Study objective: We empirically identify those aspects that make an effective lecture according to both quantitative and qualitative assessments of the opinions of a select group of emergency medicine educators.

Methods: The authors worked collaboratively with the Educational Meetings Committee of the American College of Emergency Physicians (ACEP) to distribute surveys to 150 participants identified as exemplary lecturers in emergency medicine. These participants had been rated in the top 10% of all lecturers by ACEP’s Educational Meetings Committee, according to audience evaluations. Respondents quantitatively rated the importance of a set of strategies for the design/organization and delivery of a lecture. Additional qualitative responses were elicited from semistructured, open-ended questions that were used to identify conceptual themes and subcategories of major themes.

Results: One hundred fifty surveys were sent. Seventy-four (49%) of the surveys were returned, of which 67 (45%) were analyzed. Quantitative results revealed the top 3 categories of importance about design/organization (having a manageable scope of content for the allotted time, having clear objectives, and using case-based scenarios) and the top 3 categories of importance about delivery (knowledge of slides/material, having passion/enthusiasm, and interaction with the audience). Qualitative results revealed 5 thematic concepts from the analysis of 281 statements: delivery, vehicle, content, preparation, and uncontrollables, in order of descending importance according to our results. Under the category “delivery,” the subcategory “engaging” was the most frequently endorsed quality. “Relevance,” under the category “content,” was the second most endorsed quality of all the statements obtained.

Conclusion: Quantitative and qualitative findings indicate that a specific and directed structure, a lecturer’s knowledge base, and confidence and enthusiasm for the material are key components in the development of an effective lecture. These self-reported findings help describe strategies of exemplary emergency medicine lecturers that can be considered by faculty, residents, and other presenters. [Ann Emerg Med. 2011;58:482-489.]

Please see page 483 for the Editor’s Capsule Summary of this article.

INTRODUCTION

Emergency medicine educators are in a unique position to provide faculty development at all levels of experience, with the guidance and mentoring necessary to meet the challenges and unexpected rigors of the daily practice of emergency medicine. Interactive small-group and problem-based learning styles are generally regarded as superior teaching methods. However, although cognitive science and learning theory both propose that active learning offers students a deeper understanding of content material through active learning models, the lecture format remains one of the most time-tested, widely used, and effective teaching tools we have to dispense both factual and experiential knowledge. This didactic format is widely used and familiar to audiences, and yet the skills of preparing and delivering an effective lecture are mostly passed along through experiential learning. A systematized method of designing lectures for efficiency and effectiveness will be helpful to junior faculty as they develop teaching skills.

Background

As with other modes of teaching, lectures are distinguished by 2 characteristics: structure of material and presentation of material or the presenter’s style. The structure of a lecture traditionally follows a standard
Lectures, although not favored by educators, remain a mainstay of emergency medicine education. The utility of the lecture format in medical education research, between structure and presentation, an effective lecture can be thought of as the interplay that are not easily quantified. For the purposes of this study, lecture presentation may depend on more esoteric qualities that are not easily quantified in terms of components, the stylistic aspects of delivery, content, and design for purposes of maximizing subjective effect.

**Goals of This Investigation**

The purpose of this study was to empirically identify those aspects that make an effective lecture according to both quantitative and qualitative assessments, as rated by exemplary lecturers in emergency medicine. This study defines “effective” as being successful in producing desired results, such that the lecturer was satisfied with the general reception of the lecture, either by comments provided in person or formal evaluation provided by the audience.

**MATERIALS AND METHODS**

This was a prospective study based on quantitative and qualitative survey responses. The survey was developed with the modified Delphi technique. Face validity was established by developing the survey were the strategies used by effective lecturers, how the selected exemplary lecturers rated the importance of specific aspects of lecture structure and presentation, and what they determined to be the most problematic aspects of lecturing.

The survey was designed in 2 phases (Figure 1). Masters candidates in health professions at the University of Illinois at Chicago, Department of Medical Education, contributed to the design of the survey and protocol, along with the authors. After an initial pilot test with local emergency physicians, the panel reexamined the survey to review and adjust for usability and redundancy in survey design. The authors worked collaboratively with the Educational Meetings Committee of the American College of Emergency Physicians (ACEP) to distribute surveys to the 150 participants identified as exemplary lecturers in emergency medicine. Participant anonymity was maintained through online submission of completed surveys without identifying information.

**Selection of Participants**

A purposeful sample of 150 emergency medicine lecturers was selected for potential participants (Figure 2). Individuals in this cohort were rated in the top 10% of all lecturers by ACEP’s Educational Meetings Committee according to previous evaluations from the previous 5 years. Evaluations consisted of quantitative audience scores and qualitative comments by the participants at the conference. It was important to have ACEP identify the sample population independently to avoid bias. The final population sample ensured that the caliber of each participant met a standardized norm endorsed by the emergency medicine community.

Subjects independently completed all surveys online at their convenience. The original contact e-mail was sent to selected lecturers to inform them of the study objectives and asked subjects to volunteer anonymous participation by completing the survey through an Internet address link. The introductory e-mail further explained that potential participants had been identified as exemplary lecturers by ACEP and that their insight...
on lecture strategies would benefit junior faculty lecturers. Please refer to Appendix E1, available online at http://www.annemergmed.com, for the survey and participant instructions.

One week later, a second follow-up e-mail with identical information to the initial e-mail was re-sent to those potential participants originally identified who had not responded by completing the online survey. Survey responses were collected during a 2-week period, from October 14 through October 28, 2009. A claim of exemption was filed with the appropriate institutional review board committee at the University of Illinois at
Chicago and approved for the period August 3, 2009, through August 2, 2012.

Methods of Measurement  
Respondents quantitatively ranked the importance of a set of strategies (extremely important, important, somewhat important, and not important) for the design/organization and delivery of a lecture. Follow-up questions also pertaining to the same strategies then required the respondents to make an assessment of their perceived importance. In a separate question, respondents also ranked aspects that they believed contributed to making an ineffective or poor lecture. Qualitative responses were elicited from semistructured, open-ended, questions. Questions about the time spent on lecture preparation, use of evidence-based lecture techniques, and specific sources used were also investigated but are not reported.

Primary Data Analysis  
All data from the returned surveys were maintained through the online electronic survey source. On completion of the online survey, participant responses were automatically saved, remained anonymous, and were compiled for analysis at the completion of data collection. Data analysis for this study focused on determining a consensus of both the quantitative and qualitative responses.

Respondents ranked 7 factors as they pertained to the design/organization and delivery of a lecture on an ordinal scale. Respondents also made assessments about the importance of these same factors (ie, extremely important to not important). Forcing a rank choice may have amplified small differences, so the means of the assessment responses were examined, and if they were close together, then one could infer that the items could be reasonably grouped together in importance. The data are reported with attention to frequency distribution of responses and grouping by means. All data analysis was performed in SAS (version 9.2; SAS Institute, Inc., Cary, NC).

Methodological and interdisciplinary triangulation was used to test multiple sources of information against one another to confirm one hypothesis. Triangulation is the use of multiple methods for collecting data to enhance comprehension of complex topics. Moreover, the design of the qualitative aspect of this study was based on the strategy of the grounded theory framework, wherein responses of participants were used to build a presumptive theory that would allow subsequent categorization to illuminate common conceptual themes among all responses.

The constant comparative method based on a grounded theory approach was used to assess qualitative responses by 3 independent raters. Once major conceptual themes were agreed on, each rater further subcategorized the responses. In cases in which a single response had multiple prominent attributes, this response was subdivided and each subdivision was considered a separate thematic concept.

From the labeling of major thematic concepts and their subcategories, a master scheme was constructed. Discussion among the three raters served to expand, refine and confirm a coding structure. In order to minimize rater subjectivity, an agreed upon coding structure was reapplied to the data after the initial coding. A final objective testing of inter-rater reliability was performed with another completely independent rater who was also able to apply the coding structure in the same way as the initial investigative group.

RESULTS  
Characteristics of Study Subjects  
Seventy-four of 150 (49%) participants returned surveys. Seven of the 74 (9.5%) returned surveys were excluded because of partial quantitative data and no qualitative comments, leaving 67 of 150 (45%) fully completed and analyzed surveys. Thirty of 67 (45%) respondents were aged 51 years or older, followed by 27 of 67 (40%) of the respondents clustering within the 41- to 50-year age range. Sixty-two of 67 (93%) participants reported having a background in emergency medicine that was more clinically than research oriented, with only 4 of 67 (6.0%) respondents stating that their primary focus was in research. Fifty-three of 67 (79%) respondents reported having 6 or more years of experience speaking at national conferences such as ACEP Scientific Assembly (Table 1).

When asked to rank the importance of 7 factors related to design/organization of a lecture, frequency distribution of responses (Table 2) indicated that having both a manageable scope of content for the allotted time (35%; 53%) and clear objectives (20%; 30%) were ranked as the most important factors, whereas having a catchy title (21%; 32%), a multimedia presentation, and time left for questions/comments were ranked as the least important factors. A comparison of means of the respondents’ ranking of the same 7 factors reveals similar results.
(Table 3), showing that the categories of importance to respondents about design/organization in rank order were having a manageable scope of content for the allotted time, having clear objectives, and using case-based scenarios. Although the factors “a handout,” “a multimedia presentation,” “time left for questions,” and “a catchy title” were cumulatively ranked lowest, a means analysis revealed that the respective means did not significantly differ from one another and that these factors could be similarly grouped. Respondents’ categorization of these same factors by level of importance indicated that having both a manageable scope of content for the allotted time (52; 78%) and clear objectives (36; 54%) was extremely important, whereas a multimedia presentation was assessed to be somewhat important (22; 33%) and having a catchy title (1; 1.5%) or a handout (1; 1.5%) was assessed to be not important.

When asked to rank the importance of 7 factors related to delivery of a lecture, frequency distribution of responses indicated that having a knowledge of slides/material (29; 44%) and passion/enthusiasm (22; 33%) was the most important (Table 2). A comparison of means of the respondents’ ranking of these same 7 factors reveals that the factors of importance to respondents about delivery in rank order were knowledge of slides/material, passion and enthusiasm, and interaction with the audience (Table 3). Respondents’ categorization of these same factors by level of importance indicated that having both a knowledge of slides/material (62; 93%) and passion/enthusiasm (61; 91%) were extremely important. Only 4 of the respondents assessed any one of the following factors to be unimportant: interaction with the audience (1; 1.5%), powerful or memorable opening (2; 3.0%), and storytelling ability (1; 1.5%).

When asked to rank 6 problematic factors leading to an ineffective or poor lecture, a frequency distribution of responses indicated that monotone delivery was the most problematic factor (34; 52%) and distracting use of audiovisual and multimedia was the least problematic (27; 41%). A comparison of means revealed that the other factors were all considered comparable in ranking, with no significant differences between them.

On the initial coding of statements, interrater reliability score was 49%, which increased to 88% (kappa = 0.85) after determining a consensus of the labeling system based on each individual’s coding of the statements. Two hundred eighty-one statements were collected from 67 surveys. Five major thematic concepts emerged from the analysis: delivery, content, vehicle, preparation, and uncontrollables. The subcategories of each
theme were developed to elaborate on the content of the main thematic categories. Responses grouped under “delivery” related to the respondent’s style, those under “content” related to the informational aspect of the lecture, those under “vehicle” described the format of the lecture information, those under “preparation” included descriptions of the lecturers’ preparatory work in order to ensure an effective lecture, and those under “uncontrollable” represented factors outside of the lecturers’ immediate control (Table 4).

A speaker who exhibits passion and engagement of the audience was an important theme relating to delivery, as exemplified by the comment “Remaining enthusiastic and passionate about the material being presented.”

With reference to content, relevance was counted as a strong component, with a caution against a sales pitch, as in the following statement: “Presenting an extended advertisement for a product or firm—this is the death knell.”

Under the category of vehicle, participant warnings against improper use of multimedia were prominent, with comments such as “Misuse of PowerPoint, or example reading the lecture off the PowerPoint. The PowerPoint should be used as focal points or guideposts for the audience.”

In the area of preparation, knowledge building was the most prominent component, with participants warning, “Biggest problem is uncertainty about subject matter.”

And finally, in the area of uncontrollables, we are reminded that a “good audience (responsive, involved),” is a significant positive component, whereas “AV equipment crashing and burning; computer freezes; lecturer not knowing how to use system; tying the speaker to the podium” can have a strong negative influence.

Under the major thematic concepts identified by the raters, cumulative scores are reported in order of most endorsed: delivery 39%, vehicle 26%, content 19%, preparation 12%, and uncontrollables 4%. Of the statements that were categorized under delivery, the subcategory “engaging” accounted for 12%, which represented the most frequently endorsed quality of all the statements obtained. The second most frequently endorsed quality represented in the statements, accounting for 11%, was the subcategory “relevance” under the category of content. Two other subcategories grouped under distinct thematic concepts were “passion” and “knowledge building,” 9% each. The subcategories of “reputation building,” and “environment/equipment” accounted for 1% each of the statements obtained.

LIMITATIONS

A primary limitation of this study is the participant response rate. A larger response would allow more robust data analysis, as well as a higher level of significance assessment. Our purposeful sample may have been skewed by the fact that participants were included according to their willingness to complete a survey; roughly half of the surveys sent were not completed or returned. Furthermore, correlations between junior and senior exemplary lecturers were not analyzed to determine whether there was a difference in reporting by group. Our findings are based on self-
reported perceptions on the part of lecturers and thus do not directly measure the contribution of the factors identified by the educators to the perceptions of excellence on the part of their learners, nor do they measure actual learning outcomes in relationship to these predictors. Experts often are unable to articulate the means of their expertise. These are responses that exemplary lecturers gave, but whether they were truly instrumental in producing good lectures is unknown.

**DISCUSSION**

The purpose of our study was to empirically identify exemplary lecturers’ self-perception of factors that make an effective lecture. Our quantitative results indicate that these lecturers perceive effectiveness to be related to a manageable scope of content, clear objectives, and adequate knowledge of slides/material. Further, our qualitative results suggest that a specific and directed structure, as well as being passionate and enthusiastic about a topic and focusing on the “relevance” of material, is a significant aspect of a lecture’s effectiveness. Observer or audience perception of effectiveness was not measured in this study, nor are these results meant to suggest a direct correlation to learning outcomes.

Medical education literature is replete with data showing the superiority of interactive learning, such as small-group discussion and problem-based learning over didactic methods. Davis et al\(^30\) emphasized that interactive continuing medical education (CME) sessions that use participant interaction can effect change in professional practice and health care outcomes, whereas didactic sessions have not been shown to affect physician performance. Moreover, Irby\(^31\) discussed the domains of knowledge essential to teaching excellence and focused on the effectiveness of bedside clinical teaching. Despite evidence-based studies demonstrating improved outcomes, the didactic lecture continues to be a mainstay of medical education, including grand rounds and CME.\(^1,8,10\) As such, it is important to define key aspects of any lecture’s effectiveness. Although the majority of previous studies focused on examining the utility of the lecture, we used qualitative methods to study design and presentation.

Qualitative reports and expert opinion to improve medical education have been well documented.\(^31\) Our study builds on existing literature\(^6,7,10,14,17,20\) by including qualitative reporting on the factors that can lead to an effective lecture and by applying a specific methodological analysis to a larger number of

| Table 4. Qualitative thematic concepts: count and percentage of response. |
|---------------------------|----------------|---------------------------------|------------------|
|                          | **Count** | **Percentage** | **Example Response**                        |
| **Delivery**             |           |                 |                                               |
| Engaging                 | 34        | 12              | There was just enough to keep me (and the audience) loose. |
| Passion                  | 25        | 9               | Remaining enthusiastic and passionate about the material being presented. |
| Humor                    | 22        | 8               | Humorous presentation kept interest and made the messages memorable. |
| Flow                     | 16        | 6               | Smooth, dynamic and interesting presentation. |
| Confidence               | 5         | 2               | Apologizing is usually a big mistake. For example, “I’m sorry this material isn’t more exciting.” Big mistake. |
| Humility                 | 5         | 2               | Never talking “above” the audience—you as the speaker are the audience as well. |
| **Content**              |           |                 |                                               |
| Relevance                | 30        | 11              | Presenting an extended advertisement for a product or firm—this is the death knell. |
| Novel content            | 15        | 5               | Feeling obligated to begin lecture with material that “I know all of us already know these things, but I’m going to tell you about this anyway. . . .” |
| Novel approach           | 8         | 3               | Presented and packaged information beyond what could be attained from reading a textbook. |
| **Vehicle**              |           |                 |                                               |
| Multimedia               | 21        | 7               | Misuse of PowerPoint; for example, reading the lecture off the PowerPoint. The PowerPoint should be used as focal points or guideposts for the audience. |
| Cases/storytelling/anecdote | 18  | 6               | I use quick cases but don’t dwell on them to start and then demonstrate the material. |
| Organization             | 14        | 5               | Slides with too much information. |
| Clear/concise            | 14        | 5               | Fail to address stated objectives; fail to address the issues relevant to the audience. |
| **Scope**                |           |                 |                                               |
| Knowledge building       | 26        | 9               | Biggest problem is uncertainty about subject matter. |
| Rehearsal                | 5         | 2               | Poor preparation, so lecture comes off sounding unprepared and perhaps disjointed. There is no substitute for preparation. |
| Reputation building      | 2         | 1               | Reputation with audience before lecture (credibility). |
| **Preparation**          |           |                 |                                               |
| Knowledge building       | 26        | 9               | Biggest problem is uncertainty about subject matter. |
| Rehearsal                | 5         | 2               | Poor preparation, so lecture comes off sounding unprepared and perhaps disjointed. There is no substitute for preparation. |
| Reputation building      | 2         | 1               | Reputation with audience before lecture (credibility). |
| **Uncontrollables**      |           |                 |                                               |
| Audience                 | 8         | 3               | Good audience (responsive, involved). |
| Environment and equipment | 4         | 1               | Audiovisual equipment crashing and burning; computer freezes; lecturer not knowing how to use system; tying the speaker to the podium. |
| **Totals**               | 281       | 100             |                                               |
qualitative responses. By applying a vigorous qualitative analysis to self-reports, we have identified several factors that lecturers perceive as contributing to an effective lecture.

The qualitative results from this study can provide other faculty or residents guidance about features of structure and presentation of lectures associated with perceived excellence, as well as provide suggestions for those developing other forms of teaching that use similar lecture structure and presentation strategies (e.g., grand rounds, peer-reviewed Web-based lectures). The results suggest that, in addition to content, lecturers can focus on delivery and stylistic components to enhance their lecture’s “success.”

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Supervising editor: Peter C. Wyer, MD

Author contributions: CSK conceived the study, designed the trial and the survey, and distributed the survey with help from the ACEP Educational Meetings Committee. CSK and SD collected and interpreted the data with statistical support and drafted the article. CSK takes responsibility for the paper as a whole.

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Address for correspondence: Chad S. Kessler, MD, MHPE, E-mail chad.kessler@va.gov

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Appendix E1. Survey and introduction.

This is a brief survey designed for research purposes to identify effective lecturing techniques so that junior faculty will have a better understanding of the necessary skills to produce a high-quality lecture. The survey asks focused questions about lecturing skills. You are asked to complete this because of your status as an exemplar Emergency Medicine speaker by the American College of Emergency Physicians. The survey is voluntary and completely anonymous. The privacy of subjects and confidentiality of the research will be protected via computer and physical locks. There are no foreseeable risks to the participants or direct benefits, but junior faculty will benefit from this work. We thank you very much for your participation and dedication to the education of junior Emergency Medicine faculty. I am available to answer any and all questions by email. Again, thank you!

---

### Effective Lecturing in Emergency Medicine

#### Demographics

1. Please share your age:
   - 🗓️ < 35 years old
   - 🗓️ 35-40 years old
   - 🗓️ 41-45 years old
   - 🗓️ 46-50 years old
   - 🗓️ > 50 years old

2. Your emergency medicine background is more:
   - 🕵️‍♂️ Clinical
   - 🕵️‍♂️ Research

3. How many years have you been practicing emergency medicine (since residency)?
   - 🌋 1-5 years
   - 🌋 6-10 years
   - 🌋 11-15 years
   - 🌋 16-20 years
   - 🌋 > 20 years

4. How long have you been speaking at national conferences such as the ACEP?
Effective Lecturing in Emergency Medicine

Demographics

1. Please share your age:
   - <35 years old
   - 35-40 years old
   - 41-45 years old
   - 46-50 years old
   - >50 years young

2. Your emergency medicine background is more:
   - Clinical
   - Research

3. How many years have you been practicing emergency medicine (since residency)?
   - 1-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - >20 years

4. How long have you been speaking at national conferences such as the ACEP Scientific Assembly?
   - 1-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - >20 years

Evidence-Based Practice in Lecturing

5. Do you think that using evidence-based lecture techniques, as described in the literature, lead to a more successful lecture?
6. In preparation for designing and delivering lectures at ACEP Scientific Assembly, how often do you refer to journals and/or texts on effective lecturing?
   - Never
   - Rarely
   - Sometimes
   - Frequently
   - Nearly every time

7. Which resources (if any) have you used with regards to effective lecturing?

   Text #1
   Text #2
   Journal #1
   Journal #2

Strategies for Effective Presentation in a Large-Group Setting

8. When designing and organizing a lecture, how important is it to have:

   A catchy title

<table>
<thead>
<tr>
<th>Extremely important</th>
<th>Important</th>
<th>Somewhat important</th>
<th>Not important</th>
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</tbody>
</table>
9. Please rank these seven strategies for design and organization of a lecture in order of importance from the most important (1) to the least important (7). Please use each number from 1-7 ONLY ONCE to assign relative importance.

A catchy title
A hand-out
A manageable scope of content
A multi-media presentation
Case-based scenarios
Clear objectives
Time left for questions/comments

10. Please rate importance of these qualities in DELIVERING an effective lecture:

<table>
<thead>
<tr>
<th></th>
<th>Extremely important</th>
<th>Important</th>
<th>Somewhat important</th>
<th>Not important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humor</td>
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<td></td>
<td></td>
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<tr>
<td>Interaction with the audience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of slides/material</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Passion and enthusiasm</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Powerful or memorable opening</td>
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<tr>
<td>Story-telling ability</td>
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<tr>
<td>Time management</td>
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</tbody>
</table>
11. Please rank these seven strategies for design and organization of a lecture in order of importance from the most important (1) to the least important (7). Please use each number from 1-7 ONLY ONCE to assign relative importance.

- Humor
- Interaction with audience
- Knowledge of slides/material
- Passion and enthusiasm
- Powerful or memorable opening
- Story-telling ability
- Time management

12. Remember back to a hugely successful lecture you presented to a large audience. Why was the lecture so successful?
13. Remember a lecture that you gave or witnessed that went horribly wrong. Please rank the following items in order of most problematic (1) to least problematic (6). Please use each number from 1-6 ONLY ONCE.

- Distracting use of A-V and multimedia (dancing bears)
- Monotone
- Physical and vocal distractors (um, um)
- Poor use of time (too long)
- Poorly paced lecture (too fast or too slow)
- Too large a scope of material (10 pounds of sugar in a 5 pound sack)

14. Please add any additional problems in lecture design or delivery in the space below.

15. On average, how long do you spend preparing for a one hour lecture with respect to:

- Research of topic (number of hours)
  
  [Field to input hours]

- Design and organization (number of hours)
  
  [Field to input hours]

- Practicing your presentation (number of hours)
  
  [Field to input hours]

16. Below are some strategies used to integrate AV (audio-visual) and multi-media into a presentation. Please rate the level of enhancement of these items when giving a lecture.

<table>
<thead>
<tr>
<th>Photos</th>
<th>Neither enhancing nor distracting</th>
<th>Somewhat distracting</th>
<th>Disturbing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancing</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Video clips</th>
<th>Neither enhancing nor distracting</th>
<th>Somewhat distracting</th>
<th>Disturbing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancing</td>
<td></td>
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</table>


Thank you for your time and participation!