Do Lecture Pace and PowerPoint Detail Affect Students' Comprehension of and Memory for a PowerPoint-Assisted Lecture?

Nicole D. Koktavy, Ian A. Halberg, Johnathan C. Chase, Amy E. Steffes, Amy, K. Xiong,
Carson A. Maule, Ashley S. Zellhoefer, Dr. Kathryn L. Hamilton, & Dr. Allen H. Keniston
Department of Psychology, University of Wisconsin-Eau Claire

Introduction

- Although an industry-standard lecture aid, PowerPoint has received little systematic controlled research.[1]
- A recent well-controlled study found no effect of PowerPoint on students' immediate memory of lecture material.[2]
- Based on research evaluating multimedia presentations, the previous study manipulated only the amount of detail presented on PowerPoint slides.[2]
- Research on multimedia presentations also suggests that the rate of speech (pace) affects retention of information from multimedia presentations, such as lectures accompanied by PowerPoint.[3,4]
- The current study explores the interaction between detail of the PowerPoint slides and pace of the lecture on students' learning.

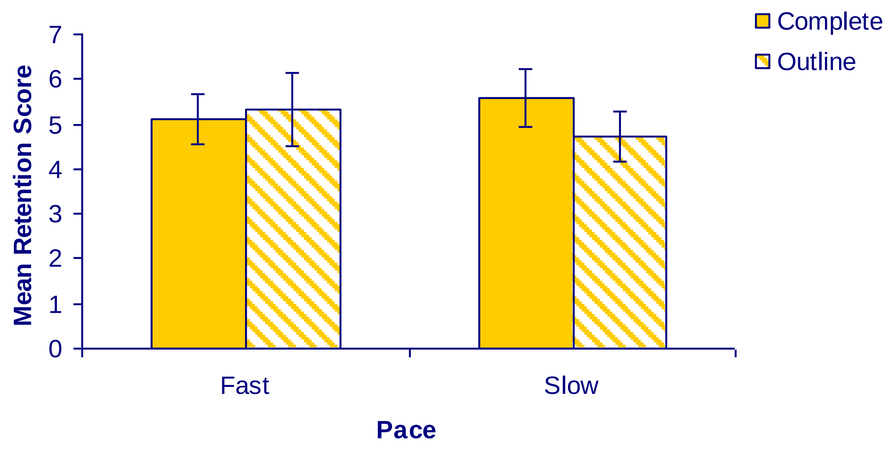
Hypotheses

- A lecture aided by complete PowerPoint slides will improve students retention of lecture material over partial PowerPoint slides.
- A fast-paced lecture will hinder students' retention of lecture material.
- A fast lecture aided by partial PowerPoint slides will benefit students more than a fast lecture aided by complete PowerPoint slides. The opposite will be true for slow-paced lectures.

Method

- 87 college students volunteered for this study.
- The experiment took place in classrooms equipped with DVD players and video projectors.
- Materials included:
  - Identical lectures on DVD delivered by a speaker unknown to students that varied according to:
    - ✓ Pace (72 vs. 205 words per minute)
    - ✓ PowerPoint detail (partial vs. complete)
  - # 2 Pencils
  - Scantron sheets
  - MC test of what participants thought they knew about neural communication
  - Free-recall retention test
  - Essay transfer test
- We arbitrarily assigned participants to four conditions (2 x 2 design) defined by pace and PowerPoint detail.
- All participants completed the test of previous knowledge, watched the video, and completed the retention test and the transfer test.
- We asked participants not to take notes.

Results



- Figure 1 displays the mean score on the free-recall retention test as a function of the 2 independent variables. Higher scores indicate better recall of material from the lecture.
- Two independent raters scored the retention tests.
  - Inter-rater reliability: $r = 0.80$, $p < 0.01$
- We used a 2-way ANOVA to determine the effects of level of detail and pace of a lecture on the retention of material presented.
- There was no effect of the level of detail on retention scores.
  - $F(1, 83) = 0.24$, $p > 0.10$
- There was no effect of the pace of lecture on retention scores.
  - $F(1, 83) = 0.01$, $p > 0.10$
- There was no significant interaction between the variables.
  - $F(1, 83) = 0.68$, $p > 0.10$
- The correlation between scores on the retention test and the test of students' perceived previous knowledge was not significant.
  - $r = 0.21$, $p = 0.06$
- Two independent raters scored transfer tests unsuccessfully (the correlation did not achieve criterion of 0.80). No further analyses were run.
  - Inter-rater reliability: $r = 0.36$, $p < 0.01$

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Discussion

- Opposing our hypotheses, pace and detail had no effect on immediate recall of lecture material.
- The current results are similar to the results of two other experiments in our research program.[5,6]
- These results must be considered in light of several methodological difficulties that appear to be inherent in laboratory simulations of PowerPoint's effectiveness as a lecture aid.
  - Retention scores were quite low, indicating that very little material was retained.
  - Participants may not have been adequately motivated to learn the material.
  - The pace manipulation may have been too extreme.
    - ✓ The fast-paced lecture may have moved too quickly for comprehension.
    - ✓ The slow-paced lecture may have impaired attention.
- We are convinced that our results are valid because we have obtained them in separate replications and extensions.
- However, we are not convinced that we have created ecologically valid representations of the influence of PowerPoint as a lecture aid in classroom settings.
- If future work shows that the problems we encountered do not influence our basic findings, we may be able to conclude that PowerPoint's utility does not lie in its text presentation capabilities.
- Nevertheless, PowerPoint may possess other utilities that recommend it as a useful tool to enhance lecture quality.

References

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