

Spear Education - Group Project Final Paper

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# Introduction of the Team

Our team had the opportunity to work with Spear Education and conduct a data analysis project for them. Spear Education is a dental education company with customers in the USA, Mexico, and Canada. It is a privately-funded equity which can also be thought of as the “Netflix of Dentistry.” Spear provides learning material to dentists who need to continue with their education in order to keep practicing. Over the last five years, the company’s focus has shifted to making dentists better at their job, and, in order for it to achieve this, Spear Education has also created programs that have brought dentists together to have collaborative meetings so that they can learn, meet community members, cross-pollinate (especially, specialized dentists).

Spear has three product types:

1. Spear Online - It provides online educational materials to practicing dentists.
2. Study Club - It is a platform where dentists get the opportunity to get together with peers and talk about the trials of being a dentist. Customers build relationships with fellow dentists by talking to and learning from them. These club meetings are run by specialists who participate in these to push business back to themselves.
3. Faculty Club - The members of this club enjoy all the benefits of the other two Spear products and additional ones.

# Our Problem

The problem that we addressed through this project was the difference in usage of the three Spear products. Some of the questions that we tried to answer with our analysis are:

1. Are different products popular in different cities and states?
2. Which is overall the most popular of the three products?
3. Why are some products liked more than others?
4. Which product has the most membership?

## Data Sources and Analytical Techniques

The data sources for our analysis were limited in some ways, but they included dates of accounts when they were created and how active those accounts have been since their creation. These rows came from a data set that was given to us by Spear, mostly coming from the customer table that was kept in their OneDrive. We also had access to some of these records in a SQL database where specific access dates for accounts could also be found. Rows of data could be aligned within Excel or joined within SQL via the `customer_internal_id`, a five-to-eight-digit identifier that gives each account its own record stamp. While the Pendo platform was brought to our attention by Spear early in the project development, the data sets to pull from it were not important to include from our analysis since most of them were survey data that did not apply to a certain Spear product specifically. The analysis of our data was kept in Excel and Tableau since our analytical scope for this project was kept relatively thin.

## Discussions with Clients

Our goal entering the project was to run a cluster analysis on our three highlighted product types to determine individual characteristics about each of them that could pertain to future users if the products were modified correctly. After realizing the data sets available did not go in depth at this level, we realized our analytical techniques would have to change drastically. While they were certainly not as technically advanced as we have worked with in the past, we created a slew of statistical summary tables (pivot tables, etc.) as well as some visualizations that better explain the findings from those tables. Through our group meetings with Spear, we were able to expand the scope of the data available, including sets that explicitly mentioned the products we are analyzing. Tristan, a member of Spear who assisted in directing most of the meetings we had with the company, mentioned she liked the idea of a cluster analysis, but agreed that the data available was better suited for other types of analysis. In talks with other groups, there were some other sources found that were related to the dentistry field in some way, but we chose not to include any of them in our analysis since none of them included the Spear product data that we were supposed to be looking at.

# Challenges We Faced

One of the largest problems that we experienced as a group during this project was the scarcity of the data that we were given. Most prominently, we received only a small amount of data specifically surrounding the products. Rather, we had much more data surrounding the customers than information regarding the products that customers purchased. This caused our project goals to change slightly, by doing more analysis on the customers' information to make judgments about the kinds of products they purchased as opposed to the products themselves.

Next, we also had some issues with the widespread sources of data. Because some sets were on Pendo, others in Excel spreadsheets, and even more in MySQL, we were tasked with piecing these sources together to get a better understanding of the company altogether. Our team decided to use this widespread amount of data by splitting up and looking at individual sections ourselves to pull analysis in unique ways. These “mini teams” allowed us to dive deeper into the data in ways that intrigued each of us personally.

In one case, we had a lot of data duplication in the tables we received. In this file, *customer\_file\_Updated - Copy.xlsx*, we found that there were multiple rows describing the same customers multiple times, and sometimes regarding the same product. These identical rows could have symbolized a repurchase of the same product. In any case, these records showed product and customer information without recording the transactional data behind it. This created some issues and some opportunities for our group due to the high data duplication, as seen in Figure 1.1 with an example of a frequently occurring customer.

customer_internal_id	customer	address_1	address_2	city	state	zip	spear product	member_since
915315	1744181124 Patricia "Trish" Takacs : Ryan Golibersuch	2408 Sir Barton Way	Suite 225	Lexington	KY	40509	Direct : CDOCS Mentor	2/2/2012
915315	1744181124 Patricia "Trish" Takacs : Ryan Golibersuch	2408 Sir Barton Way	Suite 225	Lexington	KY	40509	Direct : CDOCS Mentor	2/2/2012
915315	1744181124 Patricia "Trish" Takacs : Ryan Golibersuch	2408 Sir Barton Way	Suite 225	Lexington	KY	40509	Direct : CDOCS Mentor	2/2/2012
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Figure 1.1

## Presentation of Results

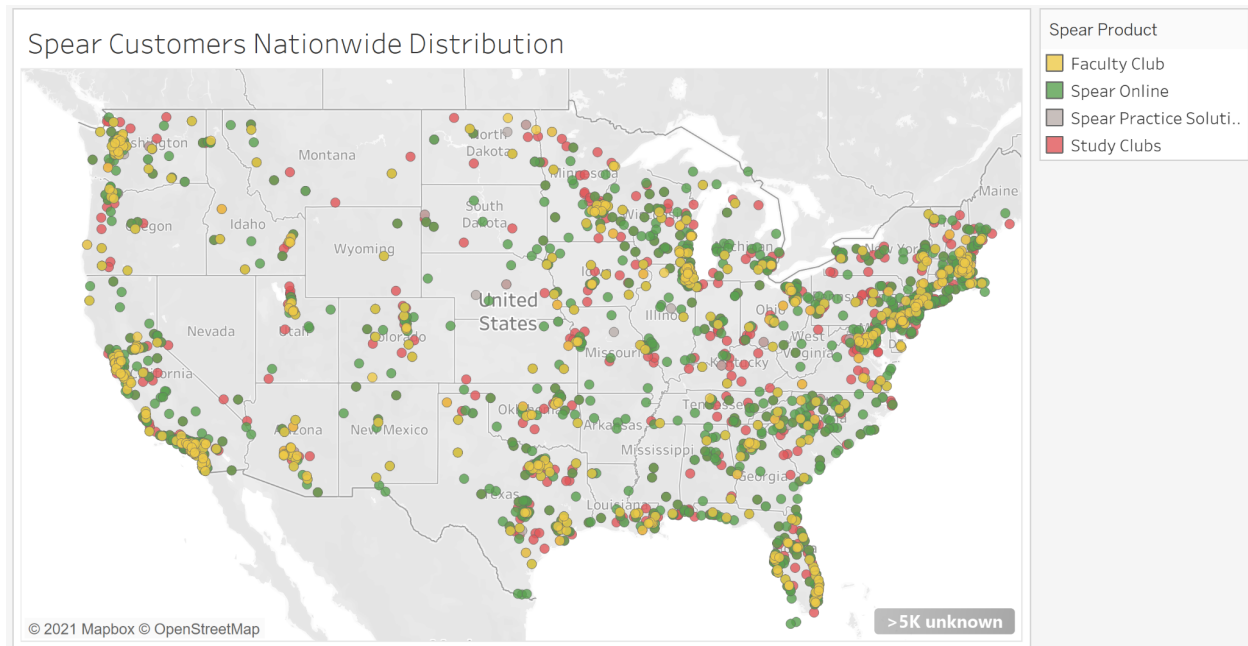
To begin to tackle the customer database in Excel, we created a view to see which products were most popular in this set. Figure 2.1 shows the relationship between each product. As you can see, our three targeted products, Study Club, Spear Online, and Faculty Club, get some membership but also compete with several other offerings and opportunities offered through Spear Online.

Products	Purchase Count
Direct : CDOCS Fellow	4158
Direct : CDOCS Mentor	4933
Direct : CDOCS Resident	17173
Direct : CEREC Academy Membership	5009
Direct : CEREC Study Club	405
Direct : Clinical Courses	19626
Direct : Faculty Club	11607
Direct : Masters Program	1154
Direct : Spear Online	22557
Direct : Study Clubs	72070
Direct : Trial Item	97
Indirect : S&M: Spear Customer Success Edu	1
Indirect : S&M: Spear Sales	1
Products	15
Spear Practice Solutions	2051
<b>Grand Total</b>	<b>160857</b>

Figure 2.1

Throughout other research that our team conducted, we were able to determine that each of these products were renewable over a period of time because they were frequently duplicated in the spreadsheet we used to explore them.

Additionally, we were able to produce a geographical map of the locations of many of the Spear customers and where in the US those customers were participating in courses.



*Figure 2.2*

Although there is heavier interaction in more highly populated areas like California, Florida, and the Northeast, Spear products are clearly available and broadcasted to a country-wide customer base.

By breaking out the populations of Spear customers by state, we were able to get a realistic view at how they interact with Spear when compared to their peers. Interactions with Spears interface were presented in three different ways: visits, events, and minutes. Visits were the individual logins of the account at a certain time, while events were interactions with different deliverables in Spear while active, such as a survey. Obviously, minutes is the active time a user is using the platform. Using these three metrics, we could see if there were any stand out areas that made for being dominant with one product type.



In visits, there was not a stable pattern found across states, although the state of New Mexico still stood out. In the trio of Study Club, Faculty Club and Spear Online, New Mexico had a top ten average visit count per user among all other states. Their dedication into Spear Online was the most prominent as the average of roughly 132 views per user was by far the highest.

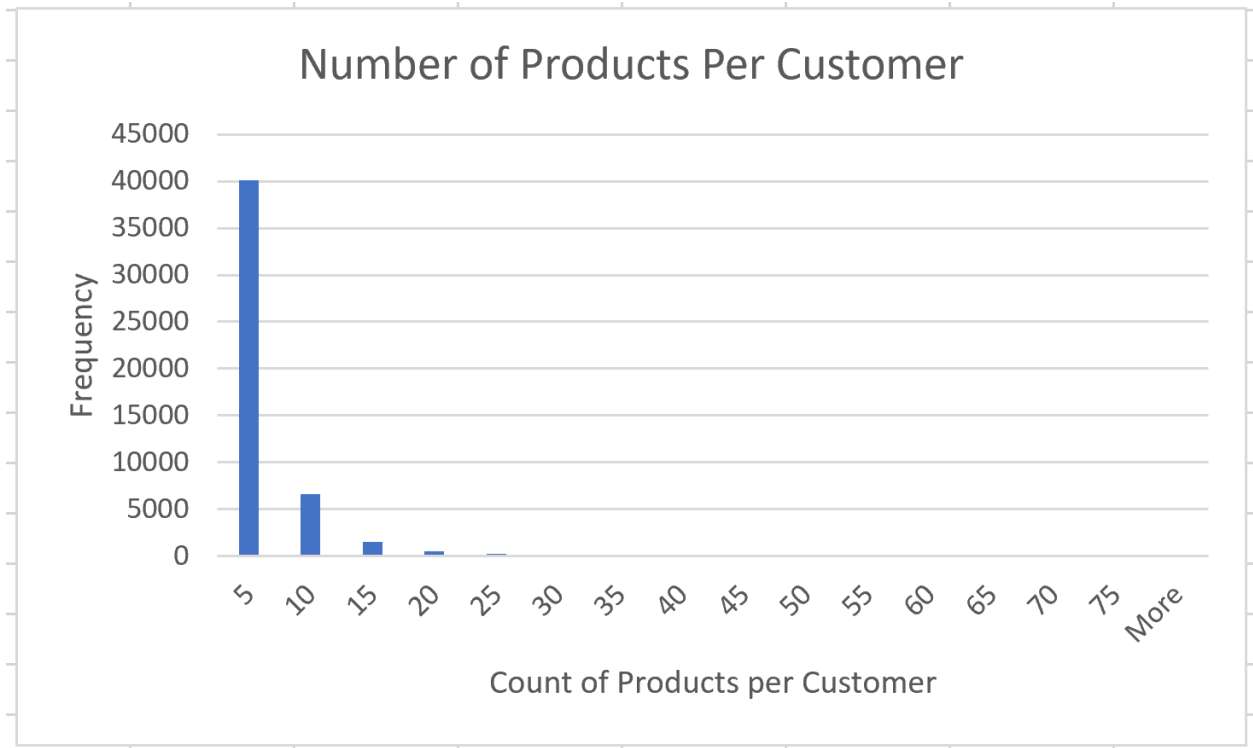
Meanwhile in minute usage, there was still no clear pattern among the three products, but the ranking of each state appeared to be more in line than it did with visits. Instead of New Mexico, Indiana was the one state that stood out as they also were the only state finishing in the top ten in the average minutes spent on the platform per user on all three products. Once again, they also were the spearhead of one of those products as their average of 1839.34 minutes on Faculty Club was the highest of all states. While there may be no clear takeaway from this information, it is interesting that from a state by state basis, there is no clear indication on whether certain products were more dominant over others in most cases. It may also indicate that the training/intellectual value of the Spear customers may be different in New Mexico and/or Indiana due to their dedication to using Spear

To get a better understanding of the customers' behaviors, we structured a Pivot Table in Excel to show us what the most loyal customers are purchasing. In Figure 2.3, the customers with the most products are listed.

Customer Name	Number of Products Purchased
1544061644 MEGAN HOMAN	73
4621 Patricia "Trish" Takacs	50
1744244434 PRD Perico	50
1744181668 David Bartran	46
1744150930 Scott Buzard	40
58466 Stephen Ura	39
6031 Louisa Gallegos	37
1744171345 Brandon Stapleton	37
000000061796 Robert Stender	37
176832544056030 Laura Justice	36
884 Bryan Shanahan	35
1744159274 Doug Smail	35
544055987 Peter A Schultheiss	34
54405455 Scott Price	34
12409 Mark Makram	34
54410627 Lodie Horn	22

*Figure 2.3*

However, we also wanted to take a look at the overall commonality of more loyal customers, so we constructed two histograms to view the likelihood of new customers. Figure 2.4 shows the first view we took, including all levels of customers.



*Figure 2.4*

As shown above, most customers purchase 5 or fewer products at Spear. We tried again with a smaller bin size for each category. Figure 2.5 displays the results of our findings.

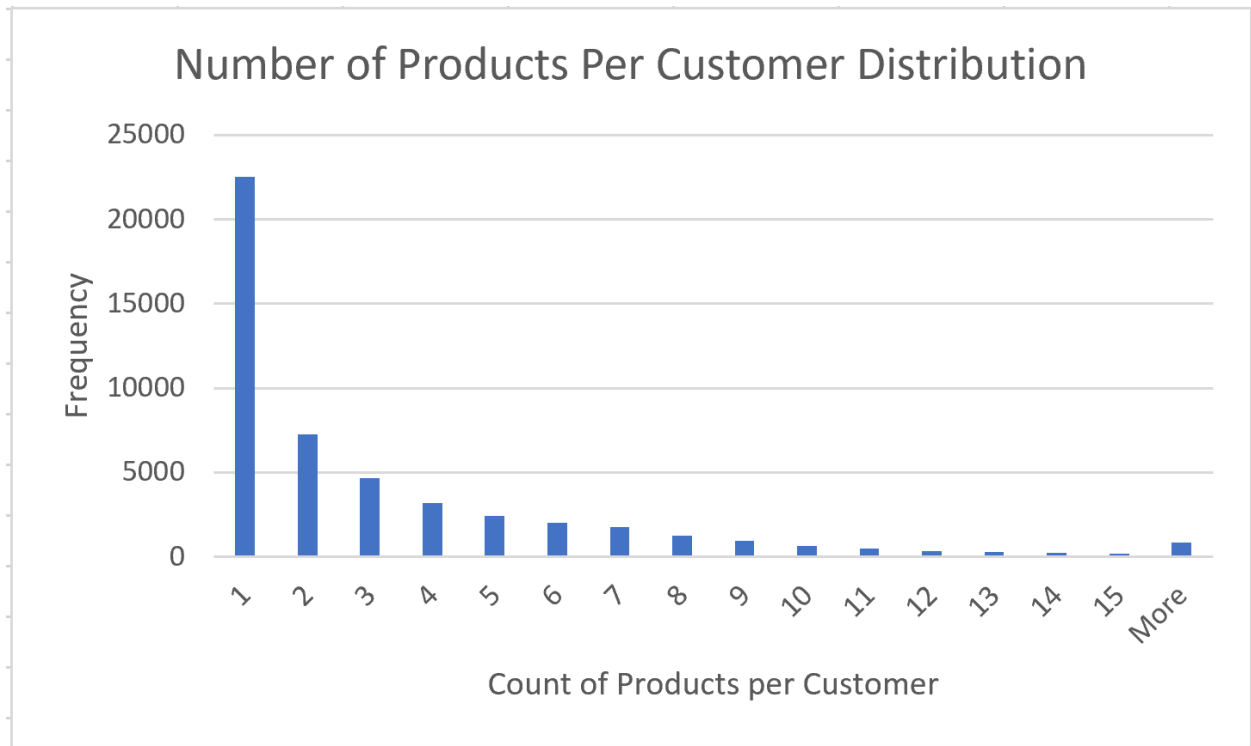


Figure 2.5

In this case, many customers only purchased a single product at Spear. However, on average, in this data source, the average number of products per customer is 3.28, meaning that it is not uncommon for customers to buy at least a few.

## Implications and Analysis

The implications of the excel file, *customer\_file\_Updated - Copy.xlsx*, were that there are many different popular products outside of the scope of our project, and that customers frequently only purchase 1-3 products on average, while a select few customers purchase an extremely high number of products for themselves or a larger workspace. This could indicate many

opportunities for Spear in the styles of advertisements or promotions for larger groups interested in working with Spear.

For example, one interesting case to note was that Patricia “Trish” Takacs had multiple customer names, seemingly under multiple dentists in an affiliated medical group. Essentially, this group has been highly loyal and lucrative for Spear, but also a rare case where an entire office was using products from Spear. If more cases of longevity and loyalty were built between a customer and the Spear Education Group, they could find that more customers would be likely to purchase more products from the organization, and possibly even attract other customers.

## Conclusion

In this project, our team analyzed data given us by Spear Education, in which we looked for patterns concerning usage and purchase statistics for the different platforms offered by Spear Education. Although we did not find very specific results for all aspects of our analysis, we did find some very useful trends particularly in the purchasing habits of customers. We determined that the average for even a singular customer was over 3.28 purchased products and that certain individual, loyal customers even purchased up to several dozen, with the max being Megan Homan at 73 products. We have also seen that Spear’s product usage is spread out throughout the whole United States and that it is very widespread in Arizona and California. As noted previously, these finds have great significance for Spear because they can use them to advertise even more specifically to certain interested groups who seem to utilize their products the most. The marketing budget could be geared particularly towards large groups in the future.

Additionally, especially after the COVID-19 pandemic, Spear Education may want to consider investing more heavily in Spear Online so that its content may be easily accessible across the nation and also that members spread out in different states may get to know and communicate with one another with ease online. Perhaps there could be additions to Spear Online in which many features of the Study Clubs are integrated, particularly that intimate communication that is so notable in these Study Clubs. By focusing its marketing budget on those who use the Spear products most and by considering expanding Spear Online, Spear Education may increase its loyal customer base and become even more profitable and successful into the future.