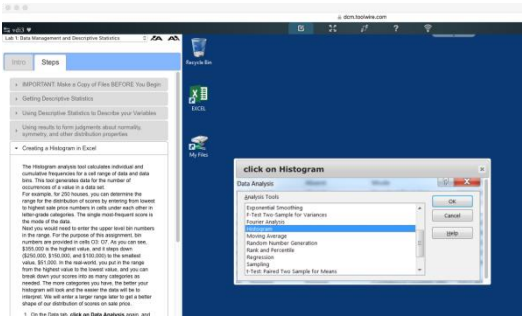
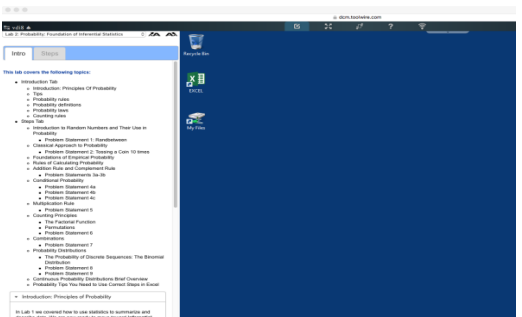


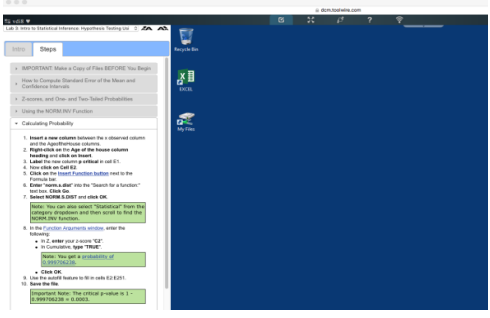
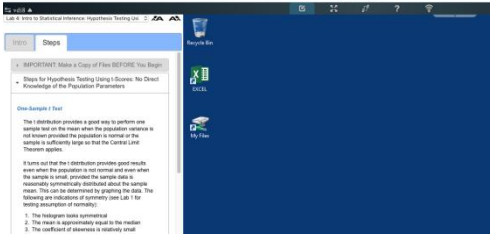
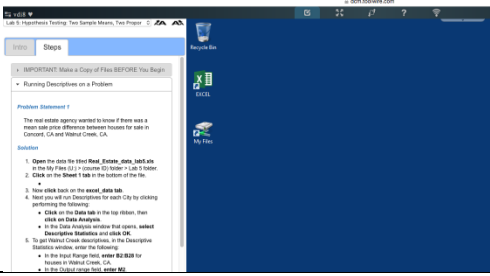
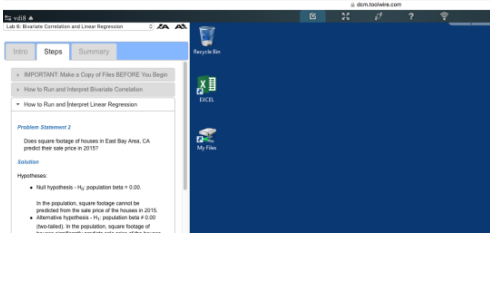
Toolwire LiveLabs Statistics

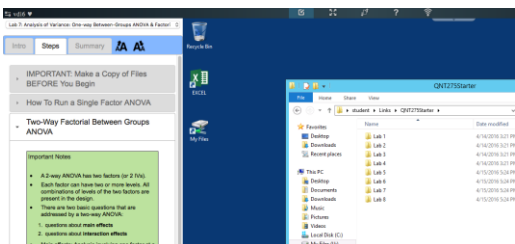
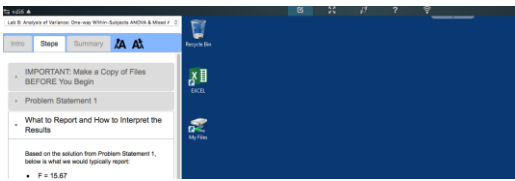
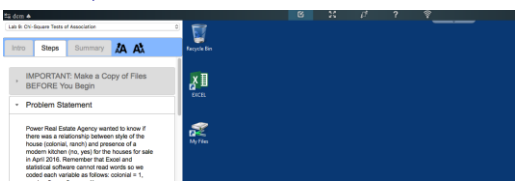
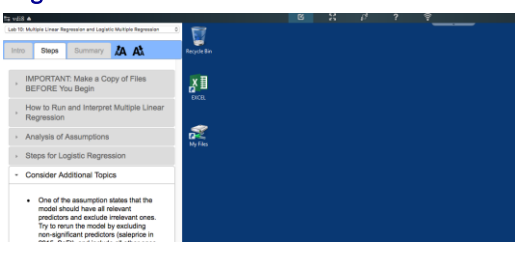
Toolwire LiveLabs provide hands-on access to LIVE software in a hosted virtual desktop sandbox environment; these are NOT simulations. Embedded within the frameset, lab guides present students with learning content and provide step-by-step text and video-based instructions that scaffold the learning experience and support self-paced learning that enables faculty to dedicate more time to high-value instruction.

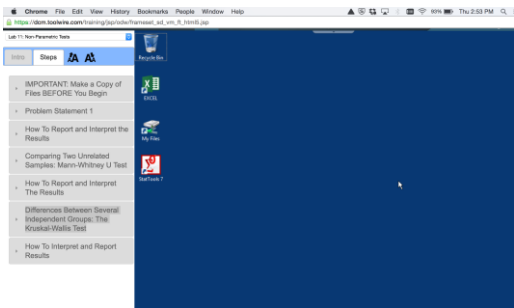
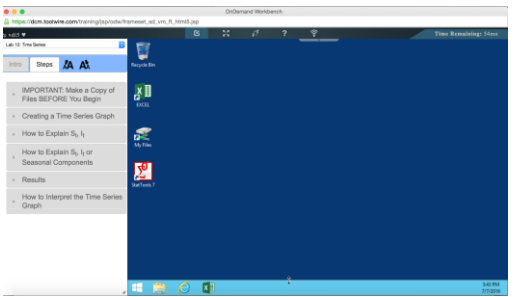
Instructors can integrate labs as assignments that take 15-30 minutes to complete. In order to increase student engagement, LiveLabs present learning in the context of workplace scenarios. This approach challenges students to apply their knowledge to solve real world problems.

LiveLabs help institutions reduce course costs associated with learning content, software licensing, computer lab hardware and equipment, and technology support. In addition, these labs are backed by Toolwire’s value added services including LMS integration, onboarding, and 24x7x365 faculty and student support from our dedicated Learner Advocacy team.

Toolwire Lab	Learning Objectives	This Lab Covers
<p>1. Data Management and Descriptive Statistics</p> 	<ul style="list-style-type: none"> • Data management • Using the AUTOSUM function • Calculating the MEAN • Using the SUMIF function 	<p>Using descriptive statistics to describe variables; Using results to form judgments; Creating a histogram; Formatting histograms; Creating normal Q-Q plots; Saving results</p>
<p>Description: Learners use existing data to test various statistics features built into Microsoft Excel. They use the data to generate histograms and plots for a visual readout of the statistics data.</p>		
<p>2. Probability: Foundation of Inferential Statistics</p> 	<ul style="list-style-type: none"> • Probability rules • Probability definitions • Probability laws • Counting rules 	<p>Coin toss; Foundations of Empirical Probability; Discrete versus Continuous Variables; Sample Space; Randomness and Independence; Mutually versus Non-mutually Exclusive Events; Addition Rule; Multiplication Rule for Independent Events; Addition Rule; Conditional Probabilities; Multiplication Rule; Counting Principles; Combinations; Probability Distributions; Continuous Probability Distributions</p>
<p>Description: Learners apply the concept of probability to a simple game of chance. They calculate the odds while applying rules, definitions, and laws of probability to determine the possible outcomes.</p>		

Toolwire Lab	Learning Objectives	This Lab Covers
<h3>3. Intro to Statistical Inference: Hypothesis Testing Using z-Scores, Single Samples</h3> 	<ul style="list-style-type: none"> Estimating Population Parameters Continuous Distributions: Central Limit Theorem Important To Know About Normal Distribution Empirical Rule 	<p>How to Compute Standard Error of the Mean and Confidence Intervals, Z-scores, and One- and Two-Tailed Probabilities; Using the NORM.INV Function; Calculating Probability; Z.Test Function Errors; Steps for Hypothesis Testing Using z-Scores: μ and σ are Known, Excel Z.TEST function: One-tailed Probability; Z.Test Function Errors</p>
<p>Description: Learners test a hypothesis with z-scores and single sample statistics methods. They utilize a number of built-in statistics functions in Excel such as Z.TEST and NORM.INV to calculate probabilities of various types.</p>		
<h3>4. Intro to Statistical Inference: Hypothesis Testing Using t-Scores, Single Samples</h3> 	<ul style="list-style-type: none"> Introduction to Statistical Inference: Hypothesis Testing using t-scores, single samples 	<p>Steps for Hypothesis Testing Using t-Scores: No Direct Knowledge of the Population Parameters, Two Types of Errors: Type I and Type II errors and Power</p>
<p>Description: Learners apply t-scores and single sample methods to test the central hypothesis.</p>		
<h3>5. Hypothesis Test: Two Sample Means, Two Proportions</h3> 	<ul style="list-style-type: none"> Sampling Distribution Independent Samples t-Test Assumptions for the Independent Samples t-Test 	<p>Running Descriptives, Independent Samples t-Test, Equal Variances Not Assumed, Independent Samples t-Test, Equal Variances Assumed, Dependent Samples t-Test, Equal Variances Not Assumed, Hypothesis Test for Comparing Two Proportions</p>
<p>Description: Learners employ independent and dependent samples t-tests to analyze the data.</p>		
<h3>6. Bivariate Correlation and Linear Regression</h3> 	<ul style="list-style-type: none"> Bivariate correlation Pearson correlation coefficient Linear regression 	<p>How to Run and Interpret Bivariate Correlation, How to Run and Interpret Linear Regression</p>
<p>Description: Learners perform bivariate correlation and linear regression using Excel and sample data.</p>		

Toolwire Lab	Learning Objectives	This Lab Covers
<p>7. Analysis of Variance: One-Way ANOVA & Factorial ANOVA Between-Groups</p> 	<ul style="list-style-type: none"> Using one-way ANOVAs Using two-way factorial ANOVAs 	<p>How To Run a Single Factor ANOVA, Two-Way Factorial Between Groups ANOVA, How To Run Factorial ANOVA</p>
<p>Description: Learners perform one-way ANOVA and two-way factorial ANOVA between groups of sample data.</p>		
<p>8. Analysis of Variance: One-Way Within-Subjects ANOVA & Mixed ANOVA</p> 	<ul style="list-style-type: none"> Running paired samples t-tests Running mixed ANOVAs Running one-way repeated measures ANOVA 	<p>What to Report and How to Interpret the Results, To run paired samples t-tests, Mixed ANOVA, Hypotheses for Main Effects, Hypotheses for Interaction Effects</p>
<p>Description: Learners perform a one-way repeated measures ANOVA, mixed ANOVA, and paired-sample t-tests on real estate data.</p>		
<p>9. Chi-Square Tests of Association</p> 	<ul style="list-style-type: none"> Using Chi-square to test association 	<p>Testing Association Using Chi-Square, One-Way Between Groups ANOVAS and Post-Hoc Tests</p>
<p>Description: Learners discover when to apply a Chi-square test of association and its difference with other tests.</p>		
<p>10. Multiple Linear Regression and Logistic Multiple Regression</p> 	<ul style="list-style-type: none"> Multiple linear regression Multiple logistic regression 	<p>How to Run and Interpret Multiple Linear Regression, Analysis of Assumptions, Steps for Logistic Regression, Additional Topic: Creating Dummy Variables</p>
<p>Description: Learners use the StatTools add-in for Microsoft Excel to practice running Multiple linear regression and Multiple logistic regression tests on real estate data.</p>		

Toolwire Lab	Learning Objectives	This Lab Covers
<h3>11. Non-Parametric Tests</h3> 	<ul style="list-style-type: none"> • Mann-Whitney U Test • The Kruskal-Wallis Test 	<p>Comparing Two Related Samples: The Wilcoxon Signed-Rank Test; Differences Between Several Independent Groups: The Kruskal-Wallis Test</p>
<p>Description: Learners will use a series non-parametric tests or assumption free tests to rank data.</p>		
<h3>12. Time Series</h3> 	<ul style="list-style-type: none"> • Time Series Data • Explaining S_t, I_t and S_t or Seasonal Components 	<p>Creating a Time Series Graph; How to Explain S_t, I_t; How to Explain S_t or Seasonal Components; How to interpret the Time Series Graph</p>
<p>Description: Learners work with variables over time (yearly income, monthly sales, weekly orders, quarter sales, etc.) to plot the values of the variable of interest chronologically on a plot, such as a time series plot or graph.</p>		