



Hi Everyone! Today myself, Dina, and Gary, will be pitching the Par for Partnerships golf tournament. The goal of hosting this tournament is to help CourseKey, an education Software Company, build connections with prospects, and hopefully turn them into customers!

Planning this tournament was no small feat though, and we will discuss throughout this presentation why this tournament will be well worth the investment.

01

Context

Let me first start by providing a little background.



Improve Enrollment



Boost Progress Visibility



Lift Retention



Reduce Compliance Risks



Streamline Operations



Delight Students & Staff

Who is CourseKey? Well it is the company that I work for AND.....

CourseKey is an education startup company that is targeted to schools that focus on trades such as nursing, cosmetology, or plumbing. These schools often run on outdated processes and CourseKey is a great way to get them to the next level when it comes to growing their school and meeting compliance requirements.



Selling to Trade Schools

- (1) In person meetings work
- (2) Need to meet with Top Execs
- (3) Total Addressable Market (TAM) is limited

When selling to these customers, it is evident that these outdated processes also translate to the sales cycle. In this industry, in person meetings are the way to go. That means inviting the top executives to meetings where you close the deal that day. And what better way than on the golf course.

Input Data



Golf Courses

The top 100 Golf Courses in the USA



Prospects

List of 565 schools with addresses



Best Customers

50 current clients with a high success score

In order to organize this deal closing tour, we used 3 different data sets.

The first dataset is a list of the top 100 golf courses in the United States, including their name, city, and cost per golfer.

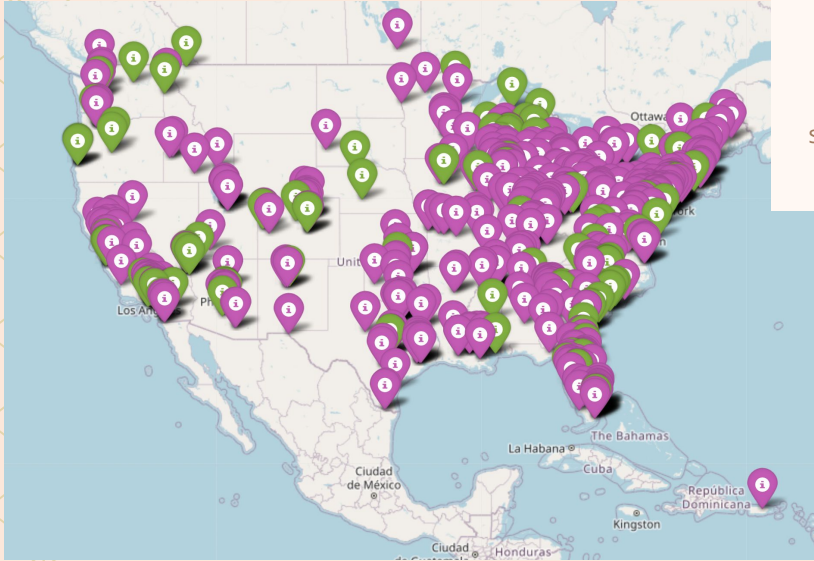
Next, is a list of 565 prospects. This list is a subset of the over 13,000 that we have in the database. These schools have been hand selected as “target accounts” by the sales team based on conversations they have already had with the schools or basic research done on the viability.

The last dataset that we used is a subset of 50 of our happiest customers. Happiest in this context, is defined as the customers with the highest success score, determined by the CSM. There are a few key factors that are looked at when determining a success score, mainly: implementation time and ease of implementation, number of support tickets, requests for product changes, responsiveness to the team, as well as a general sense from the CSM on the happiness of the people they are interacting with at the school.

The combination of these datasets allowed us to take what is already a list of hand selected and highly target-able schools and make it actionable.

Visualize

Courses and schools are spread all over the country



We can see here that there are both schools and courses scattered all over the United States, but of course we cannot assume that someone from New York is going to fly to California, just to golf at Pebble Beach. So we set a perimeter of 100 miles around each golf course before doing our analysis.

Now, I'll hand it off to Gary.

02

Choosing a Course

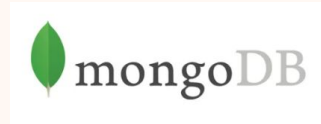
(0:06) Thanks Sophie!

Now I'll talk about the process we followed to identify the best golf courses for our tournaments.

MongoDB Business Case

Transitioning the Advertising Spreadsheet

Prospective customer database
has fields with multiple values



MongoDB's dynamic schema
feature allows nested database
objects

Allows for variation among
entries

LMS (multi-select)	SIS (multi-select)
Canvas	CampusNexus
Canvas	CampusNexus; Anthology
Blackboard	CVUE; CampusNexus
Canvas	CampusNexus
Blackboard	CampusNexus
Canvas; Moodle	CampusNexus; Campus Login; blackbaud
Sakai; D2L; Moodle; Other	CVUE; DiamondD; Other

(1:05)

In analyzing the prospective customer spreadsheet, we noticed that many fields contain multiple values. Here you can see the Learning Management System (or LMS) field, as well as the Student Information System (or SIS) field can contain multiple values. As we build our list of prospective customers and gather more information, we should consider transitioning this document to a MongoDB NoSQL database.

MongoDB excels at handling varied data types and structures, making it ideal for fields with multiple values. As our client list grows, MongoDB can scale horizontally, ensuring consistent performance, whereas a spreadsheet would eventually become unmanageable.

With MongoDB, we could query and index this data efficiently, even in fields with multiple values. This would mean faster access to potential client information and the ability to perform complex queries. MongoDB's compatibility with programming languages would make it easy to integrate the lead database with other business applications. Also, multiple team members could view or modify the data concurrently, all while taking advantage of MongoDB's built-in data integrity, consistency, and security features.

Most Valuable Prospects

Building the Graph

Graph built with relevant attributes for each school:

- Segment
 - Health
 - Beauty
 - Trade
- Type
 - Private for-profit
 - Nonprofit
- Number of Students
 - Greater than or less than 150 students
- Learning Management System
 - PivotPoint
 - Canvis
 - Moodle

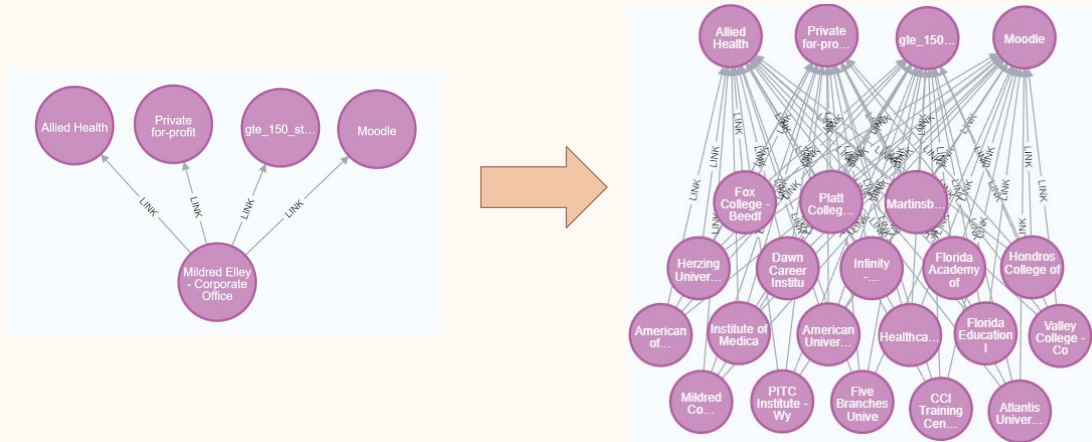


(0:55) Now I'll address the process of how we determined a weighting system to identify our most valuable prospective customers. To do this analysis, we utilized Neo4j, an advanced graph database that excels in identifying and analyzing complex relationships between interconnected data points.

First, we imported the spreadsheet of prospective clients, as well as the list of existing best clients into the database. We focused on a few key characteristics: **segment**, which characterizes the school's focus; **type**, which refers to a school's profit or nonprofit status; **number of students**; and the **learning management system** utilized. You can see some examples for each attribute here, but there were many others. We created nodes for every school, as well as every possible attribute value. Then, we connected each school to their corresponding attribute nodes.

Most Valuable Prospects

Node Similarity Algorithm



(0:45) Once the graph was built, we utilized the first of three Neo4j graph data science algorithms to answer the question, “which prospective schools are most like our existing best clients?”

For every pair of nodes in the graph, the node similarity algorithm generates a “similarity” score. Here, we consider one of our top clients and show all prospective clients that have the same connections. The node similarity algorithm would assign a value of 1 to these schools, and proportionally lower scores for less of an exact match.

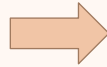
Finally, we took every prospective school and evaluated the similarity scores against every one of our best clients. For each school, we took the maximum of these scores, and assigned a default of 0.25 when they were not at all similar.

Weighted Degree Centrality

Choosing the Top Courses

Similarity Scores

American College of Healthcare and Technology - Corporate Office	1
Century College - Corporate Office	1
West Coast Ultrasound Institute, School of Imaging - Corporate	1
Atlanta School of Massage - Atlanta	1
Institute of Medical Careers - Pittsburgh	0.8
Herzing University - Corporate Office	0.8
Healthcare Career College - Paramount	0.8
AMG School of Licensed Practical Nursing - Brooklyn	0.8
Berks Technical Institute	0.8
Aveda Institute - South Florida	0.8
Empire Beauty School - Hooksett	0.8
Community HigherEd	0.8
Toni&Guy Hairdressing Academy at Penn Commercial	0.8
WellSpring School of Allied Health - Corporate Office	0.8
American Career College - Corporate Office	0.8
Avalon School of Cosmetology - Corporate Office	0.8
Aveda Institute Maine - Augusta	0.8



Golf Course Scores

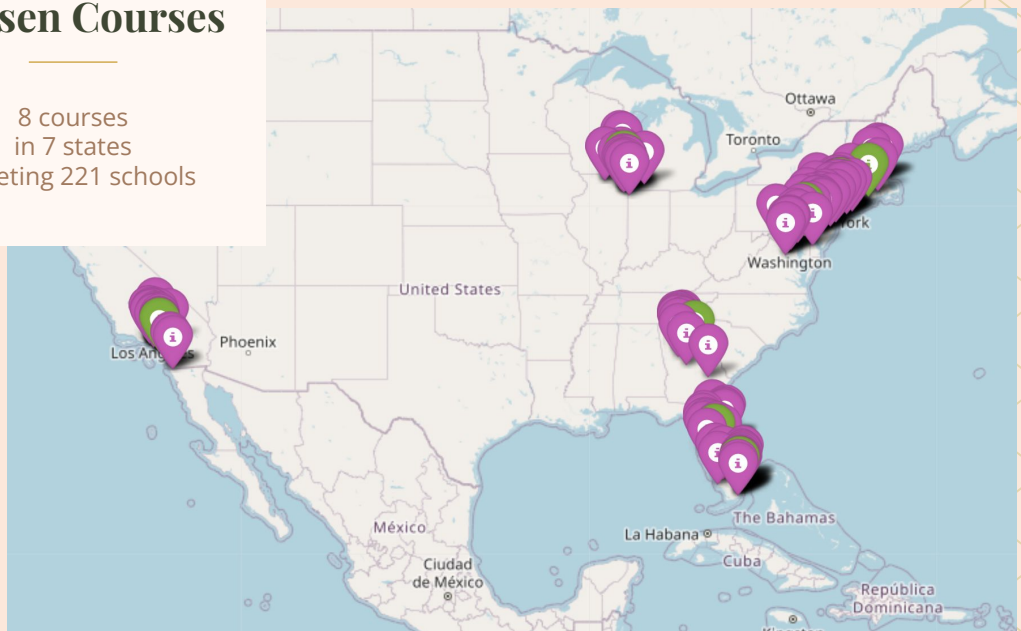
Trump Golf Links At Ferry Point	22.883333
Bulle Rock	18.083333
Cog Hill (No. 4)	15.250000
Atlantic City Country Club	15.166667
The Glen Club	14.250000
Bethpage Black Course	14.216667
Pelican Hill Golf Club (Ocean South)	12.466667
Arnold Palmer'S Bay Hill Club (Champion)	12.264286
Reynolds Lake Oconee (Great Waters)	12.083333
Reynolds Lake Oconee (Oconee)	12.083333

(0:33) Now, with prospective clients scored by value, we generated a new graph database that links every school to golf courses within driving distance. We made this a weighted graph, with each link taking the score we computed in the last step. Next, we applied Neo4j's Weighted Degree Centrality algorithm to the graph, which sums the values of weighted links incoming to a node of interest.

Finally, the centrality algorithm provided a natural score for each golf course, seen on the right, which allowed us to identify the courses that could support the most high-value participants.

Chosen Courses

8 courses
in 7 states
targeting 221 schools



(0:23) Using this information, we selected 8 golf courses to host our marketing tournaments while staying under our budget. These courses are spread across 6 states and would host up to 221 nearby schools.



Finally, here's a more zoomed in view that shows an example of a grouping of schools that will be invited to the Glen Club course in Chicago.

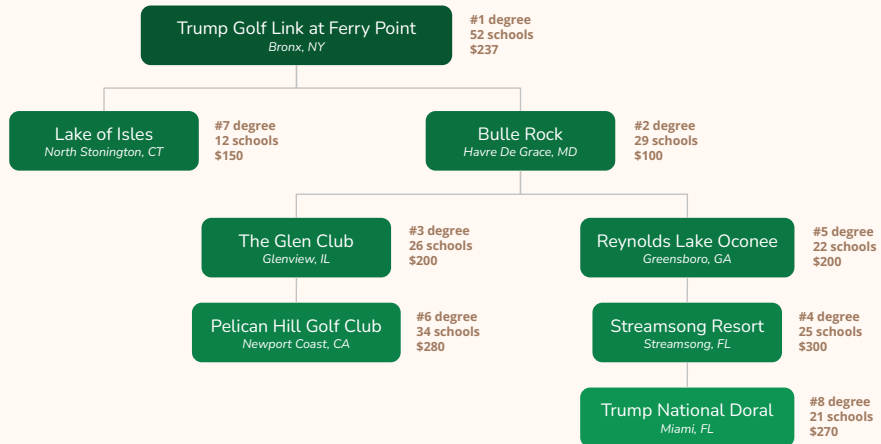
Now, Dina will discuss our use of a third data science algorithm to optimize logistics for these tournaments.

03

Choosing a Path

In order to have the internal sales team attend every tournament in an efficient order, we considered finding paths using 2 potential algorithms. In the first scenario, the team would travel together, one golf course at a time, in a Traveling Salesman fashion - not repeating golf courses and taking the shortest route through the entire tournament. Unfortunately, this problem is not optimal for Neo4j, especially with 8 destinations to travel through, and does not account for the possibility of the team splitting up to cover more ground.

Minimum Spanning Tree



Instead, we created a minimum spanning tree by linking the golf courses by the distance between them and found an optimal route of travel to hold tournaments in parallel and complete the tour within a short period of time. A team will start in New York...



Redis Business Case: Tournament Leaderboard



(1:00) I would like to now call out another powerful tool that may be extremely useful for this golf tournament and beyond. Redis is an in-memory data structure store, primarily used as a database and cache. It stands out for its speed and efficiency, making it a popular choice for real-time applications, something that is difficult to manage with a relational database.

In the context of the golf tournament, Redis could be used to efficiently communicate real-time updates to the leaderboard. This would allow us to engage the schools further by allowing staff not able to attend to keep track of the rankings. Because Redis operates in memory, scores would load without delay and any changes could be stored quickly, without the need for permanency.

A relational database would not be an appropriate choice for such an application, as updates would be too cumbersome and slow to be effective as a leaderboard.

Redis is extremely scalable and would allow us to accommodate a large number of participants without losing performance, especially if we decide to have multiple tournaments running in at the same time.

04

Conclusions

Using these methodologies we were able to create a tournament that will be both fun AND effective for winning over the best CourseKey prospects.

Next year, CourseKey's goal is to hit \$10M in Annual Recurring Revenue and running this tournament could be exactly the key that we need to push our sales over the hump.

Thank you

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Thank you!