Multimedia, It’s How You Use It: Reflections on a Selected Computerized Teaching Technology

SUMMARY. The current study chronicles what one professor learned from teaching a distance education course with and without the aid of PowerPoint multimedia presentation software. It compares student ratings of three lectures from the same classes by the same professor; the

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first, a traditional lecture without any audiovisual aids; the second, a lecture supplemented by PowerPoint notes outlining the lecture; and finally, a multimedia lecture utilizing PowerPoint notes with pictures, music and animations. Students reacted no differently to any of the presentations when delivered by an experienced teacher. The students did, however, prefer PowerPoint multimedia to PowerPoint outline presentations. Suggestions for the optimal uses of presentation software are provided. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <getinfo@haworthpressinc.com> Website: <http://www.HaworthPress.com> © 2002 by The Haworth Press, Inc. All rights reserved.]

**KEYWORDS.** Teaching, distance education, computers, PowerPoint, presentation software, multimedia

Educators are being urged to integrate computer technologies into their teaching to make it “more efficient” and “more fun.” Lectures are supposed to give way to “multimedia presentations,” and professors are being urged not to be left out of the revolution in teaching technology. Reinhardt (1995), for example, claimed that “explosive growth in . . . multimedia, and collaborative software environments is fueling a new wave of better teaching tools. This generation of technology promises more than an improvement in educational productivity: It may deliver a qualitative change in the nature of learning itself” (p. 50). Gatlin-Watts, Arn, and Kordsmeier (1999) wrote: “[I]nstructional delivery systems using multimedia can be the exponential tool that will transform education in the same manner the tractor transformed agriculture and the airplane transformed transportation” (p. 190).

In his book *High Tech Heretic* computer expert Clifford Stoll (1999) voiced a dissenting opinion. He noted that putting a computer into the hands of every student was not the panacea that many teachers hoped. Stoll stated that, contrary to manufacturers’ claims, having a particular computer or software program did not necessarily make learning “more efficient” or “more fun”; and, despite computers being hyped by business and governmental agencies, not all classroom problems could be solved by a computer.

How helpful the computer will be to education is yet to be determined. However, it is unlikely to be any more of a quick fix or panacea than the miracle tools or “magic bullets” of the past (Stanovich, 1998).
The present study is an attempt to determine initial student impressions of one computerized multimedia teaching technology—that is, Microsoft’s PowerPoint presentation software. PowerPoint is frequently used in local and distance education settings. Three types of presentations were compared within the same courses presented by the same professor. The first, a traditional lesson in lecture format (lecture lesson) without any audiovisual aids; the second, a different lesson with a series of PowerPoint slides outlining the main ideas (PowerPoint notes lesson); and finally, a lesson utilizing a PowerPoint multimedia outline, including pictures, music, and animations (multimedia lesson).

Following the presentations, students in the two psychology classes completed an After-Class Rating Sheet (ACRS), evaluating each type of lesson. The primary hypothesis was that the three types of lessons would be rated differently by the students in terms of instructor quality, presentation, and student involvement/understanding. A second hypothesis was that the two types of PowerPoint lessons (PowerPoint notes and multimedia) would be rated differently on ACRS questions specific to those presentations.

**METHOD**

**Participants**

Participants were students in either a developmental or a social psychology class at a small rural southern university. Both classes were sophomore level. As part of the ACRS survey, students were asked to generate their own “identifier,” a word to enable matching their responses during statistical analysis. Based upon the number of unique identifiers, all 75 students (74 undergraduate and 1 graduate) originally registered for the classes rated at least one of the lessons, and 50 students completed rating sheets for all three types of lessons. Of the original enrollment, 63 were females and 12 were males. Since there was a preponderance of females, gender differences were not explored. A total of 72 students received a grade at the end of the semester.

All 75 participants were volunteers. The most common classification (31 students or 41%) was sophomore. Most of the students (34 or 45%) were nursing majors. Only 6 students (8%) were psychology majors.

**Materials**

*After-Class Rating Sheet (ACRS).* The ACRS consists of 14 Likert-type items and two open-ended questions about the lesson. The ACRS
is provided as Appendix A. The Likert-type items are based on the university’s end-of-the-semester student evaluation of instruction. All Likert-type items are scaled ranging from 1 (strongly disagree) to 7 (strongly agree), except for item 7. The scale for item 7 was 1 (strongly negative) to 7 (strongly positive).

The 14 scalar items fall into four categories. The first consists of “instructor items” such as “The instructor was well prepared for this lecture.” The second category is comprised of “presentation items” such as “The presentation of today’s material was clear.” The third category is “multimedia items” such as “The multimedia materials (materials presented on television via LCD projector) contributed to your interest in this class.” If PowerPoint was not used, students were instructed to leave these items blank. Finally, the fourth category contained “self-items” focused on the students’ reactions (e.g., “I felt that I was involved in today’s class”).

The ACRS concludes with two open-ended items: The first is “The thing that I liked most about today’s class was:”; the second item, “The thing that I liked the least about today’s class was:”

**Procedure**

The ACRS was administered during the last five minutes of each 50-minute class period immediately following the lesson. To avoid contaminating the ratings, the instructor stressed that ratings would remain anonymous and have no effect on students’ grades. Students were encouraged to take as much time as necessary and to be truthful. Participation did not garner extra credit.

The four instructor items were summed to yield an “Instructor Total Score” (ITS) for each respondent. A similar procedure was used to calculate a “Presentation Total Score” (PTS) based upon ACRS’s five presentation items and a “Self Total Score” (STS) based upon the three self-items.

The ACRS contained two multimedia items. The first was “The multimedia materials contributed to your interest in today’s class” (MMIN). The second was “The multimedia materials made the presentation more clear” (MMCL). These items were analyzed separately from each other.

**Analyses**

A ceiling-effect was apparent in all ACRS items (and derived scores); the distributions were negatively skewed. Therefore, analyses
consisted of a series of nonparametric tests. Since each respondent could generate an ITS, a PTS, and an STS for all types of lessons (lecture, PowerPoint notes, and multimedia), a Friedman test for repeated measures was performed with these scores. Given the preliminary nature of the study, an alpha level of .05 was the significance criterion for each test.

Since respondents generated only two measures of multimedia effectiveness (MMIN for interest and MMCL for clarity), a Wilcoxon matched-pairs signed-ranks test was deemed appropriate.

RESULTS

Table 1 presents the medians, semi-interquartile ranges, and n’s for the 14 scalar items on the After-Class Rating Sheet (ACRS) for each of the three types of lessons. Some individuals did not complete an ACRS for all three types of presentations; therefore, only 61 of the sheets rated the lecture, while 64 rated the PowerPoint notes lesson, and 64 rated the multimedia lesson. The medians, semi-interquartile ranges, n’s, and statistical analyses for the Instructor Total Score (ITS), Presentation Total Score (PTS), and Self Total Score (STS) are presented in order, followed by the multimedia items. The open-ended items will be discussed at the conclusion of this section.

Instructor Total Score. The ITS compares students’ ratings of instructor preparedness, concern, attentiveness, and enthusiasm during the lecture, PowerPoint notes, and multimedia lessons. The medians and semi-interquartile ranges were as follows: for the lecture, \( MD = 28.00 \), semi-interquartile range was 1.5; for the PowerPoint notes lesson, \( MD = 28.00 \), the semi-interquartile range was 1.5; for the multimedia lesson, \( MD = 28.00 \), the semi-interquartile range was 1.0. The Friedman test statistic (corrected for ties) of \( \chi^2 (2, n = 50) = .540, p > .05 \) was not significant. Students’ ratings of the instructor did not vary significantly over the three lesson formats.

Presentation Total Score. The PTS compares students’ ratings of presentation clarity, ability to hold their interest, overall quality, clarity of objective, and speed of presentation during the lecture, PowerPoint notes, and multimedia lessons. The medians and semi-interquartile ranges were as follows: for the lecture, \( MD = 33.00 \), semi-interquartile range was 2.5; for the PowerPoint notes lesson, \( MD = 34.00 \), semi-interquartile range was 2.5; for the multimedia lesson, \( MD = 33.50 \), semi-interquartile range was 1.5. The Friedman test statistic
TABLE 1. Medians (Mdn), Semi-Interquartile Ranges (SiR) and N's of Items on the After-Class Rating Sheet

<table>
<thead>
<tr>
<th>Item</th>
<th>Lecture</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mdn</td>
<td>SiR</td>
<td>Mdn</td>
<td>SiR</td>
<td>Mdn</td>
<td>SiR</td>
<td></td>
</tr>
<tr>
<td>1. Instructor is well prepared.</td>
<td>7</td>
<td>0.13</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>2. Presentation clear.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>3. Presentation interesting.</td>
<td>6.5</td>
<td>0.50</td>
<td>7</td>
<td>0.62</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>4. Multimedia made interesting.</td>
<td>*</td>
<td>*</td>
<td>7*</td>
<td>1.00</td>
<td>7</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>5. Multimedia made clear.</td>
<td>*</td>
<td>*</td>
<td>7</td>
<td>0.75</td>
<td>7</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>6. Instructor concerned.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>7. Rating of the presentation.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>8. Objective presented.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>9. Instructor attentive.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.13</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>10. Presentation rate.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.00</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>11. Instructor enthusiastic.</td>
<td>7</td>
<td>0.13</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>12. I understood.</td>
<td>7</td>
<td>0.00</td>
<td>7</td>
<td>0.13</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>13. I was involved.</td>
<td>6</td>
<td>1.00</td>
<td>6</td>
<td>1.00</td>
<td>6</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>14. I was interested.</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td>7</td>
<td>0.50</td>
<td></td>
</tr>
</tbody>
</table>

Note: * Statistics for items 4 and 5 are based on N = 49, as 49 participants completed the ACRS for PowerPoint notes and multimedia. All other statistics are based on N = 50, as 50 participants completed the ACRS on all three occasions.

(corrected for ties) for this variable, \( \chi^2 (2, n = 50) = 3.288, p > .05 \), was not significant.

*Self Total Score.* The STS compares students' ratings of their understanding, involvement, and interest during the lecture, PowerPoint notes, and multimedia lessons. The medians and semi-interquartile ranges were as follows: for the lecture, \( MD = 19.00 \), semi-interquartile range was 1.5; for the PowerPoint notes lesson, \( MD = 19.00 \), semi-interquartile range was 2.0; for the multimedia lesson, \( MD = 19.50 \), semi-interquartile range was 1.5. The Friedman test statistic (corrected for ties) of \( \chi^2 (2, n = 50) = .623, p > .05 \) was not significant.

*Multimedia Interest and Clarity.* The MMIN and MMCL measures examined whether students found the PowerPoint notes lesson more interesting (MMIN) or clearer (MMCL) than the multimedia lesson, or vice versa. Medians and semi-interquartile ranges for the MMIN variable were as follows: for the PowerPoint notes lesson, \( MD = 7.00 \), semi-interquartile range was 1.0; for the multimedia lesson, \( MD = 7.00 \),
semi-interquartile range was 0.0. The Wilcoxon matched-pairs signed-ranks test statistic (corrected for ties) of the interest variable was $Z = -3.19, p < .001, n = 49$. Results indicated that students felt the multimedia lesson held their interest better than the PowerPoint notes lesson.

The medians and semi-interquartile ranges for the MMCL variable were as follows: for the PowerPoint notes lesson, $MD = 7.00$, semi-interquartile range was 0.75; for the multimedia lesson, $MD = 7.00$, semi-interquartile range was 0.25. A Wilcoxon of the MMCL variable (corrected for ties) indicated that students also felt that the multimedia lesson was significantly clearer than the PowerPoint notes effort ($Z = -3.19, p < .001, n = 49$).

The Open-Ended Items. The final two items of the ACRS were the open-ended questions, “What did you like most. . . .” and “What did you like least. . . .” Of the 189 ACRS scales completed, 131 forms had a “liked most” comment, a “liked least” comment, or both. A total of 43 students had positive comments concerning the lecture; 29 had positive comments concerning the PowerPoint notes class; and finally, 59 students commented positively about the multimedia class. On the liked least item, 5 students commented negatively on the lecture; no negative comments followed the PowerPoint notes class; and 9 students commented negatively on the multimedia class.

A positive theme that reoccurred through different lesson types concerned the use of humor, good examples, and doing something different in class (e.g., a demonstration, audience participation, singing). Negative reoccurring themes included the necessity for taking notes, getting off topic, and pacing (not enough or too much material covered). Most comments concerning integrating PowerPoint into lessons were positive, although some students disliked using PowerPoint.

**DISCUSSION**

With respect to the primary hypothesis, there was no evidence that students react more or less favorably to traditional lectures versus lessons with PowerPoint outlines or lessons with PowerPoint and multimedia when delivered by an experienced teacher. This is true regarding student ratings of the presentation, the instructor, and students’ own reactions. The data are congruent with Lookatch’s (1995) conclusions that “research to date has never verified that using a computer or any other technology improves learning” (p. 4). With respect to the second hypothesis, the data provided clear evidence that these students thought
that PowerPoint multimedia presentations were more interesting and clear than those that merely outlined what was being said.

What may be concluded about multimedia presentations? To paraphrase the English actor Edmund Gwenn, "Dying is easy . . . multimedia is hard." Creating and integrating even simple slide outlines into class presentations is a time-consuming, labor-intensive task. Much more so when one adds multimedia components (e.g., a 15-second animation may take hours to prepare).

There is substantial pressure to "get with the program" and integrate multimedia into the classroom, as if doing so will cure academic ills. While innovation is often laudable, "innovation for innovation's sake" is dubious. There is no clear evidence that multimedia can make a bad teacher good, or even a good teacher better. It may be argued that a novice teacher might be better served by innovating and developing a personal presentation style and skills before making the considerably sizable leap to multimedia. There are certain principles of sound pedagogy that transcend the media. To misquote McLuhan, "The media is not the message," but rather a "conduit" for the message (McLuhan & Fiore, 1967, title page).

While "the sound and the fury" of multimedia are flashy, the teacher should adopt a healthy skepticism about them. We are reminded of the unfulfilled promise of previous technologies (e.g., educational television and programmed instruction) that were also supposed to cure all of our teaching woes; we are still waiting.

Given that multimedia will continue to be incorporated into education, the following provide suggestions for its effective use.

1. Utilize sounds and graphics with a multimedia presentation; that's what makes it multimedia. Data from our second hypothesis confirm this. The most common mistake in using presentation software like PowerPoint is under- or non-utilization of the programs' sound, graphics, and animation capabilities, resulting in a series of slides that are no different than an automated series of overhead transparencies and often less legible. Is a limited presentation convenient? Sometimes; but it is far from making full use of even the simplest multimedia software.

2. Do not become so focused on the multimedia program or hardware that one disconnects from students. Instructors can use their notes as a buffer between themselves and students; wonder of technological wonders, some can now fiddle with PowerPoint to pretend students are not really there! When teachers fail to no-
tice that their students are getting lost, bored, frustrated, or
downright angry because the teacher is focusing the LCD dis-
play, fumbling with hardware, or looking for the missing slide,
very little positive occurs.

3. Remember, multimedia is a tool—and sometimes tools fail to
work. Plan for disaster, and have a ready backup. A good teacher
can teach by candlelight if necessary. Lessons should not stop
because of a computer glitch. It may be suggested that teachers
adopt a policy whereby if the hardware/software cannot be made
to work in the first five minutes of class, start teaching—by “cand-
dlelight” if necessary. But start teaching! Interminable delays
occasioned by technological poltergeists are inexcusable; and,
worse, once some classes are lost, it can be very difficult to bring
them back on track.

4. Do not become so enamored by a multimedia program that it be-
comes an “end-in-and-of-itself.” What’s wrong with the follow-
ing dialog? Professor to a colleague, “Wow. I’ve a great set of
slides and animations on spurious correlation.” Colleague to
professor, “Great! Are your students understanding it better?”
Professor to colleague, “I don’t know, but the slides are sure
neat!”

CONCLUSION

When all the hype has abated multimedia will occupy a proper place
in the classroom, be it locally or at a distance, not as the savior of mod-
ern education, nor as a pariah, but as one of many tools that good teach-
ers use as appropriate. Integrate such technology wisely. Teachers need
to ask whether each picture, sound, or video clip furthers student learn-
ing or is extraneous fluff. We remind our colleagues and ourselves that
an unorganized, boring lesson with animated multimedia is still an un-
organized, boring lesson.

REFERENCES

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The Education Digest, 61, 4-8.

**APPENDIX A**

**Lecture Evaluation**

Please Print your Identifier:  
Today’s Date:

1. The instructor was well prepared for this lecture.¹
2. The presentation of today’s material was clear.
3. The presentation contributed to your interest in today’s class.
4. The multimedia materials (materials presented on television) contributed to your interest in today’s class. (If no multimedia was used please darken this circle.)
5. The multimedia materials (materials presented on television) made the presentation more clear. (If no multimedia was used, please darken this circle.)
6. The instructor was concerned that students learn today’s material.
7. Overall rating of the presentation for today’s class.²
8. The objective of today’s lecture was clearly presented.
9. During today’s presentation the instructor was attentive to students and their needs.
10. The presentation was at a reasonable rate.
11. The instructor displayed enthusiasm about today’s material.
12. I understood the material in today’s class.
13. I felt that I was involved in today’s class.
14. I felt that I was interested in today’s class.
15. The thing that I liked the most about today’s class was:
16. The thing that I liked the least about today’s class was:

¹ The scale for all items (except item 7) was 1 = Strongly Disagree to 7 = Strongly Agree.
² The scale for this item was 1 = Strongly Negative to 7 = Strongly Positive.