Using Excel’s PivotTable to Analyze Learning-Assessment Data

Assessment Office
University of Hawai‘i at Mānoa
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Mission: Improve student learning through program assessment

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Learning Outcomes

• Set up pivot tables
• Alter pivot table data values
• Sort tables and create filters
• Format pivot tables
• Create pivot charts

PivotTable in Action

• Identify duplicates
• Examine student performance by course level
• Identify progress across groups
Two Data Scenarios

- Rubric data
- Test score data

Data Scenario 1

- Evaluation of student’s information literacy skills
- Four dimensions:
  1. Makes use of sources
  2. Relevancy of sources
  3. Credibility of sources
  4. Style integration when referencing sources
- Students from two class levels: 100 and 400

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### Review Source Data

<table>
<thead>
<tr>
<th></th>
<th>ID</th>
<th>Course_Level</th>
<th>Makes_Use</th>
<th>Relevancy</th>
<th>Credibility</th>
<th>Style_Int</th>
<th>TotalScore</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>400</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>100</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

- Give each column a title. Column titles → field names
- Eliminate empty rows and empty columns

### PivotTable in Action – Identify Duplicates
Drag ID under Row Labels. Drag ID again under Values.
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To Sort: Put cursor under **Count of ID**. Open **Options** tab of the **PivotTable Tools** tab. Select the symbol for **Sort Largest to Smallest**.

In the Raw Data Sheet, find the rows for ID 3, 18, and 82. Make sure that they are true duplicate records. If so, delete one of the duplicates.
PivotTable in Action –
Examine student performance by course Level

Questions of Interest on “Makes Use of Sources”
1. How many students scored 0, 1, 2, 3, 4?
2. Are at least 80% of the students prepared?
3. Are students from 400 level classes more prepared than those from 100 level classes?
Steps for Q1: Frequency Count
(Demonstration)

1. Open the sheet Clean Rubric Data.
2. Put the cursor in the data block.
3. On the Insert tab, in the Tables group, click PivotTable. Choose PivotTable. The Create PivotTable dialog box opens.
4. Make sure the range is correctly specified. Choose New Worksheet to put the PivotTable.

5. Drag Makes_Use field under Row Labels.
6. Drag Makes_Use field again under Values.
7. Click on Sum of Makes_Use and choose Value Field Settings in the pop-up menu.
8. In the pop-up window, under Summarize Values By tab, choose Count. Notice that the Custom Name changes to Count of Makes_Use.

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How many students scored 0, 1, 2, 3, 4?

What are the answers?
Steps for Q2: Percent Calculation & Grouping (Demonstration)

1. In the PivotTable Field List, drag Makes_Use under the Values again.
2. Follow the earlier steps and change the value from Sum to Count in Value Field Settings.
3. With the Value Field Settings pop-up window open, click on the Show Values As tab.
4. In the dropdown menu, choose % of Column Total.
• Change the column title to % of Students.
• Under Rating Scales, select the rows for scale 0, 1 and 2. Right Click, choose Group.

• Select Scale 3 and 4; right click; and choose Group in the pop-up menu.
• Click on the -/+ box besides Group1. The - sign changes to a + sign, and all the items under Group1 are collapsed.

<table>
<thead>
<tr>
<th>Performance in Make Use of Sources Criterion</th>
<th>Rating Scales</th>
<th>Number of Students</th>
<th>% of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group1</td>
<td>35</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Group2</td>
<td>3</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>94</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

• Click the -/+ box besides Group2.
• Rename Group1 to Not Prepared, and Group2 to Prepared.

<table>
<thead>
<tr>
<th>Performance in Make Use of Sources Criterion</th>
<th>Rating Scales</th>
<th>Number of Students</th>
<th>% of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Prepared</td>
<td>35</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Prepared</td>
<td>59</td>
<td>63%</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>94</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Are at least 80% of the students prepared?

What is the answer?
Practice 1

• Create a pivot table to answer the question: What is the number and percent of students prepared for selecting relevant sources (Relevancy)?

Steps for Q3: Crosstab (Demonstration)

1. Drag `Course_Level` under `Column Labels`.
2. Place `Course_Level` above `Values` in `Column Labels`.
3. To present data vertically, move `Values` from `Column Labels` to `Row Labels`.

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Are students from 400 level classes more prepared than those from 100 level classes?

What is the answer?

What are the results of the students who scored 1, 2, 3, and 4?
Steps to Create a Filter (Demonstration)

• In **PivotTable Field List**, drag **Makes Use** under **Report Filter**.

• Filter appears on top of the table. In the drop down menu, check **Select Multiple Items**, then uncheck 0.

![Image of Excel PivotTable with Filter]

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Present Data Graphically

- Put the cursor inside of the PivotTable, on Insert tab, in the Charts group, click Column, then click Clustered Column under 2-D Column (the first choice).

Consider Cleaning Up the Chart

1. Remove Number of Students Field: Right click Number of Students. Choose Remove Field. Notice the changes made in the PivotChart will affect the PivotTable.
2. Add data labels.
3. Delete gridlines.
4. Reformat Axis to expand the range from 0 to 100%.
5. Place the legend at the bottom of the chart.
Exercise 2

• Create a pivot chart to show the percent of prepared and not prepared students in terms of credibility of sources selected for their essays (Credibility).

PivotTable in Action – Identify Progress Across Groups
Data Scenario 2

• A natural science program is investigating the effect of peer mentoring.
• Half of the classes received peer mentors and half did not:
  – Mentor Supported vs.
  – No Mentor
• Three tests were given during the semester:
  – Beginning (Test1)
  – Mid (Test2)
  – End (Test3)

Task

• Examine the average scores on the three tests and observe whether there is a difference in the progress between the two groups.
Steps for Examine Test Progress (Demonstration)

1. Select all the data in the dataset on the Test Data sheet.
2. Insert a PivotTable in a new sheet.
3. Drag Class Type under Column Labels
4. (Click on Column Label filter and uncheck Blank.)
5. Drag Test1, Test2, and Test3 under Values.
6. Change Values Field Settings for Test1, Test2, and Test3 to Summarize Values By Average.
7. Format and clean up the table.

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Present Data Graphically

- Put the cursor inside of the PivotTable, on Insert tab, in the Charts group, click Line, then click Line with Markers under 2-D Line

Resulting PivotChart

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Clean Up the Chart

Considerations When Cleaning Up the Chart

1. Reformat Axis to represent the full possible score range (e.g., 0 to 5).
2. Add data labels.
3. Format data labels so that they don’t overlap with the lines.
4. Delete gridlines.
5. Place the legend at the bottom of the chart.
6. Increase fonts and line thickness in ppt.
Copy and Paste PivotTable

• Copy the whole PivotTable → paste to another PivotTable
• Copy part of the PivotTable → paste to another regular table.

Review of PivotTable Techniques

• Set up pivot tables
• Alter pivot table data values
  – #, %, average
• Sort tables and create filters
• Format pivot tables
  – group, table design, present data vertically
• Create pivot charts
Questions

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