Learner Analysis Feedback
Bottomline Report

Background

Quality Analytics Associates (QAA) and Bintel used their complementary skills to create a Learner Analytics Solution. To demonstrate the value of this solution, the team developed a product from a sample scenario involving the consecutive performance reviews of fictitious professors who taught an Introduction to Chemistry Course at "University Y". This is the report created for that scenario. All names and data are fictitious.

Introduction

This project required the analysis of professor performance for those who taught the Introduction to Chemistry Course at University Y for the Fall 2018, Spring 2019, Fall 2019, and Spring 2020 semesters. The two professors that were assessed were Kim Han and John Barker, which were assigned numbers (Professor 1 and Professor 2 respectively) to protect their identities for privacy purposes. Sources used for analysis included course evaluation feedback surveys, student performance, and open-source data from ratemyprofessors.com. In this report, other data sources were not used, but if the project were expanded other public and private sources describing the professors and the university as a whole could be included.

Planning & Collaboration

QAA worked with the dean of the college of sciences, the chemistry department head, and the two professors (the university team) that were to be assessed to determine what insights they were looking to gain from this experience. Their focus was to discover what exactly resulted in the scores that were given and how the professors could improve their scores. They also wanted proof that the Learner Analytics Solution was improving learner experience and resulting in higher scores.

The team determined that for this time period the most important data source would be the course evaluation surveys. However, data on student performance and data from ratemyprofessors.com was also included to demonstrate the system's capability of ingesting different types of data for this phase of the project. Data collection began and the university provided QAA with a data file containing the anonymized results of the course evaluation surveys and student performance at the end of each semester. Bintel extracted data from ratemyprofessors.com including the scoring and free text responses to the survey.

Artificial Intelligence (AI) was used to detect specific topics in the free text responses of the course evaluation surveys and from ratemyprofessors.com. The team chose these topics: difficulty, examples, extra credit, homework, instructor, lecture, office hours, study guide, tests, and textbook. AI would also be used to detect the sentiment of the free text response so that someone could see if the comments regarding a topic were generally positive, negative, or neutral.

An interactive dashboard was created for this project to allow stakeholders to view high level themes and allow them to drill down into exactly what the students were saying when desired.

Learners and Professors Served

In our example dashboard, we gathered data for two University Y professors who taught Introduction to Chemistry course over four semesters. These professors were required to ensure the learners met the same objectives by following the basic syllabus

and used the same textbook. However, the professor's method of instruction, approach for meeting objectives and engaging the learners is their choice.

Learners Descriptions

As with typical Introduction to Chemistry courses, the learners of University Y's Introduction to Chemistry were freshman or sophomores with a few upper-level learners. The majority of upper-level students attended Professor 1's classes. In addition, the learners were divided fairly evenly between the genders with some choosing not to identify.

Professors' Descriptions

We gathered data from two professors. Professor 1 (Kim Han) was tenured with 12 years of experience teaching at the postsecondary level. She had been teaching Introduction to Chemistry at the University of Y for eight years. Professor 1 has a PhD in Chemistry from State C University.

In contrast, Professor 2 (John Barker) was a novice instructor who began teaching at University Y after graduating with his EdD in Chemistry. As a graduate student, professor 2 served as a graduate assistant to multiple professors and assisted with their Introduction to Chemistry courses. Based on his ratings and performance, Professor 2 may be able to begin the tenure process at the end of the two years.

Findings

At the end of each semester the data sources were processed and displayed in the dashboard for the university team members to use. QAA did an analysis of the results of the semester and provided a report detailing trends and changes that may have reflected in the free text responses.

Professor performance, according to the course evaluation surveys, changed each semester along with the topics that the students wrote about. This correlates with the professors' actions because at the end of each semester they adjusted try to improve learner experience. The semester reports by QAA detailed what students liked and did not like, but also what the professor had changed in the last semester and intended to change in the next semester.

Outcomes

As we analyzed the results of this data, we noted the outcomes benefited not only the professors but the learners. With our dashboard, we were able to compare Professor 1 semester to semester. Or we could compare Professor 1 and Professor 2 during the same semester. The dashboard allowed us to gain a better understanding over the first two years.
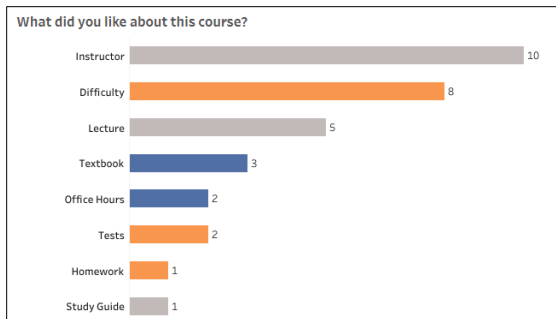
Learner Outcomes

Based on the feedback provided to the professors, learners exhibited a higher pass rate for course. The course and instructors became more engaging during and after class which allowed the learners to become more interested and retain more of the content.

As part of the analysis, our team reviewed syntax themes. We analyzed verbal comments for common syntax themes. These were narrowed down to 10 common themes:

What did you like about this course?

Instructor	10
Difficulty	8
Lecture	5
Textbook	3
Office Hours	2
Tests	2
Homework	1
Study Guide	1

Learner Responses for Professor 2

difficulty, examples, extra credit, homework, instructor, lecture, office hours, study guide, tests, and textbook. As we reviewed the resulting analysis, we noted that the number of references to these themes changed over time. This was for different reasons. For example, we noted that the theme examples decreased likely resulting in overall satisfaction from learners. The number may be reviewed in the Appendix: Table 3.
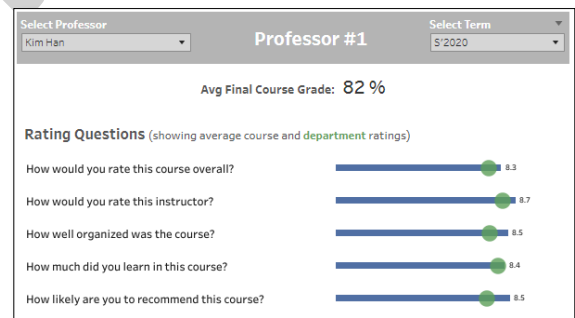

Learners beginning to engage with Instructors

Professors' Outcomes

Professor 1 and Professor 2 both took note of the areas in which students were giving them low scores. As these professors noted these issues, they each took steps to improve these areas of their performance.

For example, Professor 1 and Professor 2 both enrolled in training sessions in their identified lower areas. As a novice, Professor 2 also sought a mentor with more experience.

Select Professor	Professor #1	Select Term
Kim Han		S'2020

Avg Final Course Grade: 82 %

Rating Questions (showing average course and department ratings)

How would you rate this course overall?	8.3
How would you rate this instructor?	8.7
How well organized was the course?	8.5
How much did you learn in this course?	8.4
How likely are you to recommend this course?	8.5

Professor #1– Spring 2020

Feedback verbatims on **All**	
extra credit opportunities given	●
always willing to answer questions in class	▲
asks students if they are understanding	●
by far my favorite professor	▲
cares about student's wellbeing	▲
explains concepts well	▲

Learner Feedback for Professor 2

After four semesters or two years, there was a reduction in the frequency of "troublesome" topics expressed by students, such as difficulty, examples or study guide. Table 3 of the Appendix shows this trend. After reviewing Table 3, the syntax feedback can be reviewed within the free text responses by visiting the dashboard.

The team concluded that the objectives of the analysis had been met. Not only were the reasons for low professor scores uncovered but corrective action taken by the professors improved the learner experience. Both students and the university benefited from this collaborative effort to track, understand and improve professor teaching performance.

Further Information

To explore our data comparison, visit the following link.

References

Our sample dashboard was created for University Y and Professor 1 (Kim Han) and Professor 2 (John Barker) by gathering and editing data from the following site(s).

- www.ratemyprofessors.com

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Appendix: Tables

Table 1:

University Y - Longitudinal Data for Introduction to Chemistry					
Professor 1					
	Gender	Semester	Total # of Learners	Total # Passed	Percentage Passed
	Female	Fall 18	30	19	63%
		Sp 19	29	21	72%
		Fall 19	26	25	96%
		Sp 20	21	13	62%
Professor 2					
	Gender	Semester	Total # of Learners	Total # Passed	Percentage Passed
	Male	Fall 18	29	11	38%
		Sp 19	30	28	93%
		Fall 19	31	29	94%
		Sp 20	30	30	100%

Table 2:

University Y - Longitudinal Data for Introduction to Chemistry Learners							
Professor 1							
Semester	Total # of Learners	% Females	% Males	% 1st Year	% 2nd Year	% 3rd Year	% 4th Year or >
Fall 18	30	40%	50%	37%	27%	23%	10%
Sp 19	29	41%	52%	45%	28%	21%	14%
Fall 19	26	54%	46%	42%	27%	23%	12%
Sp 20	21	38%	57%	38%	38%	14%	0%
Professor 2							
Semester	Total # of Learners	% Females	% Males	% 1st Year	% 2nd Year	% 3rd Year	% 4th Year or >
Fall 18	29	34%	62%	38%	38%	24%	7%
Sp 19	30	40%	50%	47%	37%	13%	10%
Fall 19	31	35%	61%	48%	32%	16%	6%
Sp 20	30	43%	50%	40%	40%	20%	3%

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Table 3:

University Y - Syntax Data from Learner Responses										
Professor 1										
	Semester	**Difficulty**	**Examples**	**Extra Credit**	**Homework**	**Instructor**	**Lecture**	**Office Hours**	**Study Guide**	**Tests**	**Textbook**
	Fall 18	6	11	2	3	12	10	11	7	15	7
	Sp 19	5	7	2	5	14	9	6	5	9	1
	Fall 19	7	5	0	9	16	6	5	6	16	8
	Sp 20	5	5	0	4	15	6	7	2	9	5
Professor 2										
	Semester	**Difficulty**	**Examples**	**Extra Credit**	**Homework**	**Instructor**	**Lecture**	**Office Hours**	**Study Guide**	**Tests**	**Textbook**
	Fall 18	11	1	0	5	17	12	4	2	8	3
	Sp 19	2	9	1	5	19	9	7	5	8	3
	Fall 19	10	4	0	0	29	5	1	2	10	3
	Sp 20	6	0	2	6	29	7	7	2	3	6

Explanations of the Syntax Themes

* Difficulty - Students describing general difficulty of the course or its components

* Examples - Example problems done in class or in office hours

* Extra Credit - References to offers of extra credit or extra credit assignment content

* Homework - Homework content, type, duration, and difficulty

* Instructor - Any comments regarding the instructor directly including subject like performance, demeanor, and student interaction

* Lecture - Lecture content, duration, and professor use of time

* Office Hours - Students decribing their experiences in the professors office hours or other meetings/assistance they receive outside of class

* Study Guide - Exam preparatory materials including study guides and hints or clues as to exam content

* Tests - Exam content, type, duration, and difficulty

* Textbook - Textbook value and cost, frequency of use for course