School: ATEC – Risk Management
Course: Improving Communications Through the Compelling Display of Data
Faculty: Dr. Robert Emery, Professor of Occupational Health, University of Texas School of Public Health

Summary

In his course "Improving Communications Through the Compelling Display of Data," Dr. Robert Emery of the University of Texas School of Public Health emphasizes the critical importance of effective data presentation in decision-making and stakeholder engagement. Dr. Emery begins by highlighting the ubiquitous reliance on data for program decisions and the often-overlooked skill of displaying data compellingly. He underscores that well-presented data can significantly influence decision-making processes, while poorly presented data can lead to misunderstandings and hinder progress.

Key Concepts and Influences: Dr. Emery introduces the work of Dr. John Tukey and Dr. Edward Tufte, pioneers in the field of data visualization. He explains that both experts have extensively studied and written about effective ways to present data. Emery's approach combines their principles with practical examples from his career, emphasizing clarity, precision, and efficiency in data presentation.

Principles of Effective Data Display:

- *Proportional Representation and Clear Labeling*: Numbers should be represented proportionally to their quantities, and all graphs and charts must be clearly labeled to avoid confusion.
- *Consistency in Design*: When displaying multiple graphs, maintaining a consistent design helps viewers compare data sets more easily. Variations should be in the data, not the design.
- *Maximizing Data-to-Ink Ratio*: Most of the ink on a page should be dedicated to the data itself, minimizing non-essential elements that do not contribute to the understanding of the data.
- *Time Series Data*: Time should always be displayed on the x-axis in time series data to align with human cognitive expectations, making it easier for viewers to understand trends over time.

Practical Examples and Case Studies: Dr. Emery shares several real-world examples to illustrate the application of these principles. One example involves a graph showing nuisance fire alarms at the University of Texas. Initially, the data was displayed in an overlapping line graph, making it difficult to interpret. By transforming it into a stacked

bar graph, changing colors to represent different causes, and removing unnecessary bold elements, the data became clearer and more actionable.

Another example addresses workers' compensation experience modifiers. The original graph was cluttered and confusing, but by reformatting it to display trends and rankings clearly, administrators could easily understand and use the information. Emery also emphasizes the importance of using consistent colors and labels, which help the viewer quickly grasp the key points.

Engaging Stakeholders Through Effective Data Presentation: Effective data presentation is not just about clarity but also about engaging stakeholders and encouraging good questions. Dr. Emery notes that well-displayed data often leads to insightful questions, which is a core part of effective communication. He advises presenting data in a way that invites curiosity and discussion, which can lead to better decision-making.

Conclusion and Call to Action: Dr. Emery concludes by challenging participants to improve their data presentation skills and to collaborate in creating a repository of best practices for displaying data. He encourages the development of a professional community where individuals can share their data display challenges and solutions. This ongoing refinement of data visualization skills is essential for all professionals involved in data-driven decision-making processes.

Through this course, Dr. Emery provides valuable insights and practical advice on how to transform data into compelling stories that can drive effective decisions and foster a deeper understanding among stakeholders. His emphasis on clarity, consistency, and engagement offers a robust framework for anyone looking to improve their data presentation skills.

Learning Objectives

1. Understand the importance of compelling data displays in effective communication and decision-making.
2. Learn the key principles of data visualization, including the use of proportional representation and clear labeling.
3. Develop skills to transform complex data sets into coherent, visually appealing graphs and charts.
4. Identify and correct common mistakes in data presentation to enhance clarity and impact.
5. Apply best practices for creating time series data displays that align with human cognitive expectations.

Primary Takeaways

1. Effective data presentation is critical for making informed decisions and achieving stakeholder buy-in.
2. Common visualization tools like Excel and PowerPoint require customization beyond default settings to produce clear and accurate representations.
3. Consistency in design and minimizing non-essential elements (data-to-ink ratio) are crucial for maintaining focus on the data itself.
4. Comparing related data sets side-by-side facilitates better understanding and highlights key insights.
5. Regularly seeking feedback on data displays from colleagues can help identify areas for improvement and ensure the intended message is communicated.

Course Outline

1) Introduction to Data Visualization
   a) Importance of Data Display
   b) Objective of the Course

2) Principles of Effective Data Presentation
   a) Proportional Representation
   b) Clear Labeling
   c) Consistent Design
   d) Maximizing Data-to-Ink Ratio

3) Common Pitfalls in Data Visualization
   a) Over-reliance on Default Settings
   b) Misleading Graph Types
   c) Unclear Legends and Labels
   d) Inconsistent Formatting

4) Techniques for Compelling Data Displays
   a) Customizing Graphs and Charts
   b) Using Color and Design Effectively
   c) Creating Time Series Data Displays
   d) Applying Academic Insights (Dr. Tki and Dr. Tufty)

5) Real-World Examples and Case Studies
   a) University Data Display Improvements
      i) Nuisance Fire Alarms
      ii) Workers' Comp Experience Modifiers

   iii) Corridor Clearance Metrics
b) Global Data Display Examples
   i) Safety Program Reports
   ii) Industrial Hygiene Data During Deepwater Horizon Event

6) Practical Tips and Best Practices
   a) Soliciting Feedback on Data Displays
   b) Anticipating Questions from Stakeholders
   c) Refining Graphs for Key Meetings

7) Conclusion and Call to Action
   a) Encouragement to Develop a Data Display Repository
   b) Continuous Improvement in Data Visualization Skills
   c) Final Thoughts and Contact Information

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