Operations Management Education Review 18: 184-200.

Explaining Technical Concepts Through Humor: The Case of Bayes' Theorem

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Abstract. Many technical disciplines, including operations management, struggle to engage learners deterred by mathematical formulae. To advance inclusion in such fields, it is important to find ways to overcome this obstacle. A carefully implemented humorous presentation can provide insight into a formula, illustrate its application, and make it memorable. To exemplify this approach, we present a short video (https://youtu.be/uq1wJ8mwD54), made in collaboration with a professional comedian, using humor to explain Bayes' theorem in an accessible and engaging manner. We evaluate the video's impact through a controlled experiment, with results showing the humorous approach significantly improves student comprehension, retention, and engagement compared to conventional instructional videos. We further discuss the video's creation and underlying logic, and offer guidance for educators interested in using humor to make other technical concepts accessible.

Keywords: conditional probability, educational video, active learning, decision making.

1. Introduction

Bayes' theorem plays a key role across several disciplines and is particularly impactful in operations management (Zhu and Sarkis 2022), where it provides a structured framework for addressing uncertainty and improving decision-making. In inventory management, it helps refine replenishment policies by incorporating updated demand forecasts, thereby minimizing stockouts or overstocking. In risk management, it helps quantify and anticipate the likelihood of disruptions or process failures, enabling proactive mitigation strategies. Additionally, in supply chain optimization, Bayes' theorem facilitates the analysis of probabilistic relationships between variables, such as supplier reliability and transportation delays. Given its broad applications, understanding this concept is essential for business school students, placing the responsibility on educators to develop effective methods for teaching it (see, e.g., Weltman *et al.* 2021).

Teaching probability is challenging because its associated concepts and reasoning are often perceived as difficult to grasp, non-intuitive and even counterintuitive. Some students experience statistics anxiety (Onwuegbuzie

and Wilson 2003), which can hinder learning. Studies have shown that fostering a more positive attitude toward the use of statistics in a course leads to improved academic outcomes (Vanhoof *et al.* 2006). Similarly, incorporating examples familiar to students enhances their motivation to engage with the material (Wathen and Rhew 2019). These findings underscore the importance of identifying effective approaches to justify the use of complex reasoning, such as Bayes' theorem, and to explain these concepts as clearly and simply as possible.

The utility of using humor as a teaching tool has been previously recognized (Ziv 1998; Banas *et al.* 2011). While humor carries certain risks and its effects depend on students' perceptions (Martin 2023), numerous academic studies highlight its effectiveness in capturing sustained attention and fostering genuine student engagement. For example, Spörk *et al.* (2023) demonstrate how the use of humor facilitated students' understanding of concepts related to sustainable development and promoted their engagement in this area. Similarly, Neumann *et al.* (2009) examine an introductory university statistics course and observe that humor in face-to-face teaching can break potential monotony, provide mental breaks, reduce negative attitudes toward the subject, and enhance their engagement – although this effect is diminished for students already interested in the course.

Successful humor writers (Dikkers 2014; O'Shannon 2012; Toplyn 2014) offer valuable insights into the use of humor, but these are not specifically tailored to teaching technical subjects such as operations management. In collaboration with a professional stand-up comedian who happens to have an educational background in applied mathematics and statistics, we created an educational video that uses humor to explain Bayes' theorem. This article outlines our approach and analyzes how it can serve as an effective complement to teaching a complex concept. The proposed methodology is relatively straightforward to apply to other technical concepts in operations management, such as economic order quantity, process capability index or the bullwhip effect.

2. The Humorous Video

As mentioned above, the counterintuitive nature of Bayes' theorem makes it challenging for learners. This complexity has inspired the creation of various educational resources, including popular educational videos aimed at clarifying the concept (e.g., Khan Academy 2014; Veritasium 2017). However, such videos are often off-putting for learners averse to long explanations, as they typically exceed 10 minutes. Further, they rarely use humor as a central channel to engage the learner.