

"May the Odds Ever Be in Your Favor" Building Meaningful Student Engagement in an Online Statistics Course.

STA 210-201 Introduction to Statistical Reasoning

About the Course

STA 210 "Introduction to Statistical Reasoning," is a conceptual statistics course that prioritizes understanding statistical concepts over mathematical manipulations. The class focuses on how to intelligently consume statistical information encountered in daily life, emphasizing good versus bad inferential reasoning rather than heavy mathematical calculations. Often referred to as "statistics for poets," it requires significant writing and reading to explore conceptual ideas across three primary modules: human inference, confidence intervals, and hypothesis testing. This course employs a flexible hybrid model that adapts to the complexity of the material. For more accessible topics, the class follows a flipped classroom approach where you prepare by watching YouTube lectures or reading the textbook before engaging in hands-on activities and discussions during class. However, for more challenging concepts, the instructor shifts to a traditional lecture format to provide direct guidance and clear up difficult-to-grasp material. This design balances student-led discovery with expert instruction, ensuring you have the right level of support when students need it most. Approximately 4,000 students take the course annually.

The Challenge

STA 210 is an introductory UK CORE course focused on making sense of uncertainty. For many students, traditional statistics can feel abstract—especially in an online format where engagement, immediacy, and social connection are often weaker than in face-to-face classes. Additionally, comparing learning outcomes across online vs. in-person is complex because each modality operates under different constraints and supports.

My goal was to shift STA 210 online toward meaningful engagement and application by strengthening the learning experience through:

- Clear navigation in Canvas to support Statistical Literacy, human inference, and interpretation of real-world examples and survey data.
- A revised, clearer syllabus with learning goals and objectives explicitly integrated into the Canvas structure and tied directly to content and assignments.
- Stronger virtual community through a group project designed to promote collaboration and peer learning.
- Improved learning materials (content and videos) aligned to the topics students must master.



Strategy I: Course Structure & Organization

To "create the odds in my favor," I consulted my designated instructional designer, Sarah Asher, for guidance on course flow and structure. Together, we built an organization system that is clear and easy for students to follow after they complete the "Start Here" experience (see Figure 1).

- Self Review Rubric: Used 8 general and 18 specific standards to prioritize improvements and strengthen key course areas.
- LMS Template: Implemented a "Start Here" page and pre-built modules (Overview and Learning Materials) to guide students through each unit consistently.

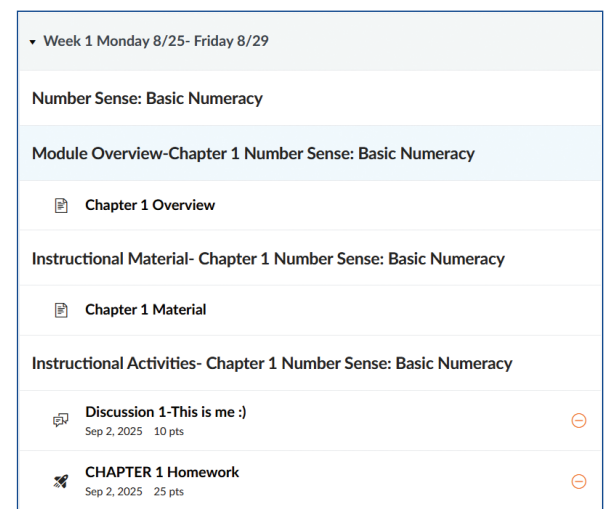
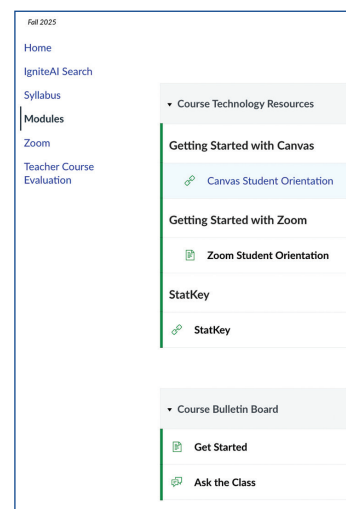


Figure 1: Course module organization utilized to allow learners to move through created and curated content in the order that Dr. Karkelanova felt was most effective.

Strategy II: Instructional Strategies & Engagement

• Collaborative development (iterative planning for engagement): The Summer Academy focused on syllabus alignment and Quality Matters (QM) standards. I used the QM Self-Review Rubric and Course Map, guided by Summer Academy presentations and reinforced through Fall sessions on evidence-based pedagogy and best practices.

• Purposeful Canvas shell design for clarity and consistency: I built a well-organized Canvas structure with all materials posted and designed the course in modular learning units, supporting easier navigation and more consistent student learning pathways.

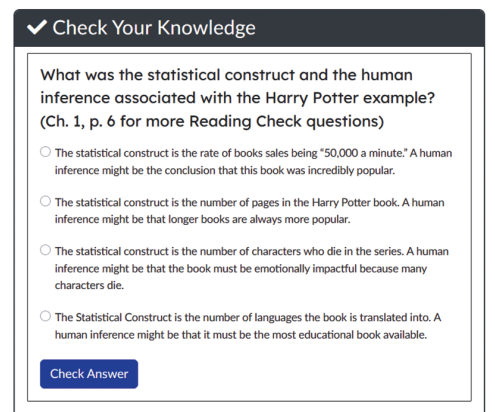
• Instructional Designer collaboration to increase interactivity: I partnered with an instructional designer to create interactive Canvas Content Blocks, improve module sequencing, and use media intentionally to support engagement. Tools included DesignPlus within Canvas.

Outcome of the pilot: inclusive, hands-on, and accessible engagement:

- The pilot study reshaped my approach by strengthening engagement in online learning through activities such as the Dollar Street group project, student introductions, and learning checks—shifting students from passive viewing to active participation.
- I also improved accessible course design by auditing media for alt text and synchronized captions (ADA-ready), and used the "Welcoming Your Learners" module to develop a streamlined, equitable course home page and learner orientation.

(Right) Figure 2: Content consists of summaries, lecture videos, readings, with interactions interspersed for knowledge checks.

(Below) Figure 3: Assessment instructions provides detailed information, combining specific sections from the text book and embedded media from external websites.



Conclusion

Key outcomes included improved mastery of the statistical lifecycle, stronger data-driven reasoning, and enhanced communication and teamwork skills. By integrating a structured online environment with collaborative, hands-on projects (e.g., Dollar Street), students experienced statistics as relevant and engaging—supported by positive student survey feedback.

The project guided students through the complete statistical workflow—data collection, analysis, interpretation, and professional reporting—reinforcing core course concepts and strengthening exam readiness. Alignment work through the Course Quality Design Program (learning objectives, assessments, and activities) provided students with a clear roadmap connecting course material to assignments and learning goals.

What I gained: viewing the course through the student perspective helped me identify and address instructional blind spots, and collaboration with my instructional designer—along with targeted feedback—was essential to improving course quality and student outcomes.



Dollar Street Project can be found at <https://www.gapminder.org/dollar-street>

Figure 4: Learners provided with real world data, allowing them to explore, analyze, synthesize, and share a multitude of economic experiences.

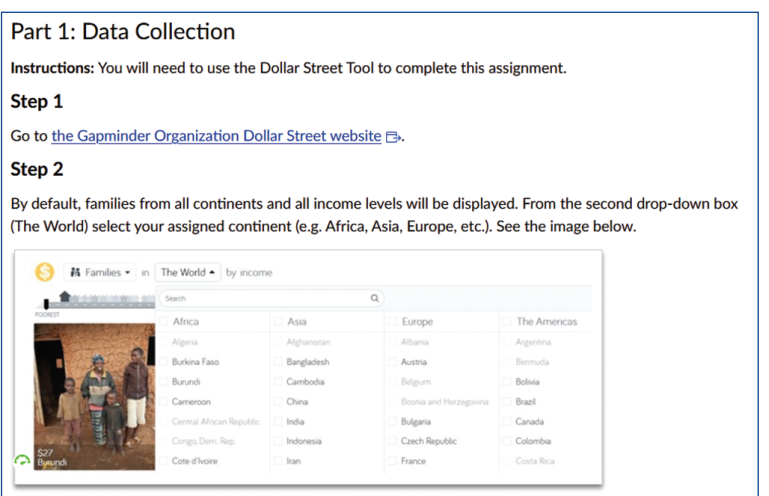
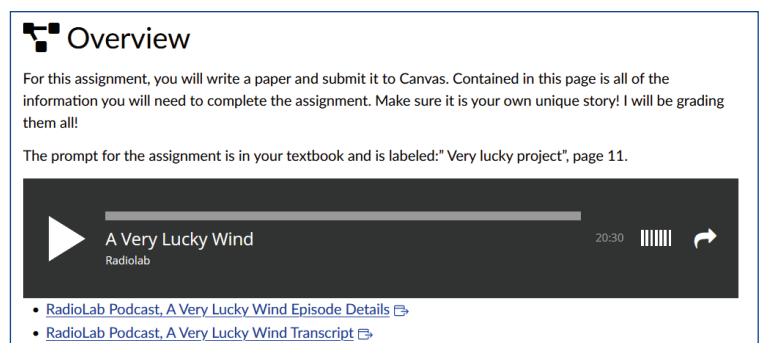


Figure 5: Projects broken down to detailed steps for separate deliverables: Data Collection Reporting, and Presentation