Interactive Statistics 2/e
By Michael Sullivan, III and George Woodbury

Preface to the Instructor

Capturing a Powerful and Exciting Discipline

Statistics is a powerful subject. Technology has changed the way the material is disseminated to the student and, because of this, statistics education continues to evolve. *Interactive Statistics: Informed Decisions Using Data* 2e is one of the new and innovative tools that you may use to help your students learn and appreciate the power of Statistics. How? By disseminating information through video, interactive explorations, and text.

Today's traditional-aged students have grown up with technology - they do not fear it, but embrace and demand innovative technology. Today's non-traditional students live in a wired world - something they may not be completely comfortable with. Yet, all students need to be exposed to the latest techniques in delivering intellectual content. This product provides such an opportunity. A traditional book delivers examples via text (sometimes very dense text). Certainly, the ability to read material and understand the contents is a vital skill to develop. However, much information in today's world is delivered via video (YouTube, for example). *Interactive Statistics* presents material using a balanced approach of delivering content through both text and video, with the video embedded into the text. And we don't stop with video as the only media. Students learn best through experiential learning. So, there are applet activities also embedded into the text to help students discover concepts. To confirm that students watch the videos or work through the activities, there are short assessment questions that follow these media assignments.

The content in *Interactive Statistics: Informed Decisions Using Data* 2e is delivered entirely online through Interactive Assignments complete with videos, interactive activities, and exercises in one seamless learning experience. Instructors and students also have access to the eText which is a read-only version that contains everything within the Interactive Assignment except for the MathXL exercises. Both versions also have an extensive chapter review that will assist your students in preparing for exams.

As with the printed texts in the Sullivan Statistics series, a special effort is made to abide by the *Guidelines for Assessment and Instruction in Statistics Education* (GAISE) for the college introductory course endorsed by the American Statistical Association (ASA). The GAISE report gives six recommendations for the course:

1. Emphasize statistical literacy and develop statistical thinking
2. Use real data in teaching statistics
3. Stress conceptual understanding
4. Foster active learning
5. Use technology for developing conceptual understanding
6. Use assessments to improve and evaluate student learning.

Navigation Within a Typical Section

A majority of the sections begin with a list of prerequisite topics called *Preparing for…* that need to be understood to succeed in the section. New in this edition is that a tab in the Interactive Assignment is dedicated to this material. For each *Preparing for…* topic, there is a pop-up link that provides a brief review of the content and an exercise that assesses the student's understanding of the concept.

After completing the *Preparing for...* exercises, the student is given a list of learning objectives for the section, which is now contained in the Introduction tab. These objectives are linked to the corresponding material in the section. We have added many new animations that provide an overview of where the student is within the course. Think of these videos as a "Where we've been, where we're going" synopsis.

To help with navigation, Preparing for…, Introduction and Objectives are tabbed across the top of the screen. The circles at the bottom of the screen indicate the number of slides in the tabbed content. A dark circle indicates the location of the slide currently being viewed within the tabbed content. Arrows may appear on either the left or right side of the slide. If no arrow appears, it means moving forward or backward is not possible. A gray arrow means scrolling forward/backward within the tabbed content is possible. Clicking a one of these arrows will move the reader to another tab.

Step-by-Step Example Structure and Technology

The examples are set up as Problem statements. We then provide an outline of the recommended Approach in solving the Problem. Next, we present the Solution.

Virtually all examples have video solutions. The video solutions are done by hand, using a TI-84C calculator, StatCrunch, and Excel (new to this edition). By clicking on one of the icons (as shown below), you will be able to view a video solution.

By Hand   TI-84C Calculator   StatCrunch   Excel

Sometimes, we also provide solutions by hand in the text if we believe it is beneficial to have such a solution for conceptual development. In addition, many of the examples that have video-only solutions will include Results of the analysis completed in the video solution. Again, this is to help your students while they review the material.

We also provide Technology Step-by-Step instructions that explain how to obtain results found in the examples using the TI- calculator, StatCrunch, and Excel.

Technology Step-by-Step Instructions

Any problem that has 12 or more observations in the **Data Set** has a data icon ⬭ indicating the data set is available for upload from Tools for Success in MyLab Statistics.

Features within the Interactive Assignment

- **Preparing for This Section** Almost every section opens with a list of prerequisite skills that are necessary for succeeding in the section. Review content is available along with an exercise to assess the student's understanding of the material.
- **Objectives** A list of learning objectives for the section is provided. The objectives are linked to the material in the section and are also tabbed on each slide for easy navigation.
- Great efforts were made to extensively incorporate **real data** in the exercises and examples to pique your interest and show the relevance of statistics.
- **Step-by-Step Examples** guide students from problem to solution in easy-to-follow steps. Solutions are also provided via video (by hand, TI-84C, StatCrunch, and Excel). Follow-up exercises assess understanding of the material presented.
- **Applet Activities** appear throughout the text and help students learn concepts through an experiential approach. Follow-up exercises assess understanding of the concepts.
- **In Other Words/Caution Animations** Throughout the course, students encounter In Other Words animated videos with avatars. The In Other Words videos are meant to take statistical definitions and concepts and state them in simple, everyday language. The Caution animated videos are meant to alert students to the pitfalls in conducting statistical analysis.
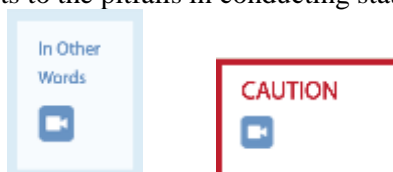
- A **Chapter Summary** delivered via video using a **MindMap.** The MindMap visual summary is available as a pdf that may be downloaded from the Tools for Success. New to this edition are tabs for the Chapter Summary, Review Exercises, Chapter Test, and Informed Decisions project. This makes navigation within the chapter review much easier.
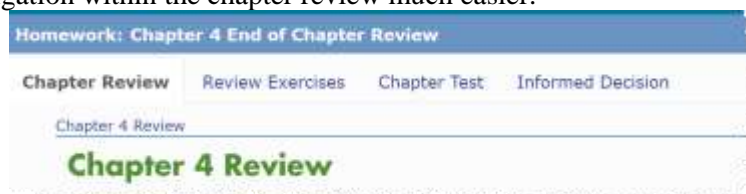
- A list of key chapter **Vocabulary** with pop-up definitions.
- A list of **Formulas** used in the chapter.
- **Chapter Objectives** listed with corresponding review exercises.
- **Review Exercises** with answers available as a pop-up. New in this edition, the Review Exercises have been coded as exercises so that students can complete them in MyLab Statistics.
- **Chapter Test** with answers available as a pop-up. Plus, each chapter test problem has complete worked out video solutions (by hand, TI-84C, StatCrunch, and Excel).

Print Supplements

Interactive Statistics 2e comes with a variety of print supplements.

- **Guided Notebook** Written by author George Woodbury, the Guided Notebook follows the material in the Interactive Assignment. The student is expected to fill out the notebook as he/she progresses through the reading assignment. When complete, the student has a complete text written in his/her own words. Instructors may want to check each student's Guided Notebook to verify the student is completing each Interactive Assignment. The Guided Notebook is either available as a print supplement or may be downloaded directly from the left navigation bar.
- **Additional Exercises** These are stagnant paper/pencil problems that you may use as additional assignments that are available for each section. The authors use these for weekly homework that is turned in as a formative assessment. This allows instructors to see the student's work and provide feedback. The additional exercises appear in the left navigation bar within the drop-down menu of each chapter's interactive assignment.
- **Activity Workbook** The subject of statistics, like many things in life, is best learned through active participation. These activities have been designed to improve your student's study of statistics, encouraging them to become a more active participant in the discipline. The activity workbook is available as a print supplement or may be downloaded from Tools for Success.
- **Instructor Resource Guide** This guide provides an overview of every chapter, suggestions for presenting the material, and additional examples that you may use when developing your lectures. The Instructor Resource Guide is available under Instructor Resources.

New to this Edition

Based on feedback from users of the first edition, we incorporated many new features into this revision.

- Expanded use of **reading assessment questions** (*RA) in the Interactive Assignment. Each section of the Interactive Assignment now has more reading assessment questions. The purpose of these exercises is to verify students are understanding concepts presented in the video and text (as well as verify the students are completing the Interactive Assignment). Be sure your students are aware of the fact that many of these exercises only allow a single attempt. This is done to prevent students from "guessing and checking" until a correct answer is found.

- **Lightboard videos**. These videos feature author Michael Sullivan presenting statistical concepts using lightboard technology. See Section 4.1 (Objective 2, Slide 3) for an example.
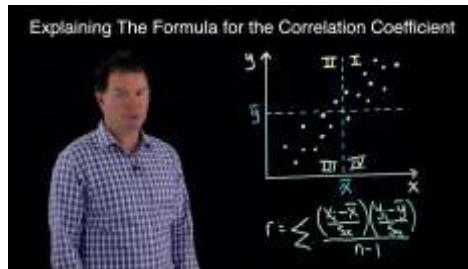
- **Animated videos**. These are fun videos that feature author Michael Sullivan, and sometimes his wife, Yolanda. The videos use avatars to segue from one section to the next. Think of them as "where we've been, where we're going" videos that allow students to see the forest among the trees of the course.   See Section 8.1 (Introduction, Slide 1) for an example.

- **Section 5.6 Simulation** is a new section that introduces students to the power of simulation in obtaining probabilities of events. This section also foreshadows concepts the student will learn later in the course including sampling distributions and the role of variability in inference.

- **Section 9.4** is a new section on bootstrapping. This section introduces one of the more recent breakthroughs in statistical inference – the ability to estimate a parameter without having access to an underlying probability distribution. This section is optional and may be skipped without loss of continuity.

- **Chapter 10** now contains sections on simulation methods for conducting inference. The organization of Chapter 10 allows for presenting simulation along with traditional inference, or simply presenting traditional inference. Should you decide to present only the traditional approach to inference (that is, through the normal model), only cover Section 10.2 (leave Sections 10.2A and 10.2B disabled). If you decide to present hypothesis testing using simulation, disable Section 10.2 and cover Sections 10.2A and 10.2B. Section 10.3A presents hypothesis testing on a mean using simulation and bootstrapping. This section is optional and may be skipped without loss of continuity.

- **Chapter 11** has new sections on randomization methods.   Section 11.1A presents randomization tests for two independent proportions. If you choose to present randomization methods, we recommend presenting Section 11.1A prior to Section 11.1. Section 11.2A presents hypothesis tests on dependent means using bootstrapping. This section is optional and may be skipped without loss of continuity. Section 11.3A presents randomization tests for two independent means. We recommend covering this section prior to Section 11.3, if you choose to discuss this approach to hypothesis testing. If you do not wish to present randomization tests, disable Sections 11.1A, 11.2A, and 11.3A.

- **Chapter 14** has a new section on randomization. Section 14.1A presents randomization tests for the slope of the least-squares regression model. If you choose to cover this section, do so prior to Section 14.1.

- Pre-built **Learning Catalytics** modules.   Learning Catalytics is a "bring your own device" web-based clicker system. The authors have written modules for each chapter of *Interactive Statistics* that you may use in your classroom.

- **Classroom Notes**. Written by author Michael Sullivan for his classes, the classroom notes may be used as a guideline in developing your lectures. Sullivan makes these notes available to his students and each student fills in the notes during class. The notes have examples different from those in the Interactive Assignment. Go to www.sullystats.com and select the Interactive "text". There, you will see a link to the classroom notes.