Final Project Write Up:

Qualtrics API Data Summary

Executive Summary:

Over fifty students every semester are used as teaching assistants in the Department of Mechanical Engineering at BYU. Because TAs are so crucial to the "ecosystem of learning" in the mechanical engineering department, they have to be rated every semester by their students to make sure that they are performing well enough to be hired again. Students rate their TAs on a myriad of topics, including friendliness in and out of the classroom, their knowledge, the quality of their explanations on tough topics, and professionalism. Students can also give comments on why they answered the survey the way they did. Before another secretary and I came to the department office, these surveys were emailed out to over 1,300 students every semester by hand, through "copy and paste." After the surveys were sent out, the results were collected and then processed by hand, and then the results of each survey were sent to each TA, as well as the TA supervisor. This would take weeks to accomplish. By automating the email process and the data collection and summarization process, this task is now done in a few minutes.

The first program sends every student who had a TA in a Mechanical Engineering class during the semester an email with a link to rate their TA. The next program adds sheets based on the classes that are offered for the semester as a place to put the summarized survey results. The main program talks to Qualtrics through API REST requests. The request downloads raw data from the server and brings it back as a CSV file. The data is downloaded in a temporary file, the program alters and summarizes the data, and then brings the data over to the master spreadsheet. The next program makes the master spreadsheet bring all of the survey results on one page, and then another program emails the results out to each TA. After all 5 programs have been run, the task is complete.

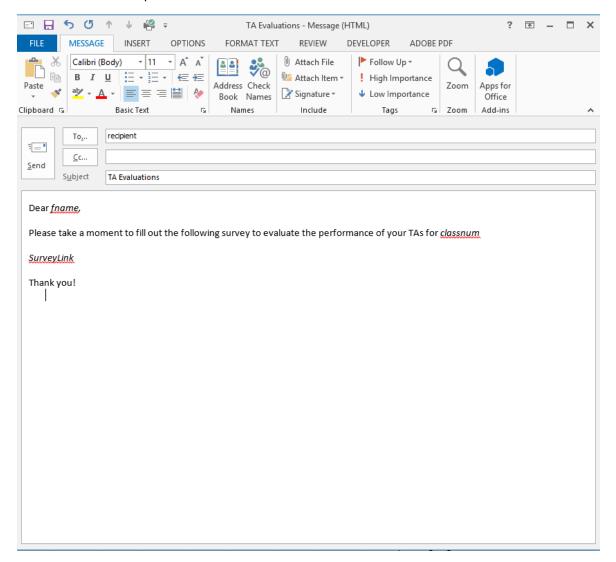
Implementation Documentation:

First things first, the actual documentation given to a secretary that knows nothing about VBA is attached as an appendix. For every little step that needs to be done to complete the entire project, please see the appendix.

This master spreadsheet has 5 new buttons added on a new ribbon that makes the process of gathering and processing the data infinitely easier.

After the names and email addresses of each student and each TA are collected through various means and the surveys have been created (see appendix for details), emails can be sent out to each student through the "SendSurveyLinks" Macro. This macro goes through the "Student Emails" sheet in the master spreadsheet and sends an email to each student in this list. The message is the same for each student, except for the dynamic variables that can change with each student, including the survey link for the class that they're in. The survey link is brought from the "Survey Links" sheet with a VLOOKUP

function and assigned to each student. The macro then interacts with Outlook and then sends each email. (see below) NOTE: If you click the "Send Students Emails" button, it will not send the emails because the Outlook part of the code has been commented out.



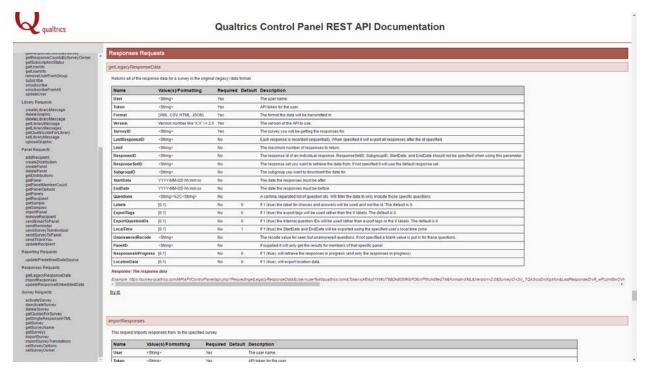
A week after the surveys are sent out, it's time to collect the data from the survey responses. First, sheets need to be added to the master spreadsheet; one for each survey that was sent out to students. These sheets will be used to show the data summarized, but separated by class. Sometimes the professors want to see just their class's TA ratings, so this provides an ease of access for professors. The "Add Sheets" button will run the "addsheets" Macro. This macro adds one sheet after the "Student Emails" sheet with each class's name listed in the "Survey Links" sheet.



(Screenshot of the class tabs added)

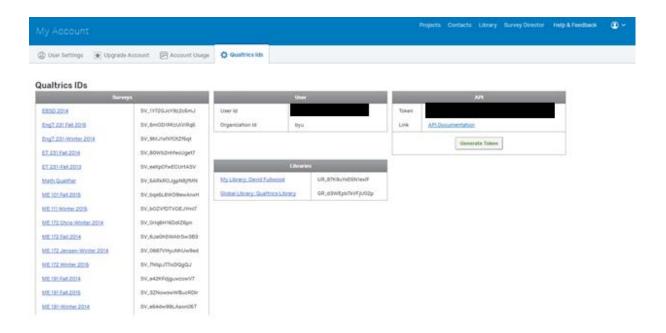
One of the most important processes that have been automated is the gathering of "Legacy Data," or data that has not been processed, from each survey. By doing this, it won't matter how the data is presented by Qualtrics when downloaded; the raw data from each survey can be downloaded through Qualtrics API requests. Any professor at BYU can receive an API token through BYU's IT Qualtrics representative. After receiving this token, it can be used at the following website:

https://az1.qualtrics.com/WRAPI/ControlPanel/docs.php#overview_2.5. This website produces the website query needed to contact Qualtrics' database for the Legacy Data.



(Screenshot of the Qualtrics API website)

To run the request, I also needed the survey ID token for each survey that I would like to process. This can be found on the same page on the user's Qualtrics Account Settings page. By going to the Qualtrics Ids tab, you can find any survey ID and the API token for the account.

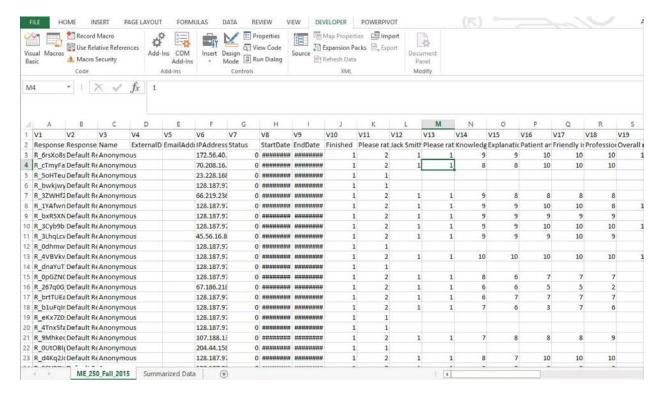


(Screenshot of the list of tokens for each survey and the account)

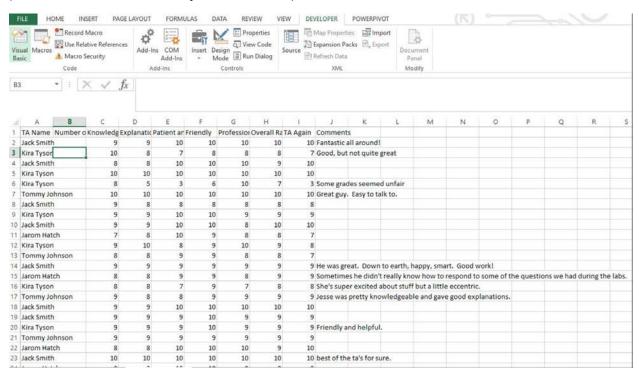
After collecting the data needed to run the API request, a dynamic url can be run, with the survey ID being changed for each class survey data needed.

"https://az1.qualtrics.com//WRAPI/ControlPanel/api.php?API_SELECT=ControlPanel&Version=2.5&Req uest=getLegacyResponseData&User=dfullwood%40byu.edu&Token= &Format=CSV&SurveyID=" & surveyID

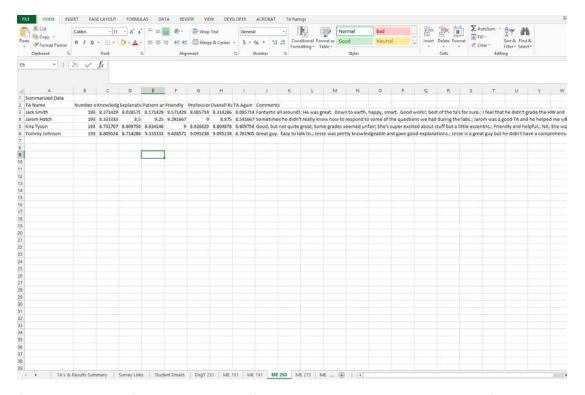
The "Summarize Data" button runs the "gatherData" Macro. By using the class module "agent" given to the VBA class and created by Dr. Allen, we can download the Legacy Data into the same folder that our current master spreadsheet is. Qualtrics will save the data to that csv file every time. The macro will run through the Legacy Response Data and summarize it, and then bring that data over into the master spreadsheet on the correct class sheet. This is done through a rigorous macro that decides first if there is one TA or more than one TA, and then walks through the raw data to summarize it. This macro was the one that took me the longest to write, because of the intricate details, including if no responses are given for a survey, or if the survey was finished or not. This process was done through many nested loops and if statements. NOTE: These surveys that my project refers to have been deleted by another secretary who is working on the current semester's TA Ratings surveys, so please don't try to run it.



(How the data looks when it is first downloaded)

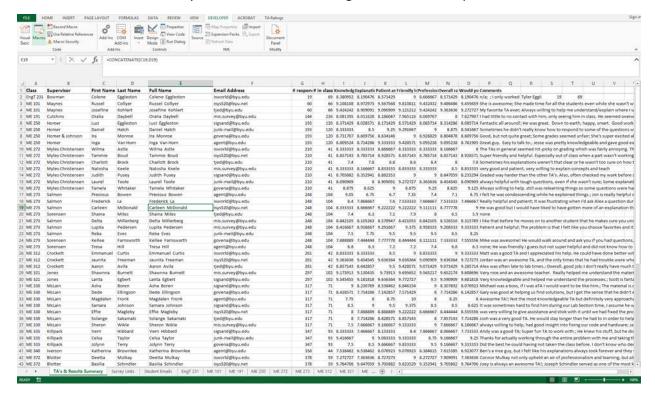


(Summarized legacy data in the temporary file)



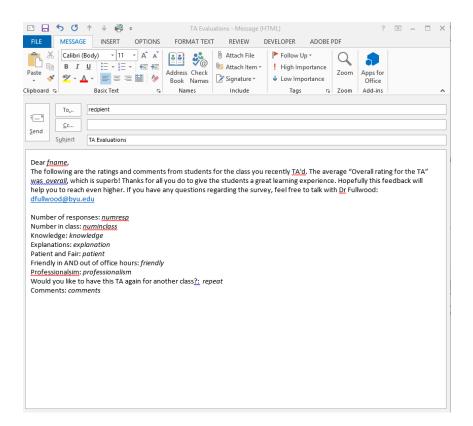
(Summarized data from the temporary file brought into the master spreadsheet)

To collect all of the summarized data and place it in one spreadsheet ("TA's & Results Summary"), the "Build Summary Sheet" button is used. This button runs the "getresultssummary" Macro. This macro walks through each class sheet and grabs the appropriate data and places it next to the TA's name and email address in the summary sheet. This is done through a few nested loops.



(The summarized data all on one page)

The final button, "Send TA Emails" will run the "ResultsToTAs" Macro. This macro is similar to the "SendSurveyLinks" Macro, because it pulls data from the summary spreadsheet and emails it to the corresponding TA by interacting with Outlook. (see below) NOTE: If you click the "Send TA Emails" button, it will not send the emails because the Outlook part of the code has been commented out.



Discussion of learning and conceptual difficulties encountered:

I learned a lot from this project. I have never worked with an API before, and I actually finished the project before integrating the API access, but then I added the API, after much difficulty, which actually makes the process much easier and streamlined now. I wanted to also include the automation of accessing the BYU AIM database, but my boss did not want me to have that much "power" loaded into a program. Because I personally do not have access, and only my boss does, there was no way for me to create the automation without the access to AIM.

Another difficulty I encountered was when a TA was listed on a survey but absolutely no student rated them. I had to create a way to work around an unknown error. On the class sheet where the TA is, a "No responses given" value is given to those cells. However, the summarizer tried to divide that string by a number of responses, which is where the error came from. After a lot of thought, I found a way to work around it. I decided to make an IF statement where the cell was evaluated. If the value of the cells was "No responses given", the summarizer would place zeros in the summary page instead. If the professors

wanted to take a closer look at why the student received zeros, they could go to the class page where they could see that the TA didn't receive any responses.

Assistance:

The only assistance I received with this project was from a former student of Dr. Allen, Jessica Peterson. She knew how to get an API token from Qualtrics through BYU. I also made sure I was going through the process correctly through BYU's Qualtrics supervisor, Larry Seawright. Professor Allen also helped me understand the class module created for our class, "Agent". The agent allowed me to save files directly from the Qualtrics website. I would not have been able to work with the Qualtrics API without everyone's help.



TA Ratings is a responsibility assigned by the MEDeptSec to a FOSec each Fall and Winter semester.

PURPOSE: To gather student feedback on student TA performance so that the "Best TA" prizes can be awarded each year.

OVERVIEW AND TIMELINES

Student feedback on the performance of TAs for their classes is gathered at the end of Fall and Winter semesters. TA Ratings Preparation is on the MEDeptSec November checklist.

- 1. **Touch base with responsible faculty member (March and November):** This is currently Professor David Fullwood. Check to see if there are any changes in the process or usual timeline.
- 2. Confirm list of current TAs (by mid March & November):
 - a. **Run a current** *Employees Report*; export to an excel spreadsheet. Delete all non-TA employees and sort by supervisor. Delete unneeded columns and send a screen snip of current TAs to each supervisor to confirm that these are current TAs for their classes. Ask faculty to correct the list (if needed) and return to you.
 - b. Update current semester TA Application (Responses): Update the first worksheet as needed.
- 3. Assign FOSEC to carry out the FOSEC procedures below.
- 4. Save work in Projects Folder: Save documents in J:mesec/Projects/Fullwood/TA Ratings/[Semester].

1. CREATE SPREADSHEET WITH ALL CURRENT TA NAMES

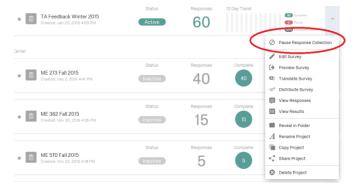
- 1. Use the template provided and save it in the correct folder:
 - a. Find the Excel Macro named Student TA Ratings Template in the following folder: J:groups/mesec/PROJECTS/Fullwood/TA Ratings.
 - b. Open the file and save it in the current semester folder with the name updated to current semester. File name should look like this <u>Winter 2015 Survey Responses.xlsm</u>.
 NOTE: Make sure the spreadsheet is saved as a macro-enabled workbook (.xlsm, not .xlsx).
- 2. Use the template provided and start on the "TA's & Results Summary" sheet.
- 3. **Fill in information on columns A, B, C, D, and F:** Get the information from the current semester's <u>GoogleDoc TA/Grader Applications.</u> **NOTE:** Column E is calculated.

4. **Go to the "Survey Links" sheet and make sure each class is listed once on this sheet in column A (in alphabetical and numerical order).** Information for the "Survey Links" sheet will be populated based on information entered on the "TA's & Results Summary" sheet. Column D content will be added in the next step *Create a Qualtrics Survey*.

1	Α	В	С	D
1	Class	# of Students	# of TAs	Link
2	EngT 231	69	1	https://byu.az1.qualtrics.com/SE/?SID=SV_6mOD1RKzUiViRq5
3	ME 101	66	2	https://byu.az1.qualtrics.com/SE/?SID=SV_bqs5L6WD9ewAnxH
4	ME 191	236	1	https://byu.az1.qualtrics.com/SE/?SID=SV_3ZNowswWBucRDIr
5	ME 250	120	4	https://byu.az1.qualtrics.com/SE/?SID=SV_bgcEAYuJKRkXsxL
6	ME 272	41	7	https://byu.az1.qualtrics.com/SE/?SID=SV_8w6TMwfHB5AQLAN
7	ME 273	104	9	https://byu.az1.qualtrics.com/SE/?SID=SV_8dgFy1IZl0brNNH
8	ME 312	42	3	https://byu.az1.qualtrics.com/SE/?SID=SV 1zRK35dq92QQvGt
9	ME 321	102	2	https://byu.az1.qualtrics.com/SE/?SID=SV 06f4lQuM5HCy5BH
10	ME 330	71	7	https://byu.az1.qualtrics.com/SE/?SID=SV 7Xaedwma12H5fUh
11	ME 335	93	3	https://byu.az1.qualtrics.com/SE/?SID=SV_cZIGvX6cia27YGx
12	ME 340	44	1	https://byu.az1.qualtrics.com/SE/?SID=SV 1yJ63bZGHFMJ0ln
13	ME 372	59	3	https://byu.az1.qualtrics.com/SE/?SID=SV_7UiPCdJFSCLBJDT
14	ME 382	39	6	https://byu.az1.qualtrics.com/SE/?SID=SV_02HbsGdMQZsbg1v
15	ME 393	18	1	https://byu.az1.qualtrics.com/SE/?SID=SV_e5xPIpoY76qVCsJ
16	ME 412	25	1	https://byu.az1.qualtrics.com/SE/?SID=SV_8hT1A9BofEKCpPT
17	ME 425	37	2	https://byu.az1.qualtrics.com/SE/?SID=SV_0VrmEnjcRysfnUN
18	ME 486	30	1	https://byu.az1.qualtrics.com/SE/?SID=SV_cSBE4ojC9LZbdT7
19	ME 497R	7	2	https://byu.az1.qualtrics.com/SE/?SID=SV_eqRcSOxFkS9PNZz
20	ME 500	20	1	https://byu.az1.qualtrics.com/SE/?SID=SV_bJUony1i9dOvny5
21	ME 505	20	1	https://byu.az1.qualtrics.com/SE/?SID=SV_8qXtdaN8TZbUzEp
22	ME 510	12	1	https://byu.az1.qualtrics.com/SE/?SID=SV_0SrmJ7wMbcH0pgN
23	ME 512	8	1	https://byu.az1.qualtrics.com/SE/?SID=SV_b7cyltJe1CVXxvD
24	ME 538	23	2	https://byu.az1.qualtrics.com/SE/?SID=SV a9tjXsAnsV8ut01
25	ME 552	18	1	https://byu.az1.qualtrics.com/SE/?SID=SV_bC71whNcfO0JhFr
26	ME 555	33	1	https://byu.az1.qualtrics.com/SE/?SID=SV 6DwedMm8ASgt349
27	ME 570	15	1	https://byu.az1.qualtrics.com/SE/?SID=SV e4ix718xj6lng8t

2. CREATE A QUALTRICS SURVEY FOR EACH CLASS

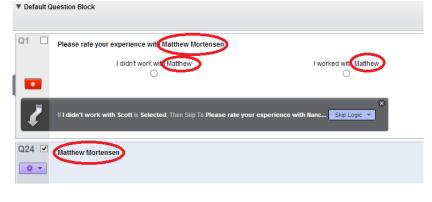
- 1. Log into <u>www.qualtrics.com</u> . User name: Password:
- 2. **Deactivate old surveys if needed:** There should be a series of active projects titled "TA Rating Template X TAs". Do NOT delete these. These are the templates you will copy. If there are surveys with a previous semester in the title with responses collected, delete those.
 - a. To deactivate old surveys from previous semesters (should be named "ME (class number) Fall/Winter (year)")
 - i. Click the arrow at the far right of the survey you'd like to deactivate (see picture below)
 - ii. Select "Pause Response Collection"
 - iii. Select "Allow all active survey sessions to be finished" and then select "Pause Response Collection".



- 3. Create new surveys for each class:
 - a. >Create Project >From Library
 - b. From drop down menu, select library >David Fullwood
 - **c.** From the Source Project drop down menu, select a TA Rating Template with the number of TAs for a particular class.

- **d.** Fill in Project Name in this pattern for each class (put the correct name of class, semester, and year): ME 250 Fall 2013.
- e. Select folder >TA Evaluations from the drop down menu.
- f. Click >Create Project
- 4. Edit each class survey with the names of the current TAs: Qualtrics should be on Edit Survey tab. If not, click >Edit Survey. Change the TA name(s) IN 4 PLACES to the names of the actual TAs for the semester. If there are multiple TAs in the class, scroll to the next TA and change the name until the names for all TAs in the class are correct. DOUBLE CHECK ACCURACY!!!

NOTE: If there is only one TA, there are only 2 spots to change the name.



Note: Make sure to put TA names in order on the quiz as they are in the spreadsheet.

5. Click > Distributions Tab:

- a. Select >email then, under "use your own email system" click >Get a single reusable link. (see below for example)
- b. Open the TA Ratings spreadsheet and select the "Survey Links" sheet. Paste in the survey link in Column D for all the TAs in each class. Do not fill in Columns B and C as those cells are calculated.
- c. NOTE: For columns B and C to be calculated correctly, the formulas in those cells need to be correct.
 - i. The formula for column B is:

=COUNTIF('Student Emails'!\$A\$2:\$A\$1353,'Survey Links'!A2)

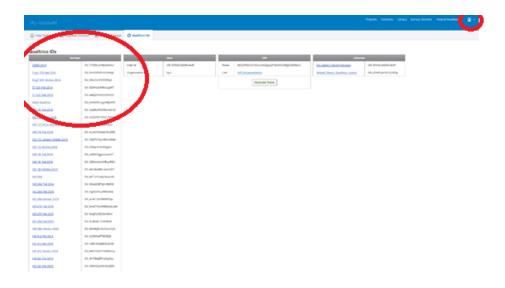
Be sure to make sure that the number associated with the second cell reference in "Student Emails", "\$A\$2:\$A\$______", is the last row that has student data on it in the "Student Emails" sheet. If you need to change this formula, make sure to change it for the first class in the list and then copy the new formula all the way down to every class's row until the last one.

ii. The formula for column C is:

=COUNTIF('TA''s & Results Summary'!\$A\$2:\$A\$67,'Survey Links'!A2)

Be sure to make sure that the number associated with the second cell reference in "TA"s & Results Summary", "\$A\$2:\$A\$______", is the last row that has TA data on it in the "TA"s & Results Summary" sheet. If you need to change this formula, make sure to change it for the first class in the list and then copy the new formula all the way down to every class's row until the last one

- 6. **Copy the Qualtrics Token for each survey into the spreadsheet.** The token for each survey can all be found on the same page.
 - a. Log into Qualtrics and then go to the upper right hand corner where a little silhouette and a down arrow are (see below).
 - b. Click on "Account Settings...". Click the "Qualtrics Ids" tab on the top of the left side of the screen, and that is where the list of IDs for each survey is.
 - c. Find the name of the survey on the left side of the table and copy the corresponding token from the right side. Paste the token into the "Survey Links" sheet of the master spreadsheet in the correct cell in column E.





3. PREPARE TO SEND THE SURVEY TO STUDENTS

Do this a week before the planned date to send the surveys out to students.

- 1. Within the master spreadsheet, update the sheet "Student Emails". Have MEDeptSec log you into CLS04 on AIM (class rolls). NOTE: Be sure to check all sections for each class. Export the excel roll for each class and copy/paste the information into Columns A, B and F. Use the feature Data>Text to Columns (see below) to split the student names into columns C, D, and E. Note that Column G "Survey Link" will auto populate based on the class in column A.
- 2. NOTE: For the survey link to auto populate, the formula in column G needs to be correct. The VLookup function is being used, and relies on the list of survey links on the "Survey Links" sheet. The formula looks like this:

=VLOOKUP(\$A75, 'Survey Links'!\$A\$1:\$D\$27,4,FALSE)

The reference to the Survey Links is crucial. Make sure that the reference includes every row used on the sheet. Make sure to have this number, "\$D\$____", correspond to the last row used on the Survey Links sheet. If you need to change this formula, make sure to change it for the first student in the list and then copy the new formula all the way down to every student's row until the last one.

- **a.** How to use the Text to Columns. NOTE: It will not look very pretty until the end result.
 - i. Insert at least 6 new columns to the right of column B.
 - ii. Select every cell from B2 to the last student in the list (only the B column cells).

- iii. Go to the Data ribbon, and select "Text to Columns" under the Data Tools section of the ribbon.
- iv. Select the Delimited option
- v. Deselect every "delimiter" and then select the Space option. Once selecting that option, the preview below will show the names split into last name, first name, and then middle names (there might be more than one). Click Next.
- vi. The column data format should be general, and the destination should start in C2, the newly created columns. Click finish. **NOTE:** If there is an error that pops up that says that there is already data in the cells, you must quit the text to columns wizard, add another column, and then repeat the process starting at step 2.
- vii. Column C can now be labeled "LName" for last name, D is now "FName", and E is now "MName". All other columns with extra middle names can be deleted.
- 3. Take a sample of the students and make sure that the correct link for the survey is in column G: click on the "Check Links" button on the "Survey Links" page to make sure the survey links will be distributed to the correct students. After clicking the button, return to the "Student Emails" page and scroll through to see if any cells in column A are highlighted in red. If they are, that means the wrong link is attached to the student, so the formula in step 2 needs to be adjusted. After fixing the formula, make sure all the cells in the "Student Emails" page have no fill, and then click the "Check Links" button again.

4 GENERATE THE SURVEY EMAILS TO ALL STUDENTS

The surveys should be sent out to students the week before finals begin. Try to send them all out on the same day if possible.

The button "Send Student Emails" will send the emails to all students in the "Student Emails" sheet. Make sure to press that button AFTER making sure everything is correct and ready to go.

5. DOWNLOAD SURVEY RESULTS

- 1. **Create a results sheet for each class**. On the master spreadsheet, click the "Add Sheets" button on the "TA Ratings" ribbon.
- 2. **Download responses and summarize**. On the master spreadsheet, click the "Summarize Data" button. This will download the survey responses and summarize them on the corresponding class's sheet.
- 3. **Collect summarized data**. On the master spreadsheet, click the "Build Summary Sheet" button. This builds the "TA's & Results Summary" sheet with the summarized data all in one place.

6. SEND DATA TO EACH TA.

Send results to TAs. The results need to be sent to the TAs, so now, after making sure all the data looks good in the "TA's & Results Summary" sheet, click the "Send TAs Emails" button. This will send an email to each TA with their survey results for each class.

SEND DATA RESULTS TO DR. FULLWOOD

- 1. Use the template provided and save it in the correct folder:
 - a. Find the Excel Macro named Student TA Ratings Result Summary Template in the following folder: J:groups/mesec/PROJECTS/Fullwood/TA Ratings.
 - b. Open the file and save it in the current semester folder with the name updated to current semester. File name should look like this *Winter 2015 TA Ratings Results Summary.xlsm*.
- 2. Copy and paste all the data from the "TA's & Results Summary" sheet in the master spreadsheet. Paste it into the first sheet of the Summary spreadsheet. Send this spreadsheet to the responsible faculty member with a note about how all results have been sent to each TA. He will use this data for a variety of things, including the Outstanding TA Awards.