



# Does Students' Analytic Skill Affect Their Ability to Learn from a PowerPoint-Assisted Lecture?



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## Introduction

- Although an industry-standard lecture aid, PowerPoint has received little systematic controlled research.<sup>1</sup>
- A recent well-controlled study found no effect of PowerPoint on students' immediate memory of lecture material.<sup>2</sup>
- However, individual differences in students' learning styles may interact with use of PowerPoint to affect PowerPoint's utility as a lecture aid.
- A learning style variable known to influence the effectiveness of lecture aids is field-dependence/ field-independence (FD/FI).<sup>3</sup>
- The present study examined how PowerPoint detail interacts with learning style to determine how much students remember from a lecture.

## Hypotheses

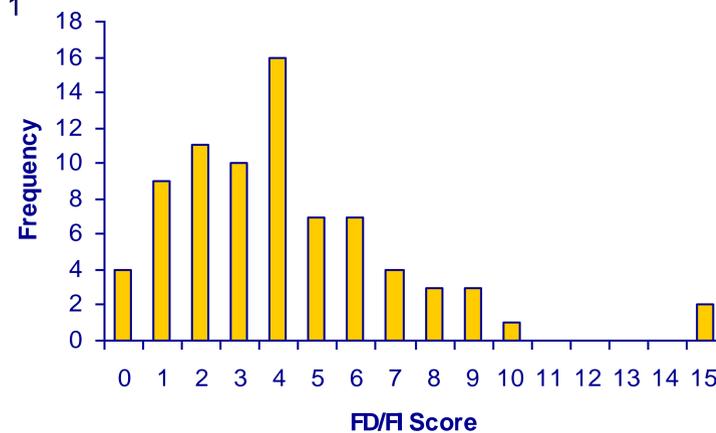
- Learning style will interact with the amount of detail to affect participants' memory for lecture material.
- Field-dependent participants will perform better in PowerPoint conditions (Complete or Outline) than they will in the Video Only condition, but field-independent students will perform no better between conditions.

## Method

- 77 college students volunteered for this study.
- The experiment took place in classrooms equipped with DVD players and video projectors.
- Materials included:
  - 10-minute lecture recorded on DVD delivered by a speaker unknown to students
  - # 2 Pencils
  - Scantron sheets
  - Hidden Figures Test (HFT)
  - MC test of what participants thought they knew about neural communication
  - Free-recall retention test
  - Essay transfer test
- We arbitrarily assigned participants to:
  - Lecture with video only
  - Lecture with video accompanied by partial PowerPoint slides (lecture outline)
  - Lecture with video accompanied by complete PowerPoint slides (detailed notes).
- All participants completed the HFT and the test of previous knowledge, watched the video, and completed the retention test and the transfer test.
- We asked participants not to take notes.

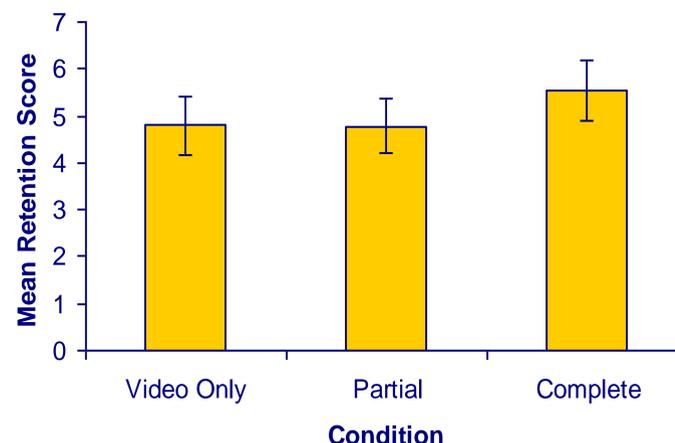
## Results

Fig. 1



- Figure 1 displays the frequency of correct responses on the HFT. Higher scores indicate field-independence.
- Mean score was 4.17 ( $SD = 2.97$ ) correct out of 16 possible.

Fig. 2



- Figure 2 displays the mean score on the free-recall retention test. Higher scores indicate better recall of material from the lecture.
- Two independent raters scored retention tests.
  - Inter-rater reliability:  $r = 0.83, p < 0.001$
- We used an ANCOVA to determine the effects of the type of lecture and used the HFT scores as the covariate.
- There were no differences among lecture formats.
  - $F(2, 72) = 0.64, p > 0.10$
- Learning style had no effect on immediate recall of lecture information.
  - $F(1, 72) = 0.23, p > 0.10$
- The correlation between scores on the retention test and the test of students' perceived previous knowledge was not significant.
  - $r = 0.16, p > 0.10$
- Two independent raters scored transfer tests unsuccessfully (the correlation did not achieve criterion of 0.80). No further analyses were run.
  - Inter-rater reliability:  $r = 0.66, p < 0.001$

## Discussion

- Surprisingly, neither PowerPoint detail nor learning style influenced immediate recall of lecture material, replicating and extending our previous work.<sup>2</sup>
- Before we can conclude that these variables do not influence PowerPoint's impact on learning, we must consider difficulties we encountered in our work.
  - Retention scores were quite low, indicating that very little material was retained.
  - Participants may not have been adequately motivated to learn the material.
  - Participants may have been fatigued by our testing procedures.
  - The majority of our participants were field-dependent, which restricted our ability to test the influence of learning style on retention.
- Despite these limitations we believe our findings are valid. For example, participants' previous knowledge, an extraneous variable, was not related to retention scores.
- The pattern of findings were similar to the results of two additional studies.<sup>4,5</sup>
- Therefore, we believe that we have demonstrated that PowerPoint detail does not strongly influence students' retention of lecture material under the conditions we used in our experiment.
- However, future work must address the influence of criterion measures, participant motivation, test fatigue, and broadly sampled learning style differences before we conclude that PowerPoint has no influence on students' retention of lecture material.

## References

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