strengths and weaknesses of this dashboard design?"
- "My dashboard looks cluttered. What elements should I prioritize or remove?"
- "Which of these design changes would have the biggest impact on clarity?"

Storytelling and Narrative Development

- "I'm analyzing [your topic] for a [stakeholder type] team. Is my story compelling, or am I just showing data?"
- "What's a clearer or more impactful title for this dashboard about [your topic]?"
- "How can I better connect my visualizations to tell a unified story?"
- "My insight is: [state your insight]. How can I make this more specific and actionable?"

Stakeholder Focused Revision

- "How should I revise this dashboard for Starbucks' marketing team focused on health-conscious messaging?"
- "What would a Starbucks product development team want to see in this nutritional analysis?"
- "Would a non-technical stakeholder understand my main message from this dashboard?"
- "How can I make this dashboard more useful for [specific stakeholder type]?"

Technical Improvement and Chart Selection

- "I'm comparing [variables] across [categories]. What chart types would best communicate this relationship?"
- "My dashboard has [describe current charts]. Are these the most effective choices for my message?"
- "How can I better use color, labels, or formatting to improve readability?"

Critical Evaluation and Reflection

- "What are the risks of relying too heavily on AI feedback for data analysis and interpretation?"
- "How should I balance AI suggestions with my own analytical thinking?"
- "What limitations might AI have in understanding my specific business context?"
- "Which AI suggestions improved my work and why?"

## APPENDIX C
## Quick Implementation Guide

Use this guide alongside the detailed student assignment description in Appendix A and the comprehensive implementation guidance in the main manuscript. This appendix focuses on key timing, common student challenges and practical considerations during assignment delivery.

Pre-Assignment Setup – Make sure to schedule the assignment across a 5-week period.

During the Assignment Week by Week

- Week 1: Introduce stakeholder framework; Stress the importance of business relevance over individual student personal interests in exploring the data set.
- Week 2-3: Remind students of the one screen constraint; Provide design feedback during work sessions.
- Week 4: Demonstrate effective AI prompting (use prompt bank – Appendix B); Remind students of the importance of evaluating AI suggestions prior to adoption.
- Week 5: Facilitate reflection discussion; connect to professional practice.

Common Student Questions

"What story should I tell?" = Guide toward stakeholder needs, not specific topics
"My dashboard is too cluttered" = Remind about audience focus and screen constraint
"Should I use this AI suggestion?" = Ask them to justify how it improves their analysis
"Is this insight good enough?" = Push for strong insights that are actionable and business relevant

Things to consider during implementation

- Grade Part 1 quickly for early feedback
- Focus on the progression of learning rather than technical perfection
- Look for evidence of critical thinking about AI suggestions
- Save strong examples (with permission) for future semesters

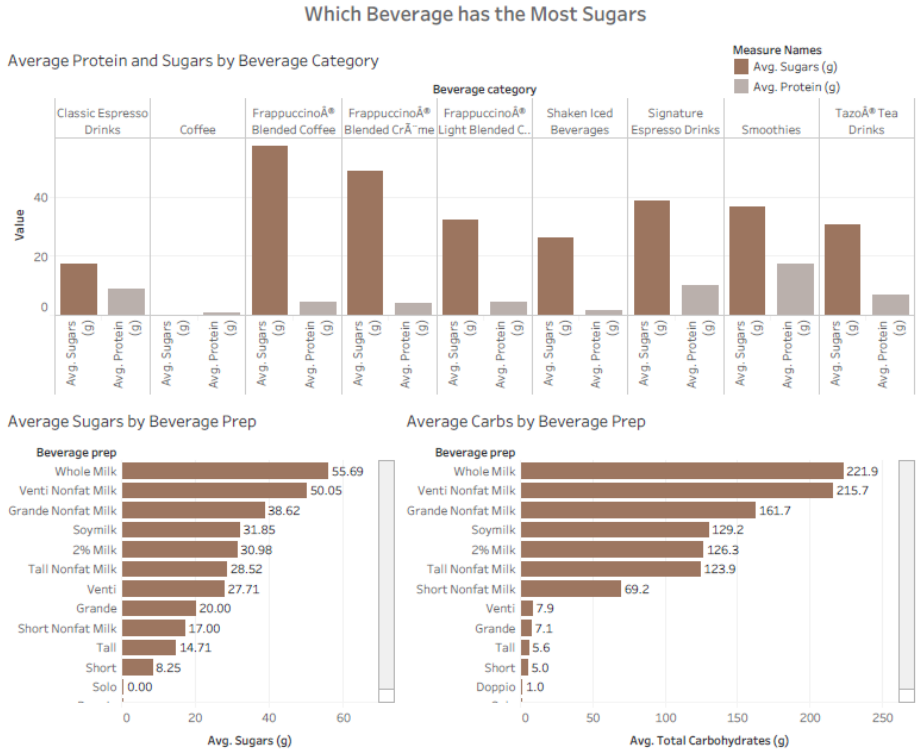
**APPENDIX D**
**Sample Student Artifact Summary**

These artifacts are one student's submissions for Stage 2 and Stage 3 of the assignment to present sample student work of how a student developed insights, applied AI feedback and revised their dashboards.

Part 2 - Initial narrative

In my dashboard the main insight I am trying to communicate is the great amounts of sugar and carbs related to the way the drink is prepared. This analysis is targeted at the Product Development team who could use this information to reformulate beverages with healthier options. Whole milk has on average nearly 100 more grams of carbs and over 20 more grams of sugar than the next option. I also looked at the side by side of average protein and sugars in different drink types. The proportion between the two is vastly different between the coffee drinks and the noncoffee beverages. I chose these visualizations to show some of the health comparisons in the options at Starbucks that might not always be as easy to look at.

Part 2 - Initial dashboard screen shot




Part 3 - AI Engagement

**Prompt**:

Look at this dashboard along with the data it is from and tell me how I can improve my visualizations of Starbucks data

**Response:**

Looking at the provided dashboard, here are some tips to improve the visualization of the Starbucks data to make it more insightful and visually appealing:

1. Clarify Labeling and Titles

- The titles could be more descriptive. For example, instead of "Average Protein and Sugars by Beverage Category," consider "Average Protein and Sugar Content by Starbucks Beverage Category (g)." This makes it clear what units are being used.
- Remove ambiguous abbreviations or label issues (like "FrappuccinoÂ® Blended CrÃ¨me"). These characters likely come from encoding issues and should be corrected to ensure readability.

2. Improve Visual Hierarchy

- Use consistent color schemes across charts to represent categories. For instance, use one color palette for "Beverage Category" and another for "Beverage Prep." This will create a clear visual connection for the viewer.
- Increase font sizes for the main titles and reduce clutter in the labels to help with readability.
  3. Highlight Key Insights
- Use visual markers (like highlighting the bar in a different color) to draw attention to the drink with the highest sugar content or protein content in each chart.
- Add annotations on bars to highlight significant data points, such as the highest or lowest averages.
  4. Add Comparison Metrics or Additional Context
- Including percentage comparisons or benchmarks, such as how each category compares to an "average" Starbucks drink, can add more context.
- For example, next to the "Average Sugars by Beverage Prep," you could add a reference line indicating the average sugar content across all beverages.
  5. Refine Chart Types and Layout
- Consider using a heat map or a stacked bar chart for comparisons across categories or preparation types if the values are clustered.
- For high-cardinality metrics like "Beverage Prep," a horizontal bar chart might enhance readability.
  6. Improve Interactivity if Possible
- If using a tool like Tableau, consider adding interactive elements such as filters to toggle between metrics (e.g., sugars vs. protein vs. carbs).
- Enable sorting to allow users to easily identify the top and bottom items within each chart.

These enhancements can make the data clearer and help the audience quickly grasp the main insights about Starbucks beverages in terms of sugars, carbs, and protein.

**Prompt:**
What are interesting trends related to the relation of protein and sugar that I can show using this data

**Response:**
Here are some engaging trends that explore the relationship between protein and sugar in Starbucks beverages:

1. Low-Protein, High-Sugar Beverages
- Trend: Highlight beverages that are high in sugar but low in protein, which are typically more indulgent options that may have a lower satiety value.
- Insight: Drinks like Frappuccinos might fall into this category, where sugar levels are high, but protein content is low.
- Visualization Idea: Use a scatter plot where sugar content is on the x-axis and protein is on the y-axis. This would show a cluster of high-sugar, low-protein drinks in one section.

2. High-Protein, Moderate Sugar Options
- Trend: Identify beverages that provide a balance of protein and sugar, which may be perceived as more "nutritionally balanced" or suitable for those looking for a filling option.
- Insight: Certain smoothies or milk-based drinks (such as those with soy or whole milk) could provide a balance, with moderate sugar and higher protein.
- Visualization Idea: A bar or bubble chart comparing different drink categories, with size/color representing sugar levels and a secondary axis for protein content, highlighting the more balanced drinks.

3. Comparing Protein and Sugar by Beverage Preparation Type
- Trend: Show how different preparation types impact protein and sugar levels. For instance, beverages made with nonfat milk might have lower sugars and moderate protein, while those with whole milk or added flavors have higher sugar and protein levels.
- Insight: Preparation type significantly affects both protein and sugar, with certain choices increasing one nutrient more than the other.
- Visualization Idea: A grouped bar chart showing different preparation types along with their average protein and sugar content could reveal these differences.

4. Protein-to-Sugar Ratios Across Categories
- Trend: Calculate and compare the protein-to-sugar ratio to highlight the most "protein-rich" drinks relative to their sugar content.

- Insight: This could reveal that espresso-based drinks have a higher protein-to-sugar ratio, making them a preferred option for people who want protein without much added sugar.
- Visualization Idea: Display the protein-to-sugar ratio across beverage categories, perhaps as a ranked list or sorted bar chart. This will let viewers quickly identify beverages with the best (and worst) protein-to-sugar ratios.

5. Impact of Size on Protein and Sugar Balance

- Trend: Explore how increasing beverage size affects the balance between sugar and protein. Larger sizes often have a disproportionate increase in sugar compared to protein.
- Insight: This can highlight how the nutritional content scales up in a way that might make larger sizes less balanced in terms of protein-to-sugar ratios.
- Visualization Idea: A line or step chart where each drink type's sugar and protein increase by size, showing how the ratio changes as the drink size increases (Short, Tall, Grande, Venti).

6. Milk Type's Influence on Protein and Sugar

- Trend: Show how different milk options (whole, nonfat, soy, etc.) affect the protein and sugar balance.
- Insight: Non-dairy options like soy milk could increase both protein and sugar, while nonfat milk may increase sugar without contributing as much protein.
- Visualization Idea: A side-by-side comparison of each milk type's average protein and sugar content, displayed as grouped bars or a small multiples chart for easy comparison.

7. Protein and Sugar in 'Healthier' vs. 'Indulgent' Drinks

- Trend: Create a comparison of "healthier" options (like teas and black coffee) versus "indulgent" options (like Frappuccinos) to see how protein and sugar content vary across these two ends of the spectrum.
- Insight: Healthier options generally have lower sugar and protein, while indulgent ones may have higher sugar with varied protein levels depending on milk content.
- Visualization Idea: A dual-axis chart where one axis is sugar content and the other is protein, showing "healthier" drinks clustered near the origin and indulgent drinks toward higher sugar values.

These trends offer insights into how protein and sugar interplay in Starbucks drinks, highlighting balance or lack thereof for viewers with specific dietary goals.

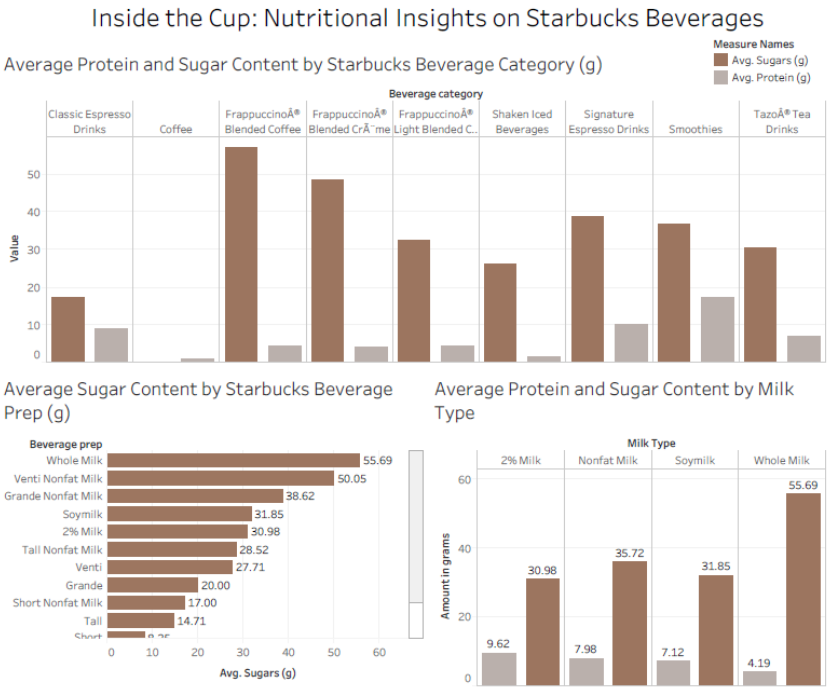
**Prompt:**
Give me a strong title for my dashboard

**Response:**
Here are some compelling title ideas for your Starbucks dashboard:

1. "Unpacking Starbucks: A Nutritional Breakdown of Your Favorite Drinks"
2. "Inside the Cup: Nutritional Insights on Starbucks Beverages"
3. "Sips & Stats: A Deep Dive into Starbucks Drink Nutrition"
4. "From Frappuccinos to Teas: Understanding the Nutrition Behind Starbucks Beverages"
5. "Calories, Sugars, and More: The Nutritional Profile of Starbucks Drinks"

Each title aims to capture the attention of viewers by hinting at the deeper insights and comparisons within the data. Let me know if you'd like any variations or further focus!

Part 3 - Revised Dashboard Screenshot




Part 3 - Revised narrative

AI helped me realize to direct my focus towards one thing. I decided that I wanted that story to be the relation between average protein and sugars in the drinks. This insight is particularly valuable for the Marketing team because it shows which drinks offer better nutritional balance for health conscious customers. I believe that this is a very important insight and it gave me the idea to incorporate milk type into this which provided an extra insight. The Marketing team could use this information to promote drinks with better protein to sugar ratios or highlight milk alternatives that provide more balanced nutrition. I think this is a stronger story and helps get my original stance about looking into the nutritional values across better.