USU's Sakai 11 Tests & Quizzes tool provides a Statistics feature with extensive information about student performance on tests and quizzes that was not available in previous versions of Sakai. It also provides information about specific test questions so that you can see where students are having problems, and explore the reliability and validity of your test questions.

A list of topics covered in this Guide appears below; note that if you are viewing this Guide online, clicking on an item in this list will take you to that section of the Guide:

- Accessing the Advanced Statistics Tools.
- Test Statistics Report: This report includes standard descriptive statistics, the Kuder-Richardson formula, and test reliability statistics such as variance and standard deviation.
- Individual Scores Report: This report displays as a list of students and shows statistics on their scores, including: the raw score, the score as a percent, the individual’s rank, as well as Z scores, T scores and stanine.
- Item Detail Report: This report displays as a list of questions and shows the following statistics: the number of times each answer was selected; the difficulty and variance indexes; the discriminating power; and the point-biserial coefficient.
- Incorrect Items Report: This report displays as a list of students and shows which questions each student answered incorrectly.
- Omitted Items Report: This report displays as a list of students and shows which questions, if any, each student did not answer.
1. In the left navigation menu, click **Tests & Quizzes** to access the tool.

2. On the **Tests & Quizzes** landing page, click the **Published Copies** tab.

3. In the **Select Action** menu, click **Scores**.

   **NOTE:** The **Scores** option is only available if at least one student has taken the test or quiz.

4. On the **Scores** page, click the **Advanced Reports** tab.

5. The available reports are: **Test Statistics**, **Individual Scores**, **Item Detail**, **Incorrect Items**, and **Omitted Items**.

   **NOTE:** At the top of each report you will find the following information: **Course Name**, **Assessment Name**, **Section(s) in this site**, **Allowed Section(s)/Group(s) in this site**, **Instructor(s) Name(s)**, and **Created by**.
Test Statistics Report

The Test Statistics tab is the default tab when you click the Advanced Reports tab. It displays descriptive statistics and information about test reliability. The descriptive statistics are:

1. \( N \): Number of submissions
2. Total Score Possible: Total number of points that can be earned
3. Mean: Average score
4. Median: Midpoint of the score distribution
5. Maximum: Highest score attained by a student
6. Minimum: Lowest score attained by a student
7. Range: The difference between the maximum and minimum scores
8. Trimmed Mean: The average score after a small percentage of the highest and lowest scores are removed (used primarily for skewed distributions)
9. Mode: The score that appears most often
10. Exam Avg %: Exam Average Percent is the mean score expressed as a percentage
11. Kuder-Richardson: The Kuder-Richardson Formula measures test reliability in order to help you determine if the test discriminated among students who achieved mastery and those who did not.

The Test Statistics tab also includes both biased and unbiased estimators for:

- Variance
- Standard Deviation
- Coefficient of Variation
- Standard Error.
The *Individual Scores* tab displays the following information for each student:

1. **Final score**: Final score on the exam
2. **Percent**: Final score on the exam as a percent
3. **Rank**: The rank of the final score among all submissions
4. **Z score**: The number of standard deviations from the mean score; should be used when the standard deviation is known and there are more than 30 submitted exams
5. **T score**: The number of standard deviations from the mean score; should be used when the standard deviation is NOT known and there are less than 30 submitted exams
6. **Stanine**: An assigned number to a member of a group, relative to all members in that group, on a nine-point scale.

<table>
<thead>
<tr>
<th>UserID</th>
<th>Name</th>
<th>Final Score</th>
<th>Percent</th>
<th>Rank</th>
<th>Z Score</th>
<th>T Score</th>
<th>Stanine</th>
<th>Percentile</th>
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<tbody>
<tr>
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<td>Student 1</td>
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<td>3</td>
<td>0</td>
<td>50</td>
<td>5</td>
<td></td>
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<tr>
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<td>0.71</td>
<td>57.07</td>
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<td></td>
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<tr>
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<td>Student 3</td>
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<td>57.07</td>
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<tr>
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<td>35.86</td>
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</tr>
<tr>
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<td>Student 5</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
The Item Detail report shows detailed statistics for each question including:

1. *Item/Answer Table:* Shows the number of times students selected each answer with the correct answer indicated by bold text and an asterisk.

2. The % Difficulty Index: The percentage of students who answered the question correctly (i.e., 100% means that all students answered correctly; it may be more appropriate to call it the “easy index”).

3. Discriminating Power: An analysis of the number of people with high test scores who answered the question correctly compared to the number of people with low scores who answered the same test question correctly. When more students who scored in the lower percentile on the test select the right answer to a question than students who scored in the higher percentile, the question will have negative validity (shown as a negative number). This can be used to identify potentially problematic questions.

4. Point-Biserial Coefficient: Used to find out if the “right” students are answering the questions correctly, and how much predictive power the question has, as well as how it could contribute to predictions.

5. Variance Index: Used to quantify whether the number of times a particular answer was selected is clustered or dispersed compared to a standard statistical model.

<table>
<thead>
<tr>
<th>Item</th>
<th>Item/Answer Table</th>
<th>% Difficulty Index</th>
<th>Discriminating Power</th>
<th>Point-Biserial Coefficient</th>
<th>Variance Index</th>
<th>Reliability Index</th>
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<tbody>
<tr>
<td>Q1</td>
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<td>75.0</td>
<td>1.0</td>
<td>0.9428</td>
<td>0.5</td>
<td>-</td>
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<tr>
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<tr>
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<tr>
<td>Q5</td>
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<td>NaN</td>
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</tbody>
</table>
The Item Detail report can be helpful in identifying problematic questions. For example, refer to Question 6 in the first table on the previous page. All students selected the answer “A,” but “B” was marked as the correct answer. This should flag the instructor to review the question.

In looking at Question 6, “Bob Dylan is an American singer/songwriter,” the instructor will find that it is incorrectly marked as “False” instead of “True.”

Incorrect Items Report

The Incorrect Items report is organized by student and shows which question(s) each student answered incorrectly along with the correct answer for the missed question. This is used to see if there are areas where individual students are having trouble with key concepts.

Omitted Items Report

The Omitted Items report is organized by student and shows questions, if any, that individual students did not answer. It can be used to help identify either areas where individual students may be having trouble with key concepts or which individual questions are most difficult for students.