

Pivot Tables

Original manual courtesy of the University of Newcastle; since adapted for use by the Statistical Services unit of The Australian National University

Learning Outcomes

By the end of this training, you will understand the basics of how to tailor information using a pivot table.

You will find out what a pivot table is, and make the most of being able to summarise and display data from a database.

Detailed training sessions are available; these are held two or three times a year. Please contact us for further information by emailing manager.stats@anu.edu.au.

Prerequisites

Before beginning this training, you should be comfortable with:

- the concepts of a spreadsheet, and
- using MS Excel 2003.



The estimated time for completion of this training is approximately 30 minutes.

We recommend you print this manual for ease of training.

What is a pivot table?

A pivot table is just one of the ways data can be manipulated in Excel.

Pivot tables summarise large amounts of data using your choice of calculation method such as summing or averaging.

The main attraction is that the tables can be easily rotated and changed (pivoted) to give different views of the data that automatically update the displayed information. You do this by moving the column and row headings.

Below is an example of an ANU Statistical Services' pivot table.

Year Group	2004-2008
Program Group	(All)
Program Level	(All)
Program Type	(All)
Combined Program Indicator	(All)
UG_PG	(All)
Program Code	(All)
Program Name	(All)
Program Area	(All)
Program Division	(All)
Program Faculty/School/Centre 1	(All)
Program Faculty/School/Centre 2	(All)
Program College 1	(All)
Program College 2	(All)
Attendance Mode	(All)
Attendance Type	(All)
CitRes Group	(All)
CitRes Status	(All)
ATSI Indicator	(All)
COB Country	(All)
COB Region	(All)
Disability Indicator	(All)
Gender Code	(All)
Language	(All)
Broad Field of Education	(All)
Narrow Field of Education	(All)
Arts and Social Sciences	(All)
Asia and the Pacific	(All)
Business and Economics	(All)
Engineering and Computer Science	(All)
Law	(All)
Medicine and Health Sciences	(All)
Science	(All)

Completions	Year	2004	2005	2006	2007	2008
Program Career						
Higher Degree Research		260	303	320	302	341
Postgraduate Coursework		1,568	1,479	1,403	1,741	1,855
Undergraduate		2,251	2,214	2,219	2,241	1,992
Grand Total		4,079	3,996	3,942	4,284	4,188

The original data source for a pivot table could be another worksheet in the same workbook, or from a different Excel Workbook; or it could be from a database application like MS Access.

Pivot table fields & items

Pivot tables are made up of 'fields' and 'items'. These fields and items are arranged in the **Page/Filter**, **Column**, **Row** or **Data** area (see image below).

Fields

A field is a category of related data. For example, in the image below, the fields are Program Career, Program Name, Gender Code, etc. There are two types of fields: fields that are used as row, column or page headings, and fields that contain values and appear in the data area.

The image shows a PivotTable with the following fields listed in the Page/Filter area:

- Year Group (2004-2008)
- Program Group ((All))
- Program Level ((All))
- Program Type ((All))
- Combined Program Indicator ((All))
- UG PG ((All))
- Program Code ((All))
- Program Name ((All))
- Program Area ((All))
- Program Division ((All))
- Program Faculty/School/Centre 1 ((All))
- Program Faculty/School/Centre 2 ((All))
- Program College 1 ((All))
- Program College 2 ((All))
- Attendance Mode ((All))
- Attendance Type ((All))
- CitRes Group ((All))
- CitRes Status ((All))
- ATSI Indicator ((All))
- COB Country ((All))
- COB Region ((All))
- Disability Indicator ((All))
- Gender Code ((All))
- Language ((All))
- Broad Field of Education ((All))
- Narrow Field of Education ((All))
- Arts and Social Sciences ((All))
- Asia and the Pacific ((All))
- Business and Economics ((All))
- Engineering and Computer Science ((All))
- Law ((All))
- Medicine and Health Sciences ((All))
- Science ((All))

The PivotTable data area is as follows:

Completions	Year	2004	2005	2006	2007	2008
Program Career						
Higher Degree Research		260	303	320	302	341
Postgraduate Coursework		1,568	1,479	1,403	1,741	1,855
Undergraduate		2,251	2,214	2,219	2,241	1,992
Grand Total		4,079	3,996	3,942	4,284	4,188

Callouts in the image identify the following areas:

- Page/Filter area:** The list of fields on the left.
- Column area:** The 'Year' field in the PivotTable header.
- Row area:** The 'Completions' field in the PivotTable header.
- Data area:** The numerical values in the PivotTable body.

Items

Items are the individual data from which the field is comprised. For example, in the diagram on the previous page the field **Program Career** is made up of three items: Higher Degree Research, Postgraduate Coursework, and Undergraduate.

The name given to a field in a pivot table is taken from the column heading of the field in the source database. The pivot table maintains a link to the source database so that it may be updated (refreshed) if necessary.

Let's have a look at a pivot table ...



Try it ...

Open the historical student data file "**Program Completions YYYY to YYYY**" from the following webpage:

<http://unistats.anu.edu.au/Data/Students/DEEWR/>

Display specific items on a "page"

Page/filter fields are used to manipulate the pivot table into several "pages" so that the data displayed relates only to one specific, selected item, eg, the data for the female gender only.

To see data for only one item in a page field, click on the drop down arrow next to a particular page field and select the item you would like to display.




Try it ...

1. Click on the drop down arrow next to the **Gender Code** filter.
2. Select **F** from the list.
3. Click **OK**. You will see that the data has changed to show data for only female students.
4. To show data for all genders again, click on the drop down arrow and select **(All)**.
5. Click **OK**.

Undo & Redo

The **Undo** command lets you reverse (undo) your last action, such as moving or deleting a field. In fact, most of the things you can do to a pivot table can be undone. If you make a mistake, just use one of the methods described below to fix it.

To **Undo** an action using the toolbar:

- Choose *Edit > Undo*, or
- Click on the **Undo** button 

The **Redo** command will let you do again what you have just undone.

To **Redo** an action using the toolbar:

- Click on *Edit > Redo*, or
- Click on the **Redo** button 



By clicking on the drop-down arrow beside either the **Undo** or **Redo** buttons, a list of your last 16 actions is displayed. By clicking and highlighting actions in the list, multiple actions can be undone or redone at the same time.

Keep this in mind ...

If you have moved so many fields or made other changes that it is no longer possible to undo or redo easily, just close the pivot table without saving, and reopen it so you can start again.

Rearranging Fields

The versatility of pivot tables lies in their ability to manipulate the structure of the underlying table. By rearranging items and fields, the pivot table can show you the data you need and summarise it using a calculation of your choice.

The pivot table can be displayed in a variety of ways by rearranging the location of the **Column**, **Row** and **Page** fields. This can be done by simply dragging and dropping the field names.



Try it ...

1. Move the cursor over the **UG_PG** field in the page/filter area.
2. Click and hold the left mouse button. Drag the **UG_PG** field to the row area so that the cursor is placed on top of the **Program Career** field name (see example below) then release the mouse button.

Completions	Year	2004	2005	2006	2007	2008
Program Career						
Higher Degree Research		1	2	3	1	4
Postgraduate Coursework		315	402	350	537	698
Undergraduate		60	52	46	40	34
Grand Total		376	456	399	578	736

3. Drag the **Gender Code** field to the right of **UG_PG**.
4. Drag the **UG_PG** field to the left of **Program Career**.
5. Now, drag the **Program Career** up to the page/filter area.
6. Finally, drag the **Cit/Res Group** to the column area, just under the row of years.

Your table should now look like this:

Completions		Year	CitRes Gro		2004		2004 Total	2005		2005 Total
UG_PG	Gender Code		Domestic	International				Domestic	International	
PG	F		474	312		786		570	292	862
	M		461	581		1,042		483	437	920
PG Total			935	893		1,828		1,053	729	1,782
UG	F		1,050	154		1,204		1,092	179	1,271
	M		928	119		1,047		806	137	943
UG Total			1,978	273		2,251		1,898	316	2,214
Grand Total			2,913	1,166		4,079		2,951	1,045	3,996



Try it again ...

Have a play, moving, dragging and selecting specific filters. To reset everything, just close the pivot table without saving, and re-open it.

Sorting the Items

Using the PivotTable Field dialogue box

1. Double-click on the field name you wish to sort. The dialogue box will open.
2. Click the **Advanced...** button.
3. Under **AutoSort Options**, choose either **Ascending** or **Descending**.
4. Click **OK**.
5. Click **OK** to close the dialogue box.

Using Drag and Drop

1. Click on the item name that you want to move (eg, you want to move the year **2007** to the beginning of the table).
2. Using the mouse pointer, point to an edge of the cell (the pointer will change to an arrow).
3. Drag the item to its new location.
4. Release the mouse button when the dotted line appears in the new location.



To be able to manually arrange the items using **Drag and Drop**, you must select **Manual** under the **AutoSort options**.

PivotTable Field Advanced Options

Page field options

- Retrieve external data for all page field items (faster performance)
- Query external data source as you select each page field item (requires less memory)
- Disable pivoting of this field (recommended)

AutoSort options

- Manual (you can drag items to rearrange them)
- Ascending
- Descending
- Data source order

Top 10 AutoShow

- Off
- On

Show: Top 10

Using field: Program Group

Using field: Completions

OK Cancel

5.

Grouping Items in a pivot table



Large numbers of items within a field can be grouped together. This helps to summarise large fields. For example, several ages could be grouped together to make one larger age group.

Try it ...

Open the historical student data file "**Enrolments YYYY to YYYY**" from the following webpage:

<http://unistats.anu.edu.au/Data/Students/DEEWR/>



Make sure the pivot table toolbar is open. If it isn't, click on *View > Toolbars > PivotTable*

Group items in a pivot table

1. Move **Age Group** down into the row area and move **Commencing** back to the field area.
2. Highlight the item names that you would like to group. For this exercise, let's group together all students under 22 years.
3. Position the cursor over the youngest age, click and hold the left mouse button, and drag to highlight all ages up to and including 22 years.
4. Release the mouse button, position the cursor over one of the selected fields. Right click to open the menu and select *Group and Show Detail > Group...*




The new group can be **renamed** by selecting the name and then typing in the new name.

Hide details within a group

1. Left click on the group name.
2. Click on the **Hide Detail**  button in the toolbar

Show all details within a group

1. Click on the group name.
2. Click on the **Show Detail**  button.

Ungroup items in a pivot table

1. Right click on the group name.
2. Click *Group and Show Details > Ungroup...*

**But wait,
there's more!**

This manual only provides the very basics of how to use our pivot tables, and is designed only to get you up and running. There is a range of other useful functions that have not been covered.

Some of the additional features include:

- totalling and subtotalling
- creating calculated fields
- changing the calculation method, eg, generating averages
- formatting data
- creating your own pivot table
- refreshing data
- creating charts

Please email manager.stats@anu.edu.au if you would like to learn more.