

## INTRODUCTION

Engineers use oral presentations to efficiently and effectively transfer information to a wide range of audiences. Usually, the setting and circumstances allow for direct interaction between the speaker and the audience. Oral presentations are a common method of evaluating the progress of a project *and* the progress of the individual. The ability to present oneself and one's project in a competent and succinct manner enhances one's college and career development.

Multiple components make up an oral presentation: 1) the audience, 2) the content and organization, 3) visual aids, and 4) the speaker. Student design teams have control over the last three items, but little control over the audience. Thus, a presentation goal is to prepare effective visual aids and a presentation method to capture and maintain the attention of the audience. As with writing, styles of oral presentation are numerous. All good presentations rely on clarity of expression, an easily followed train of thought and well thought-out visual aids that illustrate key points in the talk. High-quality visual aids can make or break a presentation as can poor organization and a sloppy presentation style (e.g., mumbling, talking to one's feet or failing to make eye contact with the audience).

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## THE AUDIENCE

Since presentations are always prepared for an audience, the presenter must evaluate the audience and determine the best way to pique its interest. Determine *who* will attend the presentation. Gather information on the technical awareness of the audience as a whole and the degree of familiarity that the audience has in the subject. For instance, a presentation on modeling weather patterns in the Pacific Ocean would be different for an audience of middle school students versus one prepared for an audience of applied mathematicians. By assessing the audience correctly, the speaker determines the best way to interest the audience. Explain *why* the presenter(s) finds the subject interesting. Convey enthusiasm when explaining *how* it was determined *what* the best

course of action was that led to the solution. The interested audience then responds with questions and comments that show an appreciation for the content and the style of the talk.

Audiences rarely have a uniform composition. Those attending may include, for instance, peers, managers, contractors, vendors and clients. Before discussing any specific details, present background information for those who have a limited level of expertise in the subject matter. This information helps bring the audience up to a common knowledge level.

Often, the audience includes those who are assessing the work itself and the capabilities of the presentation team. These individuals probably understand the topic well. For instance, an instructor evaluates a design team as a requirement for an introductory engineering projects course. In a professional setting, managers listen to presentations to evaluate alternative courses of action. In these situations, convey the technical information in a comprehensive, interesting and competent manner.

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## **THE CONTENT AND ORGANIZATION**

Preparing an effective presentation takes thought and effort. Use an organized method to develop the talk. First, express all thoughts on paper and organize the ideas. Consider the best way to present the material. Note which ideas are best presented in either text, graphical or illustrated formats. Next, develop interesting visuals that clearly display the content. The first slide (or overhead transparency) provides the **Title** of the talk. Give the title of the project, the reason for the talk (e.g., Preliminary Design Review, Final Report, etc.), the team members' names, course number and date.

Divide the rest of the talk into three main sections: the **Introduction**, the **Body** and the **Closing**. Use the simple rule-of-thumb, "*Tell them **three times**,*" according to the following general format for an oral presentation:

<b>The Introduction</b>	—————▶	Tell them what you're <i>going</i> tell them.
<b>The Body</b>	—————▶	Tell them.
<b>The Closing</b>	—————▶	Tell them what you told them.

### **The Introduction**

The second slide (or overhead transparency) presents a brief outline of the information to be discussed. The presenter briefly (10-15 seconds) overviews what is going to be discussed. Usually, the title of the slide for this section is "Overview," "Outline" or "Introduction." This becomes the first time the speaker "Tells them," providing the audience with a map of the signposts of the presentation. It is helpful to the audience if the speaker occasionally reviews the progress of the presentation; for instance, a speaker might say, "That completes the Design Objectives. Now, I'll talk about the manufacturing process before finishing with a discussion of the tests that were performed."

## The Body

The slides between the second and last form the body of the presentation and contain the important details of the presentation content. They represent the second time the speaker “Tells them.” These important slides require the majority of the preparation time. Include some or all of the following types of information, as required to convey the message:

- ◆ *Present the background or theory.* Give a broader perspective of the motivation behind the work and any pertinent applications or existing equipment. Typical titles are “Background,” “Previous Devices” or “Theory.” Use two to four lines of text to supplement what is said.
- ◆ *Discuss the design or research methods.* Show illustrations and technical drawings that highlight any important features. Use titles such as “Design Objectives,” “Research Methods” or “Critical Design Component.” If more than one or two sentences are spent explaining an item, then include a few lines of text addressing that point for the audience to read during the talk.
- ◆ *Discuss the results.* Interpret and compare expectations with the real outcomes. Address how the results affect the final design or decisions. Use slides that have sketches to illustrate points and titles such as “Metal vs. Plastic,” “Evaluation of Operational Speed” or “Considerations for Final Design.” Include three or four lines of text that can be used as discussion points for each of these slides.
- ◆ *Tell the interesting parts of the story.* Describe any mistakes and lessons learned. Use titles such as “Pitfalls of Method 1,” “Reasons to Use Plastic Instead of Cardboard” or “Computational Problems.” Again, list the items that will be discussed.

## The Closing

The last one or two slides present a summary of the key points of the talk, and represent the third time the speaker “Tells them.” No new information should be introduced at this time. Each point that is mentioned must have been previously addressed in the main body of the talk.

For example, the talk might end with something like, “Now you’ve heard about how our design of a toy manipulative takes the abilities of 2-5 year olds into account, which led to our choice of polyethylene for the construction of the prototype. Our tests went well, but showed that the base needs to be reinforced. Currently, our revised design is in fabrication and will be ready in time for the Design Expo.”

Use a final slide to summarize the points that have been discussed, such as the example in Figure 12.1

## **Findings for Final Design of New Toy Manipulative**

- ◆ Dexterity of 2-5 year olds appears sufficient to manipulate toy
- ◆ Polyethylene is smooth and safe
- ◆ Prototype shows that base needs reinforcement
- ◆ Completion planned for Design Expo

Figure 12.1. Example summary slide (or overhead transparency).

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### **VISUAL AIDS**

All presentations should use visual aids, and some engineers regard them as their most important product. Visual aids, the objective of which is to convey enough information for the audience, should be carefully developed to transmit only pertinent information. The most common form of visual aid in professional settings is the overhead transparency, variously called overheads, slides or viewgraphs. Thus, it is beneficial to become familiar with the operation of an overhead projector.

Presentation software packages (i.e., PowerPoint®) are commonly used to prepare visual aids. Such packages provide a selection of templates, borders, backgrounds, typefaces and color options that give the visual aids a professional appearance. Selected colors can have remarkable impact; however, extraneous graphics and colors can be distracting.

In addition, electronic presentations are possible, wherein the slides are stored in—and projected—directly from a computer.

Following are some answers to commonly asked questions about how to prepare visual aids:

#### **How Many Slides Should Be Prepared?**

- ◆ Plan on one slide per minute of talk, which ensures the right amount of information on each slide.
- ◆ If a slide takes more than two minutes to discuss, then there is too much information; the audience may become confused. Conversely, if it takes only ten seconds to cover the information, it may be better to include that information on the previous or next slide.
- ◆ Never talk without having a slide that emphasizes important points. If it is not worth putting on a slide, it is not worth discussing at all.

## **What Is the Format of Each Slide?**

### ***Keep Slides Simple and Uncluttered***

Carefully choose the templates (optional borders or backgrounds included with many presentation software packages) to avoid adding distracting graphics to the slides. Choose colors that add impact and enhance the legibility of any text. Use care in adding clip art images that do not contribute to the technical message. Fancy images do not make up for poor content or organization.

### ***Title Each Slide***

Use a title to emphasize the most important point being made. Avoid using “horse charts”; e.g., a picture of a horse with the title of “Horse.” Obviously, the title does not reveal much. The goal is to communicate all points visually and not raise questions that can be answered only by talking.

### ***Use Large-Sized Typefaces***

A font of 20 pt or more should always be used. To determine if the size is big enough, use the “drop on the floor” technique. If the overhead transparency can be read when it is on the floor and the speaker is standing up, then the size is large enough.

### ***Use Horizontal Orientation***

Most overhead projectors allow for both horizontal (landscape) and vertical projections. Horizontal allows the slide to be moved to the top of the screen, making it visible to those at the back of the room. Also, horizontal orientation provides for longer text lines that are generally easier to read.

### ***Cover Four Points (Approximately) Per Overhead***

A graphic should present a distilled form of the speaker’s comments, so words should be chosen carefully. Use the overheads to reinforce spoken words, not to repeat them.

### ***Present Results Graphically***

Show illustrations or photos of the prototype or device. Resist the temptation to show tables of values, as the audience cannot possibly read and understand what the data mean. For plotted results, use titles such as “Result of Torsion Tests” or “Experimental Results for Spring Made of Thin Plastic.” It is helpful to add a few lines of text to tell the audience why the results are being shown.

### ***Have Duplicates Ready***

Sometimes only a portion of a slide needs to be discussed and returned to later. If it is put aside, chances are the slide will get lost in the pile. In the time it takes to locate the slide, the audience’s attention will be lost. It is worth the extra expense to have another slide already prepared and in order.

### ***Avoid Overlays***

People try to take advantage of transparencies by having some information on multiple slides, stacking or removing the slides one at a time. This technique often leads to the presenter trying to

line up two or more transparencies while the audience waits impatiently. It is better to have one slide with the first part of the information and a second slide with the remaining information.

### ***Avoid Using Physical Objects as Visual Aids***

Unless they are large enough to be seen by the entire audience, avoid using physical objects. If an object will be passed around, be aware that it will distract each person who examines it. Several objects may be needed to make sure that everyone gets the chance to see one.

### ***Make Clear Photocopies***

Graphics and other material photocopied from textbooks or journals should be of good quality. Illegibility gives the impression that the presentation was hastily thrown together.

### ***Use Numbers Sparingly***

The audience will only remember a few key numbers, so do not bore them with too many. Whenever possible, use graphical—instead of tabular—displays of results. If equations are included, explain their relevance and results, and discuss the important variables.

### ***Plan Graphics Harmoniously***

Design or choose a format that presents the information attractively, and stick to that format for all graphics.

### ***Create Smooth Transitions Between Overheads***

Plan (and practice) smooth and clear transitions between overheads. Include text or graphics on one slide that smoothly leads the viewer to the next slide.

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## **THE SPEAKER**

Some engineers dislike giving oral presentations. However, such a negative approach can inhibit the development of an effective presentation style. Keep two things in mind when preparing a presentation: (1) *the speaker* (and the student team) have more knowledge about the topic compared to that of the audience, and (2) the audience *has an interest* in what is being said. In other words, *the speaker* and *the material* are informative and interesting. With this in mind, approach the presentation with a positive, productive attitude and develop an individual, yet professional style.

Speakers have four main objectives. First, gain the *attention of the audience* quickly. The first few minutes of the talk should intrigue the audience with the discussion to come. Next, convince the audience of the *value of the ideas*. The object is to give the audience meaningful information and guide them to the conclusion in a well-paced, interesting manner. Third, make the presentation memorable by using *effective visual aids and an engaging presentation style*. Finally, *stimulate (activate) the audience* with movement, voice and the appropriate use of visual aids. An easy way to remember these criteria is with the phrase, "I **AMMA** good presenter," with the acronym defined as:

**A**ttention-getting

**M**eaningful

**M**emorabile

**A**ctivating

Effective presenters almost never refer to notes when they speak; they take their cues from the text and graphical images on their visual aids. For novice speakers, it can be helpful to begin preparation of a presentation by writing a full script for the talk (but, do not ever read the script to the audience). Practice the script out loud, and write large notes in colored ink on paper copies of the visual aids (for reference, these copies may be placed on the speaker's podium or desktop). Each time the speaker(s) practices the talk, s/he will refer less often to the notes, eventually not needing the assistance at all.

Avoid the temptation to prepare note cards to hold during the talk. Such props often distract the speaker and the audience, particularly when the speaker reads directly from the cards. Reading from note cards makes it difficult for the speaker to maintain eye contact with the audience. Also, holding the cards hinders the speaker from gesturing to slides.

The following suggestions for delivery are fairly basic, but they are not always easy to follow. Clarity in speaking only comes when the message and the presentation are adequately prepared. The primary emphasis is placed on comprehensibility and economy of words. Part of clarity is to not distract the audience with unnecessary visual aids or mannerisms.

### **Convey Information Through Body Language**

Consider where to stand to not block overheads. Many people are uncomfortable giving talks, and as a result, they stand far away from the screen, which is where they want the audience to actually look. This positioning causes the audience to look first at the speaker and then at the screen. Instead, the speaker should take control of the audience by using his/her hands to direct the audience's attention. Stand close to the screen, and point at the item on the screen that is being discussed; the eyes of the audience are sure to follow. Also, it is important to stand comfortably without swaying.

The speaker should use his/her hands for specific, descriptive gestures that illustrate what is being discussed. This activity keeps the speaker's hands usefully employed and "out of mischief," as well as helps get the point across.

Maintain eye contact with the audience. Since it makes them feel involved, members of the audience appreciate direct looks from the speaker. His/her gaze should address all audience members.

Lastly, smile and exhibit confidence when speaking. When the speaker looks comfortable and confident, the audience focuses more on what is being said rather than on what is being done.

### **Convey the Message Through Speech**

Make the tone of the presentation appropriate for the audience, and maintain a suitable speak-

ing volume. Also, remember to speak at a reasonable pace and articulate. Also, practice varying voice and rhythm to maintain the audience's interest.

Avoid verbal distractions, such as “uh,” “um,” “you know,” “ok,” “well,” etc. If there exists a problem with repetitive habits, especially of saying “ah” or “um” before each sentence, there is only one cure: ask a practice audience for “The Um Alert.” Whenever the speaker says “um,” the audience also says “um.” This exercise is excruciating and quickly leads to avoidance of the pain stimulus.

### **Conduct a “Dry Run”**

The most important thing that can be done to improve a talk is to practice. If giving a group presentation, practice together as a group, so that each person knows what the other will say. Coach each other on style, give positive feedback and be specific on unclear points. The audience in this case consists of peers, so practice in front of them. Have someone sit in various corners of the room to determine if the slides are visible and if the speaker is easily heard.

Practice sticking to the allotted time slot. If the speaker runs over, the audience begins to worry about when the talk will end rather than what is being said. The only way to make sure that the talk fits into the scheduled time is to practice, out loud, with visual aids.

Learn how to operate the presentation equipment (pointer, projector, computer, microphone, light switches, extension cord, etc.) to eliminate operating mistakes that could be diminish the value of the presentation in the audience's eyes.

Remember: never end a talk with “That's all. Are there any questions?” This ending results in an awkward, dead silence as the audience tries to decide if they should clap or grill the speaker. Instead, use the magic phrase that always works: “Thank you,” which gracefully signals the end of the talk. The audience then applauds. The tension is broken, and questions can be presented and answered.

Discuss how each group member will participate in the question and answer session. Prepare a few anticipated questions, and practice answering them.

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## **EVALUATION OF THE PRESENTATION**

One of the most effective ways to evaluate an oral presentation is to videotape either a practice or final presentation. Review the recording with the entire student team, and use the following questions to help evaluate the delivery techniques and visual aids:

- ◆ Organizationally, what could have been done to make the presentation flow more smoothly?
- ◆ How effective were the visual aids? What changes could be made in either the slides themselves or in the presentation of the slides?
- ◆ How good were the delivery techniques? Were there any annoying gestures or verbal distractions? If so, what were they?
- ◆ What was the best (most effective) aspect of the presentation?
- ◆ What needs to be improved before the next presentation?