Analytics, MS

Program Description

The Analytics, MS program started in 2013 as a partnership between the Mays Business School and the Department of Statistics. It offers an executive style learning environment to working professionals who want to improve their careers. The lectures focus on real world case studies and utilizes the most relevant analytics tools. The program delivery is part-time program over five semesters that is a blend of both face-to-face and live online education at the Mays Business School facility at Houston CityCentre.

Outcome – Oral Communication

Students can clearly communicate business concepts and solutions in an oral presentation using elements appropriate for effective communication.

Measure – Data Visualization/Oral Presentation

Data Collection: Students will be assigned a set of poorly designed presentation slides that include data (graphs, charts, etc.) that they will be tasked with redesigning effectively for the purpose of oral communication. Students will demonstrate their data visualization skills for the purpose of effective oral communication, by operationalizing, focusing, and adding a story to their newly-revised presentation slides.

The assignment will be given in the course BUAD 679/681 Practicum. This course is managed by the Program Director and utilizes numerous faculty to deliver various components of the course. The communication and data visualization portion of the course is taught by a full-time, executive professor with a PhD in interpersonal communication. The professor will assess the students' work using the rubric and will provide summary findings to the Mays Graduate Programs Assessment Committee. The program director, faculty member, and assessment committee will then further analyze the data, including across a number of programs, and determine findings and an action plan together. During the cooperative action planning, the committee, director, or professor may also see opportunities to engage other program faculty to create new interventions on this topic, or emphasize existing interventions.

Methodology or data analysis strategy: The attached Data Visualization/Oral Presentation rubric, adapted from steps taught in Cole Nussbaumer Knaflic's book, "Storytelling with Data: A data visualization guide for business professionals", will be used to assess the students' redesigned presentation slides.

The Mays Graduate Programs Assessment Committee will assess the redesigned data visualizations against the 5 components. Additionally, the Mays Graduate Programs Assessment Committee is conducting a similar assignment, collected similar data, and assessing the data in a similar method across several of our graduate programs. We'll compare the results across those student populations to give us additional insight into which populations more quickly improve on certain elements of data visualization and which populations might need additional intervention to help improve other components. By reviewing average scores on individual components ACROSS programs, and by comparing standard deviation of individual components within a program and across programs, we can further determine where our students (in individual programs or across all our programs) might need additional interventions

in the future.

Our program-level communications instructor, in the course BUAD 679, will provide instruction on this topic (and intervention) and will then gather this data via an assignment completed in class. The instructor will gather the data, provide his assessment of the results compared to the rubric, and provide a narrative on his view of findings and his preliminary/suggested action plan.

The assignment included students submitting draft slides for their final capstone presentation after the communication professor completed the course instruction on data visualization.

Target

80% of students will score a 2 or above (on a scale of 1-3) in 4 out of the 5 categories from the Data Visualization/Oral Presentation Rubric.

TARGET REASONING:
The Mays Graduate Programs Assessment Committee decided on this target of 2 or above (on a scale of 1-3) in 4 out of the 5 rubric categories. The benchmark was set based on the committee's observations of students' ability to present data in previous presentations. In the past, we have not formally measured student's ability to present data (data visualization), but faculty have noticed a deficiency in this area in the past. We would like to measure this so that we can find an appropriate intervention. This year will serve as a benchmark of who is performing at average, or above average, in the majority of the 5 categories, and help identify areas where we may need to institute action plans to improve performance.

Finding: Met

We met our target. There were 41 total observations: 37 Passed, 4 failed, 5 did not submit. Target was 80% of students will score 2 or above in 4 out of 5 categories.

2 or above of 41 submits	%
Context	98
Display	95
Eliminate	95
Highlight	93
Story	93

Feedback from instructor is that students need to use screenshots more strategically.

From the Business Communications Instructor:

- “Some of their visualizations lack focus. Some slides have 4-8 screenshots, without a clear sense of direction or focus for the slide. I encouraged students to use fewer screenshots per slide and to graphically highlight what is important on each screenshot.

- I encouraged students to give the graphs a clearer thesis and take-away. There is a lot of information on some of the graphs, but it's not clear what the point is. Adding the "story" is important to each slide.
- Students still need to be aware of font sizing. Some used fonts and colors that would not be visible on a projector, even if they are so on a computer screen."

OTHER OBSERVATIONS

Similar to our other working professional programs within Mays, the students in this cohort demonstrated the ability to:

- Demonstrate context for the data visualization - showing that the author has an interpretation to share
- Clearly use bars, dots/boxes, and lines as appropriate for display.
- Eliminate unnecessary elements such as gridlines, colors, and other distracting elements.

However, students struggled slightly to:

- Clearly highlight the main point of the visualization and clearly use color, contrast, and axes arrangement to clearly highlight the key elements of the visualization.
- Clearly provide the story of the data with a clear thesis statement at the top of the graph; well-placed call-out boxes to guide reader interpretation; and progressive display (if needed) to highlight multiple parts.

CONCLUSION

While we met our target, we still some room for improvement with data visualization. The room for improvement is similar to that of our other working professional programs (Executive MBA and Professional MBA).

Use of Results

While we exceeded the target in each category, we still see room for improvement. From the assessment, we learned that students could use more feedback on providing effective "focus for readers" of charts and graphs and more precise take-aways.

Similar to our other working professional graduate programs, students struggled slightly to:

- Highlight the main point of the visualization and use color, contract, and axes arrangement to highlight the critical elements of the visualization.
- Provide the story of the data with
    - A straightforward thesis statement at the top of the graph;
    - Well-placed call-out boxes to guide the reader interpretation; and
    - Progressive display (if needed) to highlight multiple parts.

For future years in the course, we will have students complete an assignment to visualize data from just one or two graphs. Minimizing the number of visualizations students focus

on will allow the instructor to work through all five components of good data visualization (context, display, eliminate, highlighting, and telling the story). As we saw in our assessment, students have the capacity but didn't perform well on the latter competencies. Allowing for more time and more discrete focus on each of the five competencies should result in overall improvement.

The goal will be to make each individual graph as visually effective as possible, including all of the components needed for a good data story. Our goal for future data visualization is for the data presented to:

- Show connections within the data that are too complex to explain with words.
- Make it easier for the audience to quickly understand the information presented and consider the outcomes from that data. (DeBois, 2020)

Now that we have student-generated examples of effective and less-effective data visualizations, our business communications instructor can use these examples for tailored instruction, focusing on each of the five components within the examples.

With this scaled-down, targeted assignment, we can ensure students meet all the fundamentals before they begin constructing 10-20 separate data visualizations typically required for their Capstone Projects. The Capstone Project data visualizations will also provide a rich context for further development of individual traits.

Additional Actions:

Create a Program Data Visualization Handbook.

From the Business Communications Instructor, "This Fall, I plan to release a Data Visualization Handbook that summarizes the key principles I teach in the data visualization unit. Faculty can then use that Handbook to apply the principles to any assignment that they give. If a student produces a seemingly poor visualization, the faculty member can refer them to the Handbook for feedback guidance.".

Coordinate via Faculty Meetings.

Each semester, the Director meets with faculty before the start of classes to encourage collaboration amongst faculty. The data visualization handbook will be shared for their reference and to incorporate into their feedback resources for students.

Capstone Coaching regarding Data Visualization

The Business Communication Professor may also create an optional, online data visualization workshop for the Capstone projects.

The Business Communication Professor also coaches individual students and student teams on data visualization competencies as needed.

Future Assessment:

We will assess the revised graphics against the same rubric we used in our 2020-21 assessment and provide students with appropriate feedback relative to the rubric for improvement.

Status Update on a Previous Action

In the **2019-20 Assessment Report**, we assessed the Program Learning Outcome (PLO) of **Communication – specifically Data Visualization.**

In our PLO **Assessment Findings**, we noted a deficit in communication; specifically, data visualization in capstone projects in 2019-2020.

In MS Analytics, communicating data in such a way that business stakeholders can understand and quickly assess information presented is vital. Based on capstone assessments, the committee selected written communication, specifically data visualization, as the focus for Program Learning Outcomes. The following plan outlines the action the program plans to take in 2020-2021 to address the deficiencies.

- The faculty member who previously taught this course retired.
- Addition of new faculty member
- With the addition of the new faculty member, we added data visualization instruction with an *indirect* assignment to address:
    - addition of thesis statement at the top of data graphic for clarity
    - how to increase the focus of graphics
    - how to clearly highlight the main point
    - how to use color, contrast, and axes arrangement to clearly highlight key elements

- After instruction, informal feedback was provided by both the program director and new faculty member.

Changes:

- Even with changes in faculty teaching, we utilized the same Quant Literacy AA C&U rubric for Spring 2021 capstone presentations. We will continue to do so for comparison over time.
- We had a non-technical review of capstone slides and evaluated data visualizations after utilizing only lecture and feedback curricular changes.
- The overall average score decreased from 22.09 to 18.94. After reflection, we attributed the decrease to the lack of direct instruction on data visualization and a specific graded assignment on data visualization. An *indirect* assignment and feedback lacked the emphasis needed to see changes in Program Learning Outcome achievement.
- To further improve, the new faculty member has prepared an instructional slide deck and lecture specific to MS Analytics data visualization with examples of both good and bad graphics; as well as steps to improve slides lacking focus or story.
- In addition, the Fall 2021 students are completing a tailored, graded assignment on data visualization. Since this will be a graded assignment with detailed feedback, we anticipate improved quality in the final capstone presentations completed in Spring 2022.

Supporting Documentation

DATA VISUALIZATION/ORAL PRESENTATION ASSESSMENT RUBRIC

Visualization Definition: A good visualization should establish two aspects of the data being presented:

- Show connections within the data that are too complex to explain with words.
- Make it easier for the audience to quickly understand the information presented and consider the outcomes from that data.*

*from: https://www.cmswire.com/digital-marketing/what-makes-a-good-data-visualization/#:~:text=A%20good%20visualization%20should%20establish,the%20outcomes%20from%20that%20data.

Assignment Description: Students will be assigned a set of poorly designed presentation slides that include data (graphs, charts, etc.) that they will be tasked with redesigning effectively for the purpose of oral communication. Students will demonstrate their data visualization skills, for the purpose of effective oral communication, by operationalizing, focusing, and adding a story to their revised presentation slides.

Rubric Description: The rubric below is based on the steps taught in Cole Nussbaumer Knaflic's book, "Storytelling with Data: A data visualization guide for business professionals."

	3	2	1
Context	The data visualization clearly demonstrates that the author has an interpretation to share, both exploratory and explanatory.	The data visualization partially demonstrates that the author has an interpretation to share, both exploratory and explanatory.	The data visualization does not demonstrate that the author has an interpretation to share, either exploratory or explanatory.
Display	The visualization **clearly uses** the following as appropriate: Bars to visualize rankings and parts-to-whole; Dots/Boxes to show distribution, correlation, and geospatial relationships; and Lines to display deviation and time-series.	The visualization **partially uses** the following: Bars to visualize rankings and parts-to-whole; Dots/Boxes to show distribution, correlation, and geospatial relationships; and Lines to display deviation and time-series.	The visualization **does not use** the following: Bars to visualize rankings and parts-to-whole; Dots/Boxes to show distribution, correlation, and geospatial relationships; and Lines to display deviation and time-series.

Eliminate	The visualization **obviously eliminates** unnecessary elements. The visualization removes **all** unnecessary: gridlines; legends (if already integrated), borders, noisy colors; other elements that distract from the data.	The visualization **partially eliminates** unnecessary elements. The visualization removes **some** unnecessary: gridlines; legends (if already integrated), borders, noisy colors; other elements that distract from the data.	The visualization **obviously eliminates** unnecessary elements. The visualization **does not** remove unnecessary: gridlines; legends (if already integrated), borders, noisy colors; other elements that distract from the data.
Highlighting	The visualization **clearly** highlights the main point. The visualization also **clearly**: adds color contrasts to highlight the key element; uses cool light colors to 'low-light' all other elements; arranges the axes and data order strategically.	The visualization **partially provides** the main point. The visualization also **somewhat/partially**: adds color contrasts to highlight the key element; uses cool light colors to 'low-light' all other elements; arranges the axes and data order strategically.	The visualization **does not highlight** the main point. The visualization also **does not**: add color contrasts to highlight the key element; use cool light colors to 'low-light' all other elements; arrange the axes and data order strategically.
Tell the Story	The visualization **clearly provides** the story of the data. The visualization **clearly** includes: a **clear** thesis statement at the **top** of the graph; **well-placed** call-out boxes to guide reader interpretation; progressive display if needed to highlight multiple parts.	The visualization **partially provides** the story of the data. The visualization **may** include: a thesis statement **somewhere** on the graph; **well-placed** call-out boxes to guide reader interpretation; progressive display if needed to highlight multiple parts.	The visualization **does not** provide the story of the data. The visualization **does not** include: a thesis statement on the graph; call-out boxes to guide reader interpretation; progressive display.