

Creating and Presenting a Thought line in a Technical Topic Area

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Introduction

Technical experts like scientists, engineers, and programmers are being asked more and more frequently to give presentations. And not just to other technical experts. Often they are speaking to people with little or no technical expertise, to people from marketing, sales, and finance. There is an urgent need to cultivate such presentation ability and skill set amongst engineers of present generation. More often are the opportunities where engineers and scientists are asked to present their work or a paper or a poster. There have been instances where one is asked to give a key note and also participate in the global debate to talk on latest technology. Engineers at school should be very well versed with such skill set and be able to present the content at ease. CSE 291 course offered for the spring quarter of 2010 at University of California, San Diego is targeted for Embedded System Seminar. In this course, we present various and latest topic of interest in Embedded System world. Over the series of presentations we have learnt lot of lessons that are presented concisely in this report. This report is a succinct description of main elements of writing and delivery for reaching out to technical audience following elements of good writing style with concision and clarity. First few sections describe briefly my views on how to build a thought lines, few important aspects that must be covered and rules that must be followed along with major archetypes of thought lines that can be used for presentation purposes. In the later sections, for each of the 8 lectures covered in the class, I succinctly describe the thought line as if I would present it.

Views on how to build thought lines

Limit the Subject: With most presentations, there is no time to say everything that one would want to say. This encourages one to prioritize. It's the presenter's job to know what to say and, just as importantly, what *not* to say.

Understand the Audience

Knowing who the presenter is talking to – the audience – is as important as knowing what he is talking about – the subject. Audience's knowledge level, experience, learning style, and attitudes will – or should – affect how he shapes and presents his material.

One should ask the following questions to better understand the audience and the subject to present:

- *What does audience already know about the subject?*
- *Are they experts like the presenter or neophytes?*
- *How much knowledge can a presenter take for granted?*
- *How much background will presenter has to explain?*
- *Will audience understand basic jargon?*
- *What is their learning style?*
- *Are they accustomed to sitting through lectures and holding their questions to the end? Or will they expect to interact with the presenter, asking questions throughout the presentation?*

- *Do they like lots of PowerPoint™ slides and handouts? Or are they expecting the presenter to be more interactive?*
- *What are their opinions, prejudices, preconceived notions, and agendas?*
- *What is their stake in the subject?*
- *How will the presentation affect their research or work?*

Determine the Objective

What does a presenter want to accomplish? What does a presenter want the audience *to do* as a result of the presentation? Does a presenter want them to...

- *Challenge the assumptions or data or to confirm them?*
- *Implement the procedure or technique?*
- *Renew the grant?*
- *Approve the proposal?*
- *Give a go ahead for the next step of the research?*

Once a presenter knows what he wants them to do, he should ask himself what they need *to know* and *to feel* in order to do it.

Prepare the Outline

If possible, break the presentation into three basic sections. (Can divide each section into more smaller units.)

Here are some 3-section outlines:

- The problem, its causes, and the solution.
- The current situation or standard operating procedure, the problems associated with it, and an alternative
- The state of your research, questions raised by your research, and the next steps
- A product, its composition, and its application

Once the various elements of the talk are “clumped” into their major sections – preferably three sections could have as many as five – add an introduction and conclusion.

Important aspects that must be covered

Aspect 1 - The Speaker

One of the major components of any presentation is the speaker himself i.e. the source of the message. Many people forget they are the presentation and not the visual aids. Many presenters today put so much effort into the visual aids and they forget that those are just aids to the speaker.

There are three factors we need to consider about any speaker:

- a. Motivation in giving the presentation
- b. Credibility as a speaker
- c. Deliver or speaking style

A Speaker's motivation can be approached in terms of two considerations

- Whether direct personal reward or indirect rewards (feeling good about helping others) are involved
- Whether immediate rewards or delayed rewards (getting a college degree after 4 years of college play a part

In essence, a speaker may be motivated by one or both of these factors. Before speaking you should consider what your motivations are.

Speaker's credibility

Speaker's ideas are accepted as believable only to the degree that the speaker is perceived to be credible. The speaker's credibility depends on their trustworthiness, competence, and good will. The speaker who is well organized will usually be considered competent. The speaker who is attractive and dynamic will be seen as more credible than one who is not.

The most fundamental factor a speaker projects is the attitude they have toward themselves.

Speaker's delivery

The delivery, the way the message is presented, should complement the speech's objective. A well written speech delivered poorly can quickly lose effectiveness.

Aspect 2 - The Message

The message refers to everything a speaker does or says, both verbally and non-verbally. The verbal component may be analyzed in terms of 3 basic elements:

- Content
- Style
- Structure

Let's look at each of these elements.

Content - is what we say about the topic. The content is the MEAT of the presentation. Research the topic thoroughly. Decide on how much to say about each subject. Then decide on the actual sequence to use. It is important to consider the audience's needs, time factors, and other items as the content of the presentation is prepared and presented.

Style – It is the manner in which the content of the speech is presented. Styles can vary from very formal to the very informal. Most presentations fall between these two extremes and in EVERY case, the style should be determined by what is appropriate to the speaker, the audience, as well as the occasion and setting.

Structure - The structure of a message is its organization. There are many organizational variations, but in each case, the structure should include:

- An Introduction
- A Body
- A Conclusion

The **introduction** should include:

- an opening grabber such as a quote or shocking statistic.
- an agenda
- the purpose or main message of your presentation.

The **body** should include:

- your main points or ideas.
- points which support your main message.

The *conclusion* should include:

- a summary of your main points.
- a closing grabber.
- time for questions & answers, if appropriate.

When speeches and presentations are poorly organized, the impact of the message is reduced and the audience is less likely to accept the speaker or the speaker's ideas.

Three more aspects

In order to make a perfect presentation one must do research on the product or idea so he is knowledgeable on the topic and can answer questions. Also, he needs to have good charisma which means speaking clearly and at a good volume. Finally, when creating the perfect presentation, the person doing the presenting must have a well executed visual aid for the audience. In order to create a good visual aid, one might want to use a computer program to create a more interactive presentation.

The first step to creating an amazing presentation is to start by doing some research about whatever it is to be presented. For example, if you are trying to explain to fellow classmates about the good things that come from traveling outside the United States, then you would want to have knowledge studying abroad. If you have no knowledge of studying abroad, it will be very obvious and the presentation will not be as good.

After most of the research has been done for the presentation, one needs to start working on how to present the material. When giving a presentation everyone should hear the presenter loudly and clearly. If there are really interesting facts and a lovely visual aid, but no one can hear or understand, then those two positives will make no difference. One can practice the speaking by doing a practice presentation in front of coworkers, friends, or family members and ask for their advice. Creating the perfect presentation is probably the least practiced, even though it is one of the most important aspects of a presentation.

Finally, the important thing is the kind of visual aid for the presentation. It is important to remember that different people learn differently, so some people involved in assessing the presentation may understand better if they can actually see it. Also, a well designed visual aid can only enhance the presentation. A visual aid can be anything from a poster with different kinds of charts on it to a Powerpoint presentation complete with sounds and which includes audience interaction. These visual aids are an important part of a presentation because they really help pull the project together.

Rules that must be followed

Organization

1. Have a very clear introduction, to motivate what one does and to present the problem one wants to solve. The introduction is not technical in nature, but strategic (i.e. why this problem, big idea).
2. Don't put all the details in the talk. Present only the important ones.
3. Use only one idea per slide.
4. Have a good conclusions slide: put there the main ideas, the ones presenter really want people to remember. Use only one "conclusions" slide.
5. The conclusion slide should be the last one. Do not put other slides after conclusions, as this will weaken their impact.
6. Having periodic "talk outline" slides (to show where one is in the talk) helps, especially for longer talks. At least one "talk outline" slide is very useful, usually after the introduction.
7. Don't count on the audience to remember any detail from one slide to another (like color-coding, applications measured, etc.). If presenter needs it remembered, he should re-state the information a second time.

8. Especially if you have to present many different things, try to build a unifying thread. The talk should be sequential in nature (i.e. no big conceptual leaps from one slide to the next).
9. Try to cut out as much as possible; less is better.
10. Help the audience understand where the presentation is going. Often it's best to give them a high-level overview first, and then plunge into the details; then, while listening to the details they can relate to the high-level picture and understand where you are. This also helps them save important brain power for later parts of the talk which may be more important.

Mechanics

1. Use a good presentation-building tool, like MS PowerPoint. Avoid Latex, except for slides with formulas (Leslie Lamport himself says that slides are visual, while Latex is meant to be logical). Good looks are important. If formulas are needed, try TeXPoint, George Necula's Latex for Powerpoint.
2. Humor is very useful; prepare a couple of puns and jokes beforehand (but not epic jokes, which require complicated setup). However, if you're not good with jokes, better avoid them altogether. Improvising humor is very dangerous.
3. The more you rehearse the talk, the better it will be. A rehearsal is most useful when carried out loud. 5 rehearsals is a minimum for an important talk.
4. The more people criticize the talk (during practice), the better it will be; pay attention to criticism, not necessarily to all suggestions, but try to see what and why people misunderstood your ideas.
5. Not everything has to be written down; speech can and should complement the information on the slides.
6. Be enthusiastic.
7. Act your talk: explain, ask rhetorical questions, act surprised, etc.
8. Give people time to think about the important facts by slowing down, or even stopping for a moment.
9. Do not go overtime under any circumstance.
10. Listen to the questions very carefully; many speakers answer different questions than the ones asked.
11. Do not explain the completely obvious things.

Text

1. Slides should have short titles. A long title shows something is wrong.
2. Use uniform capitalization rules.
3. All the text on one slide should have the same structure (e.g. complete phrases, idea only, etc.).
4. Put very little text on a slide; avoid text completely wherever possible. Put no more than one idea per slide (i.e. all bullets should refer to the same thing).
5. Don't use small fonts.
6. Use very few formulas (one per presentation). The same goes for program code (at most one code fragment per presentation).
7. Do not put useless graphics on each slide: logos, grids, affiliations, etc.
8. Spell-check. A spelling mistake is an attention magnet.

Illustrations

1. Use suggestive graphical illustrations as much as possible. Don't shun graphical metaphors. Prefer an image to text. E.g. 80% of the slides with images
2. Do not put in the figures details you will not mention explicitly. The figures should be as schematic as possible (i.e. no overload of features).
3. Do not "waste" information by using unnecessary colors. Each different color should signify something different, and something important. Color-code the information if possible, but don't use too many different colors. Have high-contrast colors.
4. A few real photos related to your subject look very cool (e.g. real system, hardware, screen-shots, automatically generated figures, etc.). Real photos are much more effective during the core of the talk than during the intro.
5. For some strange reason, rectangles with shadows seem to look much better than without (especially if there are just a few in the figure).
6. Sometimes a matter pasted background looks much better than a white one.
7. Exploit animation with restraint. Do not use fancy animation effects if not necessary.

8. However, there are places where animation is extremely valuable, e.g., to depict the evolution of a complex system, or to introduce related ideas one by one.
9. Use strong colors for important stuff, pastel colors for the unimportant.
10. Encode information cleverly: e.g. make arrow widths showing flows proportional to the flow capacity.
11. Use thick lines in drawings (e.g. 1 1/2 points or more).

Results

1. Don't put useless information in result graphs (e.g. the 100% bar for each application).
2. Label very clearly the axes of the graphs. Explain the un-obvious ones. Use large fonts for labels;
3. Discuss the results numbers in detail; "milk" them as much as possible.

Major archetypes of thought lines for presentation purposes

Strategic presentation plan for presentation organization helps to

- Chose the kind of approach that can best bring the message across
- Be direct and not beat around the bush
- the kind of support that will be most effective

Presentation Strategy

Deductive Strategy

- Decide on what sort of message one will be delivering
- Deductive Strategy
 - Speaker immediately presents the main idea, provides the supporting detail, then recaps her main idea.
 - Usually used to present good news or routine statements
- Example:
 - Main Idea: My grant proposal was funded
 - Detail: This means more money for research ...
 - Recap: Hard work is rewarded.

Inductive Strategy

- Speaker begins only by hinting at the main idea, then presents details leading to the main idea
 - usually from most easily acceptable details to more “controversial” details
- After details the main idea is communicated
- Speaker concludes with recap
- Example:
 - Hint: We compliment your research efforts and would like to explain some recent events – NSF funding was cut, strategic direction was changed, ..
 - Main Idea: Although it was a good effort, we must pull the funding from this line of research.
 - Recap: You will need to switch directions of research.

Formulas for Presentation Organization

Basic Formula

- OIBCC
 - Opening – grab attention
 - Introduction – “Why bring this topic up?”
 - Body – bulk of the presentation
 - Remember that for every important point that you make, you must provide support and this support can take the form of

- Statistics, analogies, testimony, illustrations, or specific examples.
- Conclusion – summarize briefly points
- Close – last strong sentences that leave the audience with something to remember
 - Must tie to your main idea and should tie to your opening to be effective

Harvard School Formula

- For persuasive speeches
- PREPY
 - Point of View – *“Smoking is hazardous for your life”*
 - Reasons – *“Smoking causes cancer”*
 - Examples/Evidence – *“50,000 people die per year from cancer”*
 - Point of view restated – *“If you want a long full life, give up cigarettes”*
 - “You” oriented – *“Take the first step tonight and sign up for ‘no more smoking’ seminar”*

Approaches

There are two basic approaches to developing effective presentations: Serial and Parallel. Both work equally well as long as the approach used is consistent with the style, experience, background and preferences of the people who are developing the presentation.

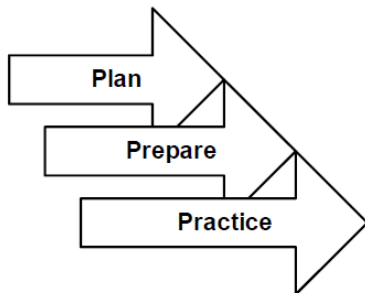
Serial

The serial approach entails working on one task until it is complete, then the next and so on. Tasks are identified, queued up and completed one at a time.



Parallel

The parallel approach involves working on several tasks, working on what can be worked on at the time. The effort “comes together” toward its end. The Present stage is missing from the set of stacked arrows immediately above because only the Plan, Prepare and Practice stages overlap. The presentation itself is a separate, subsequent event.



Thought lines for all the 8 lectures

Each lecture’s line of thought is presented with the help of OIBCC basic formula for presentation organization given in previous sections.

DVFS Based Task Scheduling in a Harvesting WSN for Structural Health Monitoring

Presenter Aruna Ravi

Opening	I would start with a verb opening because of DVFS scheduling scheme
Introduction	Problem is Energy constrained system that monitors the health of a structure
Body	<ul style="list-style-type: none"> - Describe the energy consumption by various components used at present. - Compare it with the system being developed at present. - Describe the system, DVFS algorithm, PZT sensors, WSN - Explain the effectiveness of this scheduling algorithm over other schemes by compare and contrast
Conclusion	Summarize and Show in a table the energy usage of this system vs. previously used schemes
Close	Results to prove that this system is more effective

Pharmacophore – Computation chemistry

Presenter	<i>Patrick Brown</i>
Opening	I would start with a definitive opening because of unfamiliarity amongst the audience on chemicals like neurotransmitter and transporter and processes like binding and transport
Introduction	<p>Define different terms which I would use in the presentation</p> <p>Describe the model which is being developed which is a Qualitative 3D Pharmacophore</p> <p>Describe modeling the ligand to receptor interaction</p>
Body	<ul style="list-style-type: none"> - Describe similar work being done by other people - Differentiate them by showing in a table similar models and their tradeoff - Give the audience an idea as to why the present model is being developed - Describe the model and its working.
Conclusion	Summarize
Close	Compare the present model with the already existing models and prove that the model is better than others

Energy Efficient Proactive Thermal Management in Memory Subsystem

Presenter	<i>Krishnam Raju Indukuri</i>
Opening	I would like to start with a verb opening because of addressing a problem of Heat Dissipation
Introduction	<p>Distinguish different levels of memory: Logical and Physical</p> <p>Talk about address mapping between these levels</p> <p>Introduce the page-addressing emphasizing its difference to the linear addressing</p>
Body	<ul style="list-style-type: none"> - Problem scope: Pages reside in DIMMs and the activity within the DIMMs cause temperature to increase. We spend extra energy in cooling them when they heat up. - Graphically: flexibility of managing the pages, ways of controlling the heat and improve the net system energy - Importance of the net power consumption of the system - Explain duty-cycling and gather-scatter. - Describe the page migration and prior art - Explain the proposed solution addressing the downsides and the timing of the problem <ul style="list-style-type: none"> o Temperature prediction o Page Migration
Conclusion	<p>Summarize and proper emphasis on power savings with some limitations</p> <p>Associated costs for the approach like the cost for migration, the computational overhead for prediction</p>
Close	Future: Important assumptions of the current work and how are we planning to improve this in future

A Low-Cost, Low-Energy Underwater Acoustic Modem

Presenter	<i>Digvijay Dalapathi</i>
Opening	I would like to start with a definitive opening as this talk would be a gizmo one
Introduction	<p>Importance of an acoustic modem with emphasis on cost and energy reduction</p> <p>Goal: Reduce the cost of transducer and overcome the challenges involved in deploying it in the</p>

	modem transmitter and receiver
Body	<ul style="list-style-type: none"> - Compare the design of the modem with the present ones emphasizing on the cost of the devices - Describe the scheme used to implement the encoding and decoding the data are QPSK - Explain what the scheme is and how it assists in reducing the cost of the modem over the other encoding schemes. - Describe the Channel Estimation techniques used and considered for the design - Adaptive equalization technique emphasizing on its low energy
Conclusion	Summarize
Close	Reaching on both the goals of the design that are low cost and low energy

Computer Vision Techniques for Underwater Navigation

Presenter	<i>Chris Barngrover</i>
Opening	I would like to start with a definitive opening as this talk is similar to a gizmo talk
Introduction	<ul style="list-style-type: none"> - Define the terms I would use in the presentation - underwater navigation system which is using an underwater network and computer vision techniques to navigate through the water
Body	<ul style="list-style-type: none"> - Explain the navigation equipment that's built and the design - Talk about the algorithm used and is constrained for this system - Contrast between the general and specific application of the algorithm
Conclusion	Summarize
Close	Give some important applications of the navigation system like, data collection from underwater network deployed deep in the blue ocean

Codesign for Coherent Co-processing of Computational Mass Spectrometry

Presenter	<i>Devi Sravanthi Yalamarthy</i>
Opening	I would like to start with a noun opening stressing on proper nouns Proteomics, Mass Spectrometry
Introduction	Describe the acceleration of protein search using co-processors
Body	<ul style="list-style-type: none"> - Talk about protein modifications and how it limits the searching speed - Speedup is the challenge that is addressed deeply - Describe various algorithms like Vectorization - Naive to popular, and its limitations. - Simulation: Realization and implementation using Co-processor enabled system
Conclusion	Summarize
Close	Need for system to make the search fast using hardware and software co-means

System modeling for massive computing infrastructure

Presenter	<i>Gopi Krishna Tummala</i>
Opening	I would like to start with a verb opening as I would start with the power and heat problem in datacenters
Introduction	Explain about the datacenter and the power issues in it for its efficient carbon print
Body	<ul style="list-style-type: none"> - Describe power share amongst datacenter components. - Talk about dynamic power optimization techniques called DVFS, DPM and MVI - Introduce system level power manager in a datacenter and its system model like stochastic models - Importance of accurate models - Emphasis on Adaptive Control in Datacenters with multi-tiered and multi-agent power and thermal control
Conclusion	Summarize and prospects of the model wrt performance and scalability
Close	Importance of systems where it is more than Watts

Power Meter IC – low cost system to measure power usage

Presenter	<i>Bharatan Balaji</i>
Opening	I would like to start with a definitive opening as it is yet another gizmo talk

Introduction	Talk about power meter that has been designed and can be plugged into any socket and is used for measuring the power consumed by any equipment
Body	<ul style="list-style-type: none"> - Focus on the design of the power meter - Describe the various components of the power meter - Explain the reason for choosing the components - List down the similar work being done at other academia institutions or in the industry - Explain why this system is better than the other systems with its tradeoffs
Conclusion	Summarize
Close	Demonstrate the application of the device and its practicability

Conclusions

Main ideas, view points, methods, strategies and lessons learnt in creating and presenting a thought line in a technical topic area are talked about. This is an opportunity where in I put to use my learning from elements of style, in-class presentation reviews and prepared a report reflecting the concision and clarity to a maximal degree. Various efficient lines of thought are talked upon. Understanding the audience, determining the objective, preparing the outline are major initial thought points. Recommended important aspects that must be covered are the speaker's traits (credibility and delivery), the message with its content, style and structure along with three more prime aspects. Few rules were talked about that are mostly ought to be followed are on presentation organization, mechanics, illustrations, results and references. Major basic models of lines of thought for presentation purposes are strategic presentation plan (deductive, inductive). There are few formulas for presentation organization (e.g. Basic Formula, Harvard School Formula). Each lecture's line of thought is presented with the help of OIBCC basic formula for presentation organization. Definitive, verb, noun and adjective openings are used to open most of the presentation kinds in the class CSE 291 "Embedded System Seminar". This exercise made me learn on many efficient and effective ways to handle technical writings and presentations. Prof. Rajesh Gupta's in person guidance in the class did help me understand more than what a literature could have offered me. I hope to practice the lessons learnt in this class widely.

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