



Note-taking as a Determinant of the Effectiveness of PowerPoint as a Lecture Aid



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Introduction

- PowerPoint is a much used but little researched multimedia lecture aid.
- Few studies have shown that students appreciate PowerPoint assisted lectures, but rarely have demonstrated learning benefits.³
- The most compelling finding to date is that PowerPoint enhances learners' interest in the lecture; cognitive benefits have been less established.^{1,3}
- Our previous controlled studies² have not found PowerPoint to enhance immediate recall or transfer of lecture material.
- Our previous studies may have yielded no effects because we manipulated only features of the PowerPoint presentation.
- However, students often take notes during PowerPoint facilitated lectures.
- Note-taking's effects on immediate recall and knowledge retention have been widely documented.^{5,7}
- Perhaps note-taking interacts with PowerPoint to enhance knowledge transfer and retention of lecture material.
- Therefore, we conducted an experiment that examined the interactive effects of PowerPoint and note-taking on learners' immediate recall and transfer of learning from a lecture.

Hypotheses

- Learners who take notes will score higher on an immediate multiple choice test and on a true-false transfer test than will students who do not take notes, because they will enjoy the effects of note-taking.
- Learners who view PowerPoint slides accompanying a lecture will score higher on recall and transfer tests than will students who hear the lecture without accompanying PowerPoint slides.
- Viewing PowerPoint slides and taking notes will interact, because generative effects and reduced cognitive load will act synergistically to create an environment ideal for the recall and comprehension of the lecture material.

Methods

Participants

- Psychology students recruited at a comprehensive midwestern university
- Predominantly white
- Females=30 vs. Males=9

Materials

- Informed consent form
- Test of previous knowledge of neuron transmission
- Scantron sheet and #2 pencil
- Two 10minute lectures visually recorded on DVD (one with, one without PowerPoint slides) about neuron communication
- PowerPoint slides gave brief outlines of associated lecture material
- 28 item multiple choice retention tests
- 24 item true/false transfer tests
- Evidence of participation and debriefing forms

Procedure

- We randomly assigned participants to one of the 4 conditions.
- Students read and completed the informed consent form.
- Students then completed the test of previous knowledge about neuron communication.
- Participants viewed the recorded lecture projected on a screen in a standard classroom.
- Participants either did or did not take notes.
- After the lecture participants took a retention test and then a transfer test.
- When finished, participants received evidence of participation and debriefing forms.

Design

- 2 (no note-taking, note-taking) x 2 (no PowerPoint, PowerPoint)

Results

Table 1

| PPT Condition | Note Condition | Mean | Standard Deviation |
|---------------|----------------|-------|--------------------|
| No PowerPoint | No Notes | 18.00 | 4.16 |
| No PowerPoint | Notes | 18.86 | 4.41 |
| PowerPoint | No Notes | 20.00 | 2.83 |
| PowerPoint | Notes | 18.11 | 4.91 |

- Table 1 displays means and standard deviations of scores on the retention test. Higher scores indicate better recall of material from the lecture.

- We used an ANOVA to determine the effects of PowerPoint and note-taking on the retention test.

- There were no significant differences between PowerPoint conditions.

$$F(1,35) = .227, p = .64$$

- Note-taking had no effect on immediate recall of lecture material.

$$F(1,35) = .154, p = .70$$

- There was no interaction between PowerPoint and note-taking.

$$F(1,35) = 1.090, p = .30$$

Table 2

| PPT Condition | Note Condition | Mean | Standard Deviation |
|---------------|----------------|-------|--------------------|
| No PowerPoint | No Notes | 15.20 | 2.82 |
| No PowerPoint | Notes | 15.29 | 2.98 |
| PowerPoint | No Notes | 15.69 | 3.59 |
| PowerPoint | Notes | 14.78 | 2.64 |

- Table 2 displays means and standard deviations of scores on the transfer test. Higher scores indicate better comprehension of material from the lecture.

- An ANOVA was also used to determine the effects of PowerPoint and Note-Taking on the transfer test.

- There were no significant differences between PowerPoint conditions.

$$F(1,35) = .000, p = .99$$

- Note-Taking had no effect on comprehension of lecture material.

$$F(1,35) = .166, p = .69$$

- There was no interaction between PowerPoint and Note-Taking.

$$F(1,35) = .242, p = .63$$

Discussion

- There were neither main nor interactive effects of PowerPoint or note-taking.
- However, before we conclude that these variables do not influence learning, we must consider difficulties we encountered.

- Participants may not have been motivated to learn the material.

- Participants' lack of motivation could have been due to the fact that the extra points offered were not contingent on their performance.

- The lecture material was dry and/or difficult to comprehend.

- Additionally, the PowerPoint slides may not have been optimally designed to highlight the conceptual structure of the lecture.

- Finally, this study suffered the limitation of few participants.

- Despite these limitations, the consistency of the current findings with our previous work² reinforces our growing conviction that variations in PowerPoint implementation do not influence students' immediate recall of lecture material under these or other conditions.

- Our research has looked only at variations of text-based functions of PowerPoint. Perhaps such variations in the use of PowerPoint have little effect on learning, but rather other features of PowerPoint, including tables, figures, and videos, may influence learning. In fact, a growing literature on multimedia learning has documented powerful effects of these aspects of teaching materials on retention and transfer⁶.

References

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