Database Redesign for STEM Academy

Midterm Progress Report

by JEM

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Abstract

STEM Academy requires a database system to collect survey data for assessment, in order to determine their impacts on the respective participants. This will allow easy access to information that can be used to apply for funding for continued growth of the program. This paper contains our journey from the start of Winter 2018 up till now.

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1 Introduction

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

In this document, we will be talking about the purpose and goals of the project. We will also be talking about where we are on the project currently and what were the problems we faced in this term so far, and also how we overcame the problems we faced during this term.

2 Purpose

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

Stem Academy requires a survey system to collect survey data for assessment of their program, determining their impacts on the respective participants. This will allow them to have an easy access to information that can be used for applying towards getting funds. Our team will be working on improving the database system with the help of a survey software called Qualtrics. We will be testing different tools which would allow us to distribute surveys, collect responses and generate reports, and hopefully meet all of the requirements of our clients. The purpose of this document is to present what we worked on since the last term up to now.

3 Goals

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

Our goal is to provide our clients with the following-
-A system that allows them to add surveys without going through adding and replacing CSV files.
-Allows students to change their answers.
-Allow our clients to make changes in the survey if the students submitted wrong information.
-Allow the database to create graphs and reports.
-Allow our clients to merge similar questions from different surveys.
-Allow our clients to make import and export survey data.
-To make an extra tab on the STEM ACADEMY website to add about impacts about their programs.

4 Current Stage of the Project

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

After the first term, we knew about what our project is and what goals we need to achieve. The original main task was to redesign the previous database system and the data solutions website developed by previous capstone team to make it functional and add some new features. However, the clients wanted us to evaluate the database before going ahead

with it. Thus, we just evaluated the website by browsing the interface of website. We think it is not good enough and the previous team also suggested our client to use other solutions, like the existing survey software, Scantron, etc. Also, our client is open to new solutions. Thus, we did much research for our client. And we found that Qualtrics could be our best choice. Our client approved our solution and we started to research on Qualtrics. We began to learn how to use it as a new user because none of our group members used Qualtrics before, except taking survey via Qualtrics. The process of learning how to use Qualtrics is also the process of figuring out if it can meet our client's requirements. We looked through the functions of Qualtrics roughly and knew about what Qualtrics can do for us. Then, we started by creating a blank survey and added some survey questions from our client (We added some random questions before to test.)

Qualtrics allows users to add many kinds of questions, including multiple choices, drill down, side by side, etc. We also found that we can import the previous surveys as a template. Qualtrics also allows users to change how the surveys look like. The best feature is that the survey creators are allowed to demo surveys automatically to get as many responses as they want which means you do not need to worry about not getting enough data for testing. After creating, we asked some friends to take our survey to test more.

Qualtrics can distribute survey via email, website, QR code, etc. The most logical medium of distribution for our clients would be to generate an anonymous link, which takes us to the survey directly without tracking our identifying information. For this medium of distribution, however, our clients were worried about the length of the website address. They feel the anonymous link is too long. We found that we could use Google URL Shortener to solve this problem. Google URL Shortener can shorten the website URL and be accessed by anyone. We got enough responses so we could test the data section based on the requirements of our client. We tried to edit data, though our client does not require it. But it can avoid the case that if some participants submitted wrong answers and someone took wrong surveys. We figured out that Qualtrics allows us to modify, add, and delete data. Whats more, we can also export/import data via a file. That means we can merge the responses from two identical surveys. We tried to merge responses from two different surveys, but it did not work well. We found a way to merge two different surveys. But it just tried to revise one of the surveys to make them identical. Next, it just followed the same ways of merging two identical surveys. Therefore, it is not useful. We gave it up and are trying to find other better ways. After collecting responses, we can generate a standard report including graphs via Qualtrics. We can add filter to determine what are included in the report. We also can change the style of statics and graph. There are many options of visualization. We compare the data we got from the report with the data from our client. They are same which means the results in Qualtrics are correct. Furthermore, it also contains more scientific statistics, like maximum / minimum value, standard deviation, average, and the number of respondents and responses.

The clients asked us to survey a sample data which they provided us with. The sample data were questions and responses from the pre-camp and post-camp surveys of a previous camp. They wanted us to test out some functions like merging the data, comparing changes in responses to similar questions from pre-camp and post-camp surveys after the camp, and generating different types of graphs and reports. We created the survey in Qualtrics using the provided

data and tested out the functions and report generation mechanisms, and demonstrated them to our clients. They want to know if it can be possible to merge and compare reports of several surveys from past years, which we are currently working on.

Besides these, we decided to make a tutorial which is designed for our client. They will not have much time to learn how to use Qualtrics and figure out what Qualtrics can do for them on their own, considering they are always busy with programs. This tutorial can lead them to use Qualtrics step by step. They could solve most of problems they could meet in the future when using Qualtrics. We are still working on this special tutorial because we want to make our clients more comfortable with Qualtrics and make it easier for them to use the software.

5 Project Future

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

Our team needs to work on the following things for the rest of the term:

-A tutorial: This tutorial would be for our clients which will illustrate the functionalities of Qualtrics like how to merge similar questions, make reports and how to create graphs. It would also include a step by step walkthrough for how to generate surveys. Our tutorial would also be helpful to them in how to distribute and check the responses to the survey. It will also allow them to come back and forth to the tutorial and use Qualtrics as it would appear in the PDF version.

-We need to test how to merge Qualtrics reports, such that it allows us to compare the statistics of similar questions from separate camp surveys.

-We need to find a way to compare the data of different years. For example, our clients want to create a report of different years and compare them in order to find out how much impact have they brought.

-We are also going to create a new tab on the STEM Academy website which brings up a page outlining impacts of their program. This will tie into the research we have done to determine the best methodology to get this information.

6 Problems that impeded our progress, and Solutions

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

There were different kinds of problems (some of them also have solutions) that we faced in our progress. Some of them are as follows:

-Merging different reports: We tried to merge reports of separate surveys but it requires us to map the answer options from each question of one survey to that of the other, and it is only possible if the surveys have identical questions. A

possible solution to this is to open the responses of the surveys separately in two different browser windows, apply filters to the surveys for specific types of questions and participants and comparing the reports (e.g. checking what percentage of all females responded to a specific question from the post-camp surveys differently from what they answered in the pre-camp survey). However, like our clients said, this solution will not work for comparing several surveys from past years. A possible solution to this could be to filter the specific results of the surveys we want to compare and export in a CSV, and import all the results into Qualtrics or some other software that can generate a report from the data and help us compare them. Our clients also mentioned they can make identical questions for both the pre and post survey so they can merge the reports directly in Qualtrics. For example, they can make the same questions for every post-camp survey so that the reports from all the post-survey questions can be merged and compared. We still need to test this out properly.

-Need more work to present: Our TA suggested we should ask for more work from our clients which we can present in Expo on our poster and progress report. We decided to redesign the stem academy website. After discussing this with our clients they did not want us to redesign the website as they like the website how it currently is. So instead of redesigning the website, the clients asked us to add an extra tab on the website. This tab would contain information about the impact of their programs and possibly also a link to a common survey. The web page could include graphs and reports, for example, for a question like ”How has this program helped you know more about STEM?”, the report would be on this tab so it allows new participants to make an assumption, and be interested to attend the camps. Also, this tab will have something like a subscription bar which would allow users to subscribe to get notifications about different programs being promoted, sponsored or hosted by STEM Academy. So we will also be implementing this tab for our research.

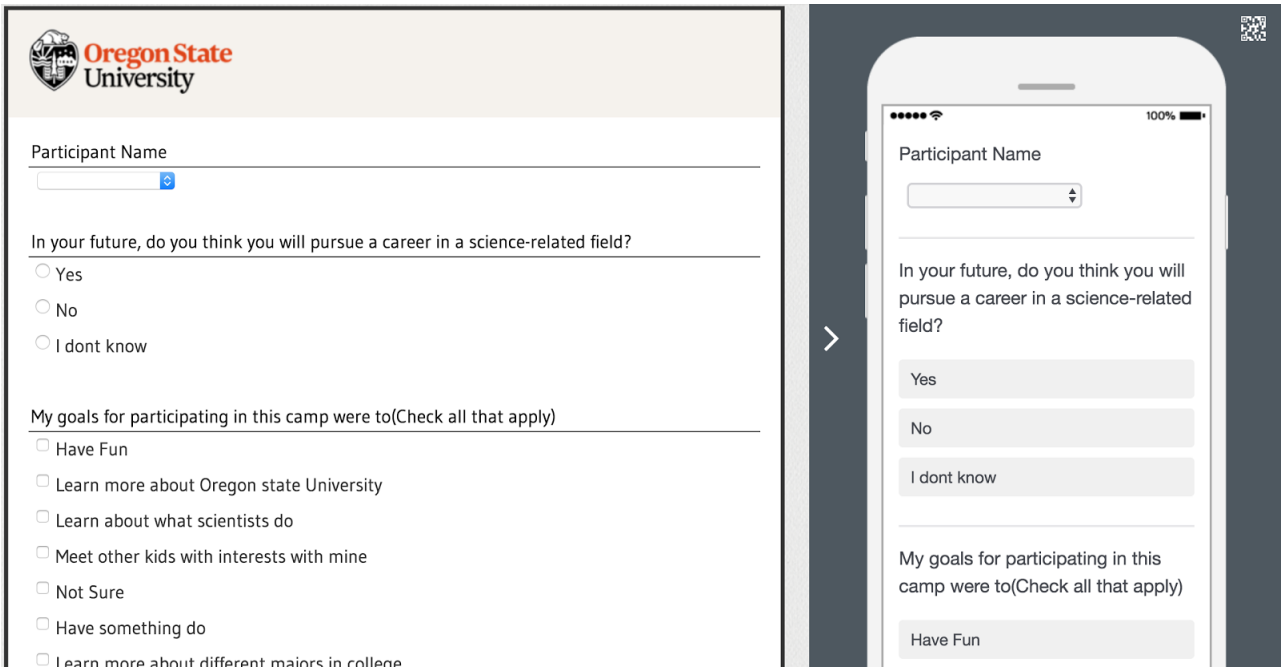
-Access to code: As suggested by our clients we will be making an extra tab for the website which would contain information about the impacts of their programs. To do this we are still waiting for access to the code for the website. Our clients mentioned it will take time getting access to the website code through CN. We are working on a paper prototype for the extra tab. Also, our clients mentioned they will discuss this extra tab at our next meeting. This problem is the one we are still facing as we are waiting for further discussion with our clients regarding the tab and also getting access to website code files through CN.

7 Project Images and Findings

(Jiaxu Li, Munisha Prakash Parikh and Ehmar Khan)

Static Content	Descriptive Text	Graphic
Standard Questions	Multiple Choice	Matrix Table
	Text Entry	Slider
	Rank Order	Side by Side
Specialty Questions	Constant Sum	Pick, Group, and Rank
	Hot Spot	Heat Map
	Graphic Slider	Gap Analysis
	Drill Down	Net Promoter Score®
	Highlight	Signature
Advanced	Timing	Meta Info Question
	File Upload	Screen Capture
	Captcha Verification	
Replace From Library	Question Library	

This shows what type of questions users can add in a survey. Qualtrics is really a powerful survey software. It includes different types of questions like text entry, multiple choice questions, rank order, side by side etc. These are the most basic types of questions a user can add with the help of qualtrics. Also complicated questions like timing, highlight, constant sum can be added to make the survey more interesting. We tested the sample surveys with standard questions.

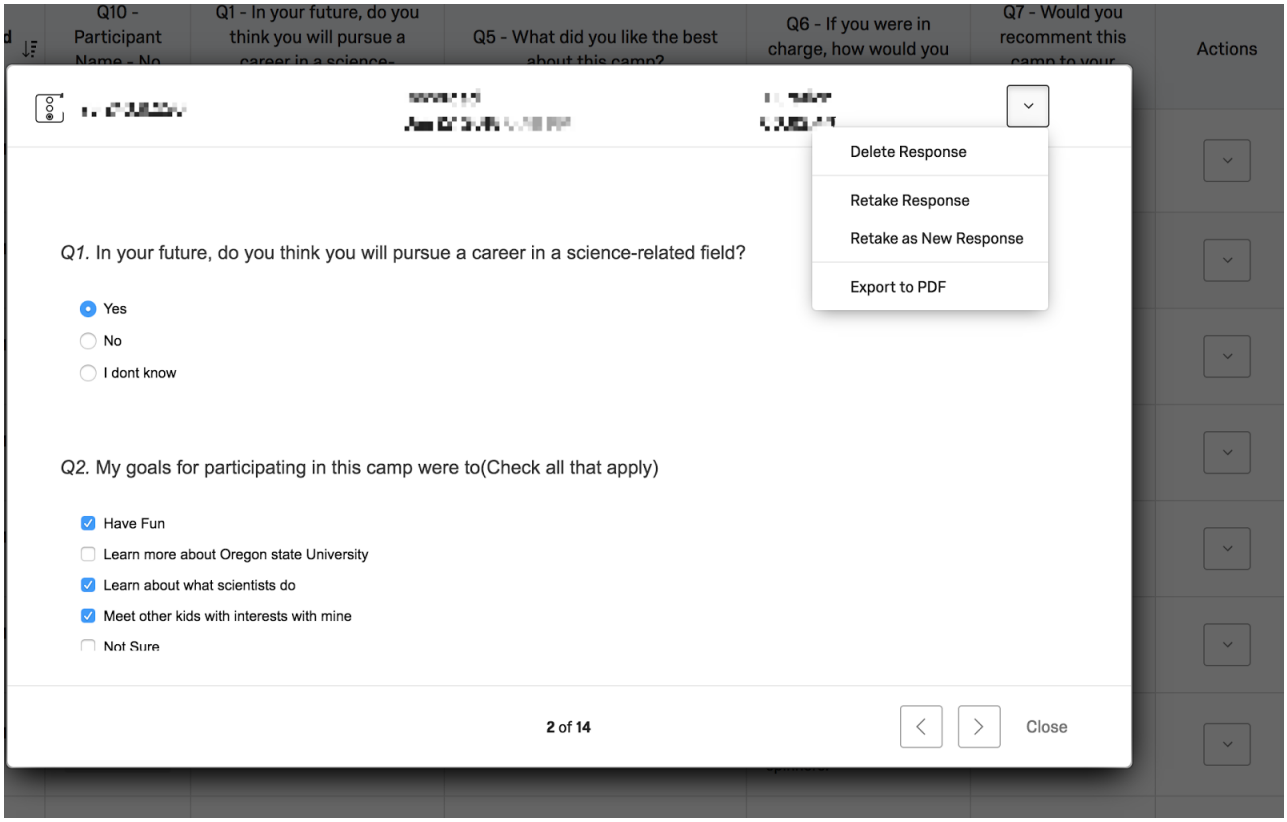


The above screen shot is how our survey looks like. It is very convenient as it can be taken on desktop or mobile devices. Also we have added a drop down list with names of all participants which allows the participants to select name from the drop down list and not type different names they go by. This would make it easier for our clients if they want to search a specific person as the names would be specified in the excel sheet which would be uploaded via CSV files. Also there are questions where multiple answers can be selected and unselected, as there was one specific problem with the last teams work– the participants could not deselect something they had already selected. So that is solved.

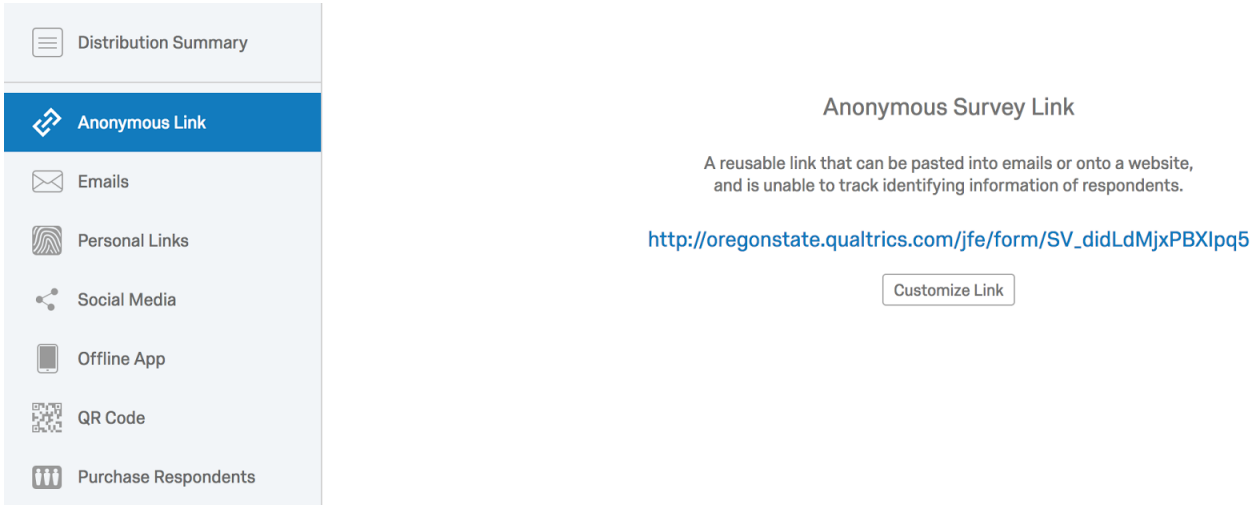
Q10 - Participant Name - No Name	Q1 - In your future, do you think you will pursue a career in a science-related...	Q5 - What did you like the best about this camp?	Q6 - If you were in charge, how would you change the camp?	Q7 - Would you recommend this camp to your friends ?	Actions
Morgan Young	Yes	I liked doing experiments in the lab since I don't get to do those things in school.	I liked the camp how it was.	Yes	
Emma Yonemura*	Yes	Making new friends and the elephant toothpaste! :D	In no way		
Max Solensky	Yes	The instructors, they were very funny.	More diverse group		
Kayna Smith	I dont know	The experiment and tools I don't usually use.	Make the camp longer.	Yes	
Colin Smith	I dont know	Snack time.	More snacks.	Yes	
Olwyn Reed	I dont know	I liked the experiments and all the chemicals.	I would change the pickup/drop off spot.	No	
Madigan Rear	I dont know	Meeting new people and learning about science.	I'm not sure, I probably wouldn't give out fidget spinners.	Yes	

View Response
Delete Response
Retake Response
Retake as New Response
Export to PDF

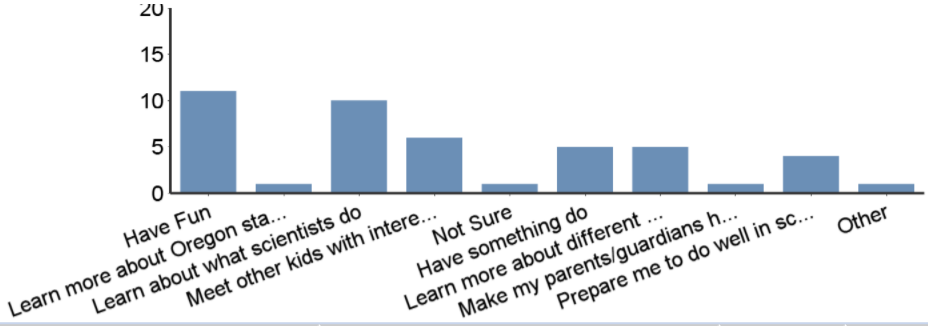
These data are collected from survey takers. This can be found under the data and analysis tab, and filters can be applied to look for specific participants or responses to specific types of questions. Survey administors are allowed to edit the data, like delete, add and change existing data. Also they can also export the data to PDF which would allow the survey administrators to keep a track of the response if they wanted to.



One of the problems previously in the requirement document used to be that they can not fix or edit responses of their participants. The previous database system did not allow them edit or delete response. But now our Survey administrators can read all of the responses collected from one person and edit responses if necessary.



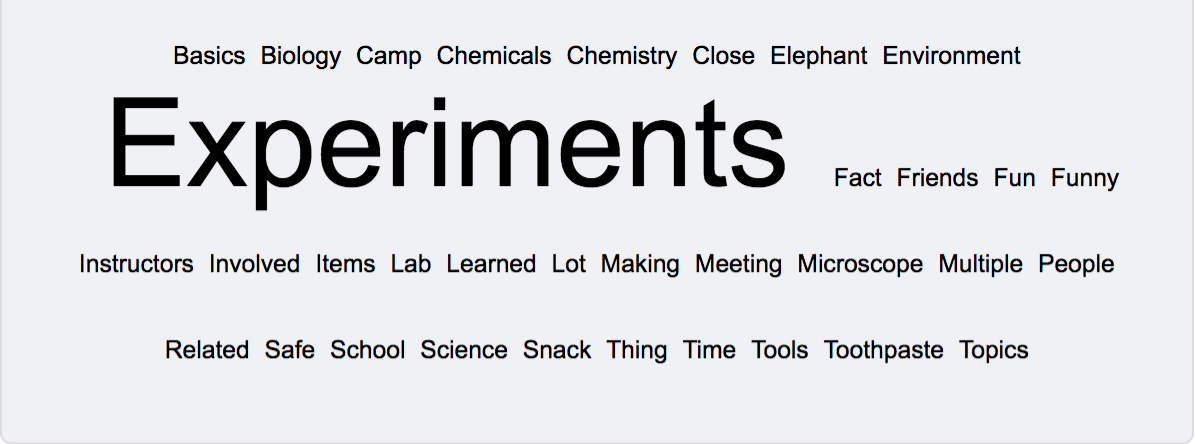
This is how Qualtrics can distribute the survey to participants. The most appropriate medium for our clients would be generate an anonymous link which takes the participants directly to the survey, without tracking identifying information of the respondents. Other methods of survey distribution are through Emails, Personal Links, Social Media, Offline App, QR Code, and by purchasing respondents.



#	Answer	Bar	Response	%
1	Have Fun		11	78.57%
	Other			
	I like science, so I did this camp to pursue that			
4	Meet other kids with interests with mine		6	42.86%
5	Not Sure		1	7.14%
6	Have something do		5	35.71%
7	Learn more about different majors in college		5	35.71%
8	Make my parents/guardians happy		1	7.14%
9	Prepare me to do well in school		4	28.57%

Min Value	Max Value	Average Value	Variance	Standard Deviation	Total Responses	Total Respondents
1	10	4.24	7.46	2.73	45	14

This is one of the questions of survey in report. The report is very professional and gives all the required answers. It contains many scientific statistics, e.g. the percentage of selections for each answer option, including maximum / minimum value, average, variance, standard deviation, and the total number of responses and respondents.



Text Entry
The instructors, they were very funny.
The experiment and tools I don't usually use.
The fact that we were in the lab most of the time.
Many of the experiments were fun and I learned a lot so that was the best thing about camp.
I liked the experiments and all the chemicals.
Meeting new people and learning about science.
Snack time.
I liked experimenting with chemicals in a safe environment and looking at items close up with a microscope.
I liked how you could experiment outside the basics.
Making new friends and the elephant toothpaste! :D
View More

We found this to be one of the most interesting aspects of Qualtrics survey software. This tool allows us to extract the most used words from different responses.This is pretty interesting, as we can see the most used words in a larger font than others. This can also help the clients determine what the most used words by the participants are, and help them summarize the feedback on their programs.