FOCUS ON FEEDBACK
Application of System Dynamics to Public Speaking

Julia M. Di Stefano
New Hampshire College
Manchester, New Hampshire 03104

ABSTRACT

The interaction between the speaker and his audience is a subject of universal interest, especially to professionals. It is a subject, moreover, requiring a dynamic method of analysis. This paper presents a conceptual model of public speaking. The purpose of this preliminary study is to identify the essential factors needed for (1) the effective delivery of a prepared speech in a conversational manner and (2) the growth of the speaker's abilities over time. As a result of my preliminary analysis of the feedback loops operating during a technical presentation, my approach to teaching novice speakers has changed. One benefit of my new approach is that it accelerates the process by which novices develop the competencies they need to give successful informative speeches. Further study of the interaction between speaker and audience using System Dynamics will contribute significantly to our understanding of human communication.

FOCUS ON FEEDBACK: APPLICATION OF SYSTEM DYNAMICS TO AN ANALYSIS OF THE DYNAMICS OF PUBLIC SPEAKING

INTRODUCTION

Human communication requires feedback. The purpose of my study is to identify the essential factors needed for the (1) effective delivery of an extemporaneous speech on a technical subject and (2) the growth of the speaker's abilities over a semester. My study of the dynamics of the individual speech and the development of the speaker over time demonstrates how the speaker and the class as a whole, benefit from focusing on feedback. The need for effective feedback in human communication is stated succinctly by Dean C. Barnlund in Interpersonal Communication: Survey and Studies:

> The timing and amount of feedback, the positive or negative value it carries, and the interpretation made of it--all affect the degree of understanding achieved through communication. The data suggest that when receivers are encouraged to respond with questions, comments, corrections, or even counter arguments, greater confidence and mutual respect are likely to result. (232)

To be effective, the speaker must be able to observe his performance, compare his goals with his results, and use this information to modify his performance in process, as well as to guide

Note: Some System Dynamics concepts, diagrams, and descriptions of causal loops have been provided by Prof. Willard Fey.

his future speeches. Successful speakers are skillful in gauging the audience's interest and degree of understanding of his message. They are also skillful in modifying the content and mode of delivery of their speeches (as for example by cutting out key points, or simplifying explanations, or providing additional illustrations, or by speaking louder, or more slowly) in response to environmental conditions and to the response of their audience.

My thesis is that the interaction between the speaker and the audience is a subject of universal interest, especially to professionals. It is a subject, moreover, requiring a dynamic method of analysis.

The purpose of my study is to identify the essential elements of (1) the effective delivery of an informative or technical speech (the terms are used interchangeably) given in the extemporaneous mode, and, (2) the growth of the speaker's abilities over a semester. Note an extemporaneous speech (unlike an impromptu which is delivered on the spur of the moment) is a prepared speech, requiring research, outlining, practice and delivery in a conversational manner. In our high-tech society, we are challenged to do more than generate more data more quickly and more accurately with the aid of computers. Now we are challenged to communicate new information to others in a humanistic context, a context which recognizes the significance of people as individuals, and of interpersonal communication. We have studied information systems in

terms of how to optimize results from machines. Now it is time to analyze the dynamics of public speaking in order to help the speaker--or the manager--optimize his results while informing and interacting in a positive way with his listeners. Science and technology have come a long way since Aristotle analyzed the art of communication in his Rhetoric. Applying the methodology of System Dynamics to the relatively new science of communication can help us teach more effectively the competencies required to give successful technical presentations.

Many studies of the communication process discuss the concept of feedback, and most public speaking textbooks show various diagrams illustrating the dynamics of communication. But these models are generally inadequate. Linear models, which reflect a one-directional view of communication, imply "that the speaker can perform specific actions in a specific sequence during a speech and get specific desired results from listeners." (See figure A page 4). These models ignore the interaction of speaker and audience essential to the dynamics of the process. The interactional model of communication, based on cybernetics, is somewhat more complete, since it "accounts for the influence of the receiver's responses. It thus suggests a process that is somewhat circular: sending and receiving, sending and receiving, and so forth" (Berko, Wolvin, Wolvin, 43) See figure B page 4 . However, this description is fuzzy, and not adequately helpful to the novice

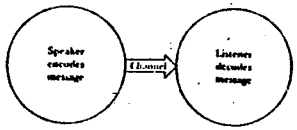


Figure A Linear model of communication (one-directional communication)

From Berko, Wolvin and Wolvin, 42

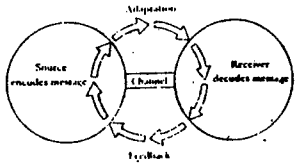
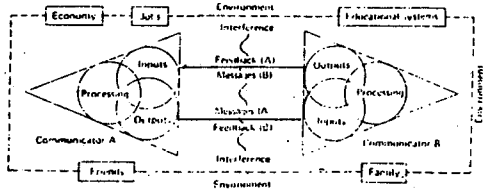


Figure B. From Berko, Wolvin and Wolvin, 43

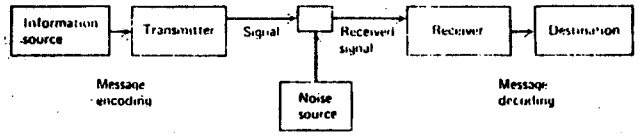
COMMUNICATION SYSTEMS

The basic elements within any communication system are fairly simple. Our model is of a very basic interpersonal communication system: the dyad. The concepts we will discuss are, however, applicable to more complex communication systems.



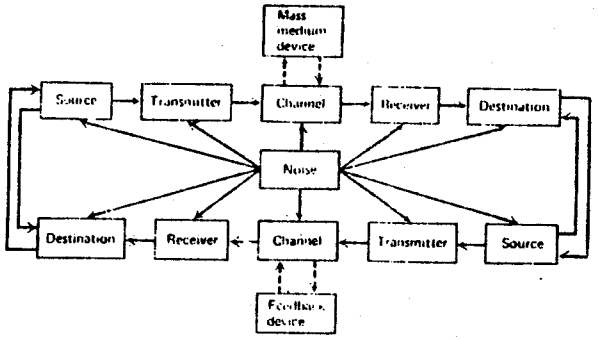
Emmert-Donaghy model of a dyadic communication system

Figure C. From Emmert and Donaghy,40



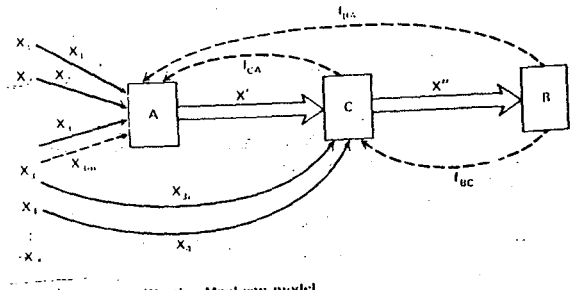
Shannon-Weaver model.

Figure D. From Emmert and Donaghy, 353.



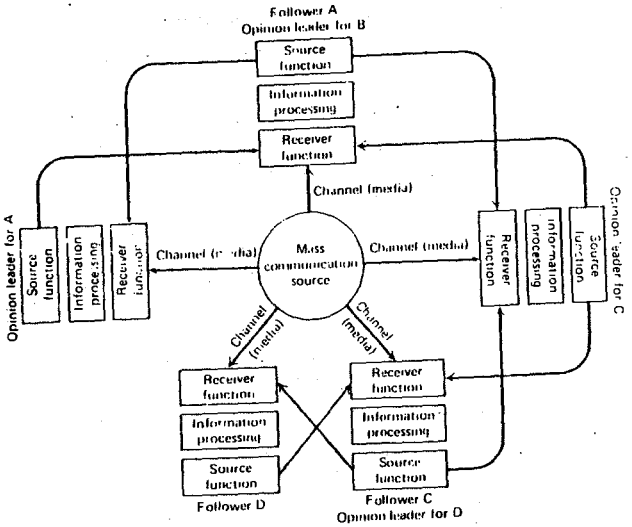
DeFleur model.

Figure E. From Emmert and Donaghy, 354.



The Westley-MacLean model.

Figure F.
From Emmert and Donaghy, 356.



Multi-cycle, multi-step flow model.

Figure G. From Emmert and Donaghy, 357.

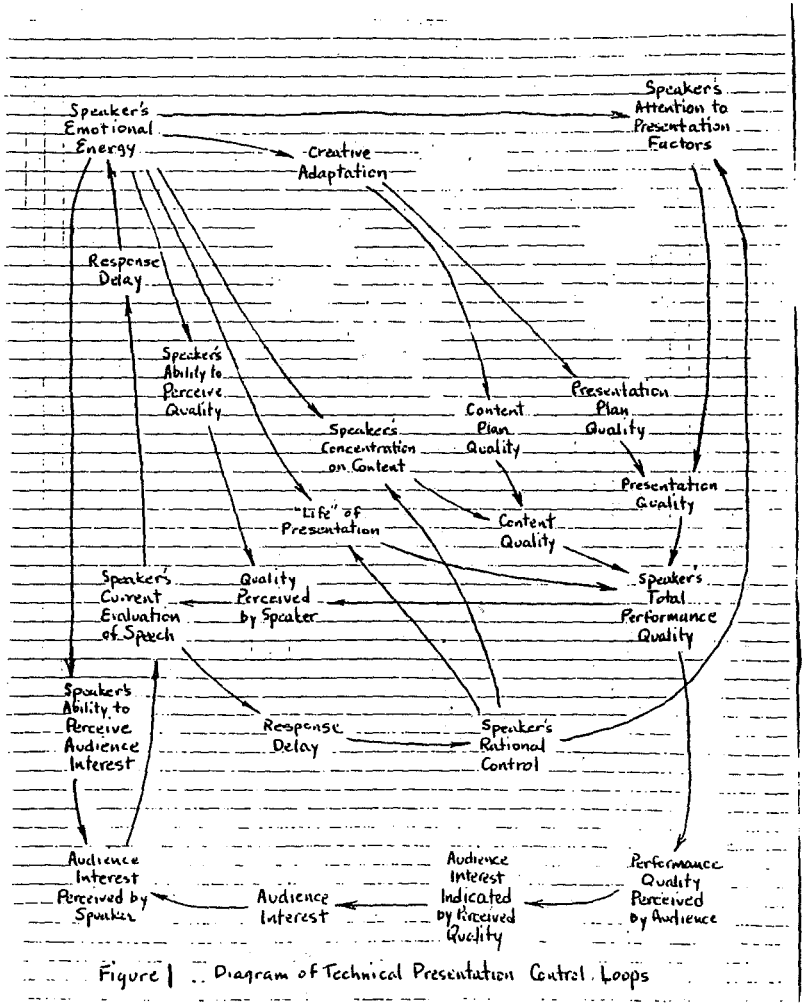


Figure 1 .. Diagram of Technical Presentation Control Loops

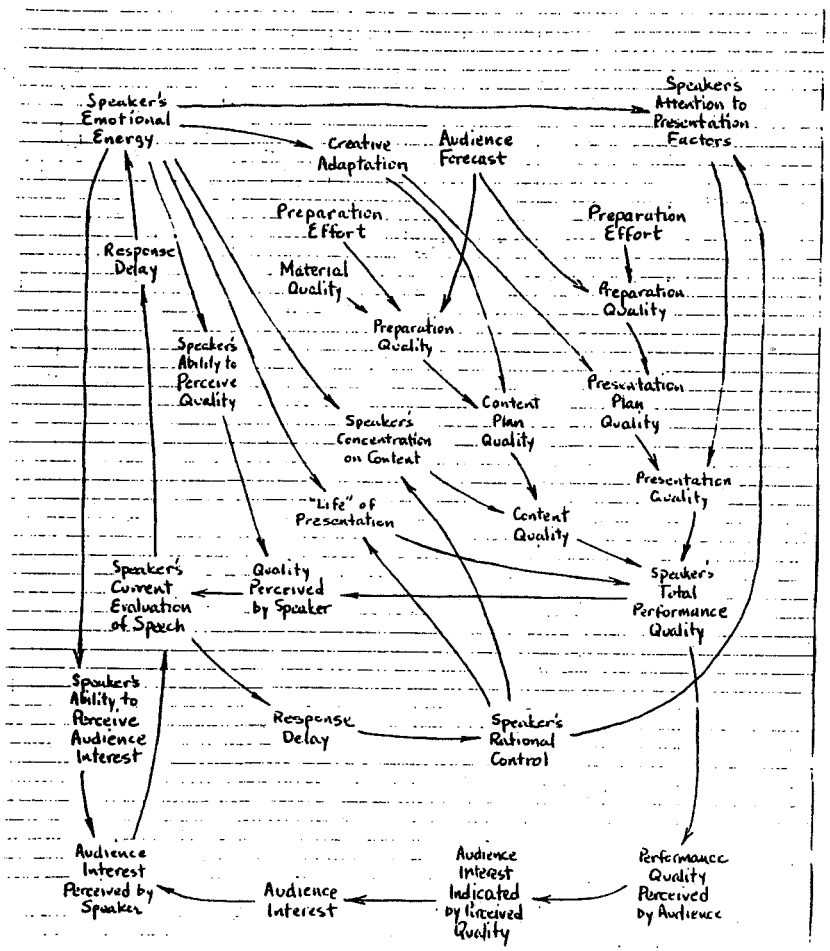


Figure 2. Diagram of Technical Presentation Control Loops

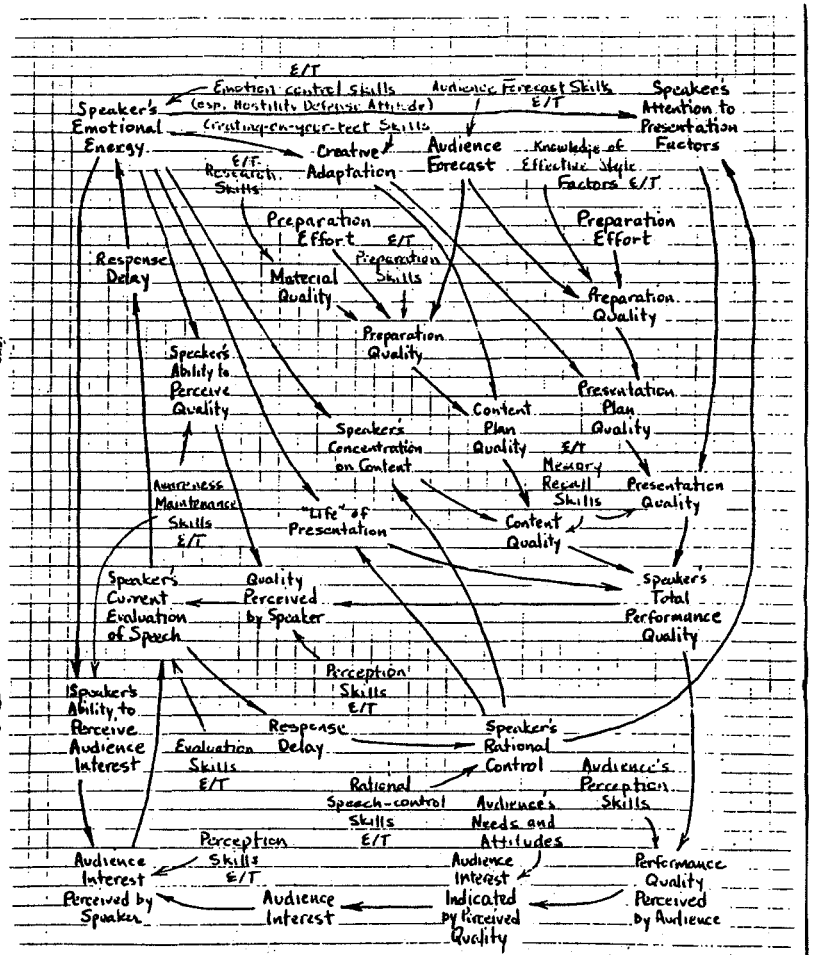


Figure 3. Diagram of Technical Presentation Control Loops

E/T indicates those characteristics of speaker that control the indicated factors and change from speech to speech as a result of experience and training (E/T).

Personal Development of the Speaker

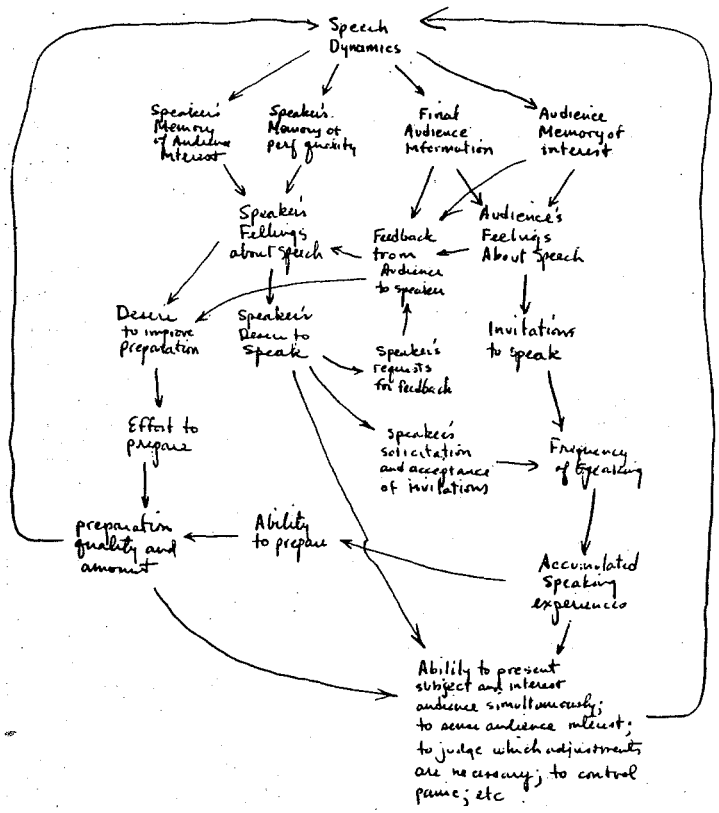


Figure 4

speaker facing the juggler's job of controlling his stage fright, conveying his message, and winning over his audience.

But my diagrams of the communication process are different. The uniqueness of my method is that my model uses causal loops to diagram the dynamics of public speaking. My model identifies specific elements, actions, and behaviors that operate while a speaker is delivering a technical presentation to an audience of twenty or so. The loops are invaluable in the analysis of the many variables operating simultaneously while the speaker addresses the audience (see figures 2 and 3) and the variables, occurring over a period of time, which contribute to the personal development of the speaker (see figure 4). (Diagrams of causal loops courtesy of Willard Fay).

The reasons for basing my study on the interaction between speaker and audience during technical presentations are these:

1. technical presentations have more uniformity in terms of audience response than entertaining speeches; this uniformity lends itself well to analysis
2. the success of many professionals today (and of the business students I teach), depends partly on their ability to make effective technical presentations.

The goal of my project is to analyze the relative importance of the essential components of the process, ranking them in order of importance: in addition, I hope to ascertain the order in which

the novice speaker should concentrate on each component, so that he can achieve success more quickly. If we can eventually quantify the components and variables of a successful technical presentation, we may be able to teach the most heavily weighted competencies early in the course so that the speaker will achieve positive results more quickly: these positive results would be likely to increase the speaker's solicitation and acceptance of opportunities to speak, and would accelerate the growth of the speaker over time, as shown in the loops in figure 4.

As a result of my preliminary findings based on an analysis of these causal loops, my approach to teaching public speaking has changed, and my students are generally at a higher level of performance in mid-semester than students of previous classes were at the end of the semester. Indeed, one of my colleagues who stopped into my classroom recently was surprised to learn that mine was not the advanced, but the basic public speaking course.

CONTENT

The competencies we teach in the basic public speaking course are:

1. how to gain and maintain the audience's attention
2. how to motivate the audience to learn what the presentation is designed to teach
3. how to select a topic appropriate for and interesting to the audience
4. how to organize the speech, making certain that beyond the general purpose--to inform--the speech has a clearly defined specific purpose as well as beginning that wins the attention of the audience; an information-filled body; a strong conclusion; and smooth transitions
5. how to express ideas clearly and logically
6. how to use good evidence to support arguments, and a good choice of words and imagery
7. how to use appropriate gestures and maintain good posture
8. how to maintain eye contact with audience
9. how to maintain good vocal variety with appropriate volume, pitch, enthusiasm, and rate
10. how to enunciate clearly and pronounce words correctly

LEVEL OF STUDENTS

My basic public speaking classes consist of twenty to twenty-four business students in a four-year undergraduate program. They major in General Management, Accounting, MIS, or Economics/Finance, and range in age from eighteen to twenty-six. Two-thirds of them are American, mostly from the northeastern U.S.A.; the rest are from Malaysia and Singapore. We meet three times a week for fifty minute periods over a period of sixteen weeks.

EFFECTIVENESS AND SPECIFIC BENEFITS

The benefits of my approach are that it accelerates the process by which novices

1. learn the components of the process of giving a technical presentation
2. develop the competencies they need to give successful technical presentations

For example, the concept of videotaping the audience, as well as the speaker, is based on the closed, causal feedback loop. From the videotape, the student can see what happens both to him, and to his audience during the speech. Does the speaker memorize his opening, mumble, lose the audience's interest, panic and become speechless? Or does he begin with stagefright, perceive the audience's interest in his speech as it progresses, deliver his speech with more energy and liveliness, and communicate effectively?

Some specific results demonstrating the effectiveness of my new approach are that my students this semester:

1. review and analyze their videotaped speeches more frequently
2. revise and improve their subsequent speeches more diligently
3. show more interest and support of other students in the class, especially by writing comments and giving oral comments to each speaker on his performance

4. use visual aids of higher quality, and much more frequently than classes in previous semesters
5. show more concern for the audience's rate of learning and audience's interest

   Examples:

   a. speakers design short answer quizzes for some speeches, to ascertain whether the audience has learned what the speaker attempted to teach
   b. speakers sometimes interrupt their speech to ask if the audience understands their charts or diagrams, and in similar constructive ways, interact with their audience, adjusting their delivery appropriately to their audience's response

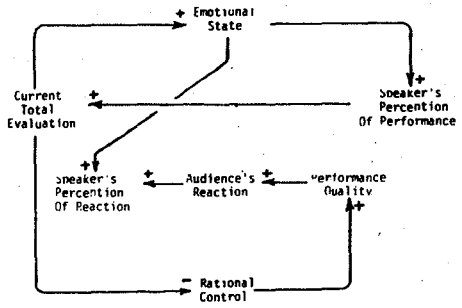
My approach, using causal feedback loops, can be used to improve almost any informative presentation; explicating new techniques or ideas to fellow professionals; explaining technical problems or processes to clients; or presenting an organization's policy in order to win the support of the community.

DESCRIPTION OF DIAGRAM OF TECHNICAL PRESENTATION CONTROL LOOPS

The Diagram of Technical Presentation Control Loops is based on the idea that the key dynamic variable in a speech is the speaker's total performance quality. At each instant of the speech a

complex combination of what is being presented (content quality) at that time, how it is being presented (eye contact, posture, voice, inflection, visual aids, etc. called "presentation quality") and "life," (the energy, enthusiasm, and animation) then produce a total performance quality at that time. The variation of this total performance quality throughout the speech produces the dynamic pattern. The pattern might be a monotonic increase in the presentation quality, or a fluctuation of some kind. The content quality, presentation quality and "life" are determined by three kinds of factors. These are 1) the speaker's skills and experience (which are about constant during the speech, but develop from speech to speech; 2) preparations and plans for the speech, representing the proposed or projected time history, which the speaker attempts to create in fact, and 3) dynamic factors that change during the speech and that are related to the speaker's emotions and conscious (rational) control of content and presentation style. The speaker's emotions and conscious controls are influenced by his perception of how well the speech is going in terms of his evaluation of his performance quality and his perception of the audience's reaction. The ability to perceive and to evaluate is often influenced by the speaker's emotional state. These relationships create the feedback loops which operate throughout the

the speech. The operation of the loops causes the variables to change through time and create the patterns mentioned above with the proposed time history (plan) as a guide. Thus a declining trend in performance could be caused by the emotional loops (positive loops which tend to reinforce any trend once started), or by the rational control loop attempting to correct the wrong aspect of the presentation or by a plan that has put interesting material at the beginning, but failed to carry the audience's interest through to the end of the speech. A simplified form of the loop diagram is shown below.



The rational loop is negative because it attempts to reproduce the plan in reality. Perceived errors between the goal and perceived results produce rational attempts to correct and

achieve the goal. Oscillations can occur either out of weakness in the organization of the speech or an interaction between the emotional and rational loops; or from a rational control loop that has long reaction, perception, evaluation and decision-making delays compared with the speaker's correction times.

If during the speech the speaker could suddenly improve his emotional state (feel more confident), the performance quality would improve. If performance quality improved, the audience would become more interested (after a while) and the speaker would perceive the improved interest (even later). His estimation of how the speech is going would rise and his confidence and emotional energy would increase to a higher level than it was moments before. This process would recur and produce a continuing improvement in the speaker's emotional state and in his performance. How much it would increase and how long it would take are determined by the various time delays around the loop and the various response functions at each step as one variable influences the next. During one particular speech the time delays and response functions remain fairly constant. But for novice speakers at least, delays and functions change from speech to speech as the speaker absorbs and integrates what he has learned from his previous speeches, and the comments from his audience and from his instructor.

"Creative adaption" is the process in which the speaker alters his content organization and/or his presentation plan during the speech, in response to audience responses, time or facility constraints, etc.

There are three forms of the Technical Presentation Diagram. The first includes only the dynamic variables of the speech in process. The second adds the preparation and planning factors while the third introduces the skills and attitudes that determine the shapes of functional relationships and delay times. The latter change from speech to speech through experience and training. The videotapes are part of the feedback in the development loops that control these speech-to-speech changes.

As a result of using feedbacks loops to analyze public speaking, I have modified my teaching techniques. In the past I videotaped only the first and last speeches of the semester, and required students to evaluate their progress in a five-hundred word essay comparing the strengths and weaknesses of the two performances. Now I videotape the first two speeches (and as many others as our audio-visual studio resources can tape) and require students to write their evaluative essay early in the semester. As a result my students this semester have learned faster and more effectively to compare their perception of their audience's reaction with their videotaped performances. Because we hve been focusing on feedback from audience to speaker, students spontaneously provide each other with more oral and written comments after each speech than in previous classes. By mid-semester students are learning to evaluate feedback from the audience directly, while they are giving the speech, without the time delay of the instructor or the listeners telling them at the end of the speech that they were speaking too fast, or not clearly defining their terms, and so on.

Focusing on feedback has given students more control over their own learning, by enabling them to see without waiting for the instructor to tell them, the strengths and weaknesses of their presentations. In addition to teaching the competencies they need for giving successful technical presentations, I am informally teaching them the methodology of System Dynamics--or how to analyze feedback loops so they can improve their performance--without using the technical jargon of the discipline, or showing them my feedback loop diagrams.

ORGANIZATION OF COURSE

One of my responsibilities, as the instructor, is to provide a supportive environment for my students, to teach them where to look for feedback, and how to use it to improve their performance. Recalling from previous semesters how distrust and animosity hampered students' growth in public speaking, I now , on the first day of class, ask anyone who feels hostile towards anyone else in the class to drop the course immediately. Since so much emphasis is placed on the evaluations students provide each other after each speech, it would be harmful to everyone if students do not support and respect each other.

While students recognize that the environment I create for this class is artificial, they appreciate the encouragement they receive while they are overcoming their initial fear of speaking. In the advanced public speaking course, students go on to more threatening exercises; they are placed in adversarial positions in negotiations simulations, and are trained to deal with hostile and indifferent audiences.

In order to minimize the novice speaker's stagefright and start building confidence from the first day of the course, I ask each student to interview, and to be interviewed by, someone he does not know in the group. Each student then introduces his new acquaintance to the entire group, relating some biographical data. This impromptu speech (which is not graded) is effective as an ice-breaker, and also as a means of providing information about the group for audience analysis. They learn about the geographical and ethnic backgrounds, career goals, and avocations of members of the group, and they quickly recognize that they share many interests, as well as sharing the fear of public speaking.

Criticisms are always to be offered as constructively as possible, i.e. we criticize only what can be improved, and praise the strengths of the speech before pointing out the areas requiring improvement. By expecting listeners to give oral as well as written comments to the speaker immediately following the speech, I create some loops that would not be there without my intervention. By discouraging hostile criticism, I eliminate potentially detrimental loops. Thus I provide data to the speaker about what happened in his presentation, and the student interprets the data, integrating what he has learned into the preparation and the delivery of subsequent speeches.

The first extemporaneous speech required of my novice speakers is an informative speech of three to five minutes based on a recent magazine or newspaper article of interest to the speaker and the audience. Invariably, these first speeches lack clarity of purpose, logical organization, and interest and appeal to the audience.

Though we discuss these principles before the first speeches, students generally ignore them because they do not perceive their relevance. Typically, the novice speaker forces himself to stand up before his audience, starts to deliver his message, forgets some of it, and is more concerned with "getting the speech over with"than with communicating to an audience. It is only after he gets feedback in the form of oral and written comments from his audience and from his videotape that he is ready to think about principles of organization and how to improve his performance.

Beginning speakers fear the wrong things. They think the hardest part of public speaking is standing up in front of a group, and overcoming stagefright. But they learn, as they gain practice speaking, that concentration on preparing their speech, formulating a specific purpose for their presentation, and organizing their information logically, helps to diminish their stagefright.

To a great extent, especially for the novice, the organization and preparation of the speaker determines his ability to focus simultaneously on the subject and an the audience. If he perceives that the audience is interested and attentive, he is likely to feel more confident and increase his attention to both the subject and the audience. On the other hand, if he perceives that the audience is bored or hostile, the novice speaker is likely to speak faster, or mumble more, or forget his next point, and may even panic and not complete the speech.

Unfortunately, it is virtually impossible for novice speakers to make constructive use of feedback during their first presentations. They feel as frustrated trying to control simultaneously the many loops the the model of the dynamics of a speech as a would-be juggler attempting the feats of an expert. The place to begin is to gain mastery over the information and the organization of the speech. If the speaker focuses attention and energy on his message, and is excited about it, he is less likely to worry about how well he is performing during his presentation. The speaker's confidence in his message tends to feed his confidence in himself. The inexperienced speaker wastes energy worring about self-consciousness instead of concentrating on what excites him or her about the speech, and how he can adapt the information to the interests of his audience. After the beginner reviews his first videotape, we analyze the value of feedback, where to look for it, and what to do about negative feedback.

Too often the novice speaker is inaccurate in his reading of the audience's interest (or indifferent to it). He often does not maintain eye contact with his listeners, and sees only a mass of people rather than individuals. Novice speakers must learn how to establish and maintain rapport by modifying their posture, gestures, voice and rate. They must also develop the perceptual skills to know when they have rapport, and how to regain it if they have lost it. I teach students to analyze the tapes of their speeches and their audience's responses to it. With training and experience novice speakers learn to look into the faces of those in the audience, and to guage their responses more accurately.

One reason novice speakers avoid eye contact with their audience is fear that the audience may appear bored or hostile. Part of the role of the instructor is to help prevent the speaker from panicking as he sees the audience losing interest and the presentation failing. The instructor manipulates the loops in the process by signaling the speaker to slow his rate or increase his volume; by smiling at the speaker and nodding in agreement; or in rare cases by interrupting him and giving him the choice of delivering the speech another time.

As a result of focusing on feedback most students this semester were as skillful at developing and maintaining rapport with their audience at mid-semester as my previous classes were at the end of the semester. By mid-semester thay can read the audience well enough to judge which adjustments will correct negative feedback. For example, if they see their listeners appear puzzled, they may repeat key points, give more concrete examples, adjust their rate, or directly ask their listeners if they understand, or if they can see their transparencies on the overhead projector. Another result of the emphasis on feedback is that students use visual aids more frequently . Not only do visual aids help the speaker remember the organization of the speech, but they also help the audience understand and recall the speaker's key points.

Focusing on feedback between speaker and audience has also resulted in a more rapid improvement of the students' listening skills. When they recognize that their comments and questions are valued, they tend to listen more critically and more actively. They also learn that listening actively to the speeches of others is helpful in planning one's own speeches. They imitate what was successful, such as starting a speech by addressing a provocative question to the class, or by bringing to class such sports equipment as a Jet-ski, a sail of a sailboat, or scuba diving equipment for their demonstrations. Similarly, they learn to avoid topics not of general interest to their present audience, such as the political future of Hong Kong. In short, they learn from the successes of previous performances--their own as well as their classmates'.

My focusing on feedback loops this semester has motivated be to modify my teaching techniques. To encourage more feedback, and more constructive feedback, between speaker and audience I

- videotape the audience as well as the speaker
- ask students to give written, as well as oral comments to the speaker immediately following his presentation
- require students to more frequent and more detailed evaluations of their performances, starting earlier in the semester, instead of waiting for the final speech
- require students to write an account of how they felt at the beginning, middle, and end of their speech, comparing their perceptions with comments from the audience and the videotapes

- require students to prepare brief quizzes to test the audience of recall of their key points

In addition to the above, I also schedule thirty-minute conferences with each student mid-semester, to review with the student his essay evaluating his videotapes, and to discuss his progress. Students do most of the talking. At this time I ask them to rate the most memorable speeches given to date, and explain the reasons for their success. Not suprisingly, there is a consensus about the five or six most successful presentations and why they succeeded.

MODELS, MEASUREMENTS, AND GOALS

The need for communication models has been widely recognized, and many theorists have noted the need for models that would better accommodate the dynamic properties of communication. The models of the dynamics of a technical presentation (figures 1, 2, and 3) and of the personal development of the speaker over time (figure 4) are a conceptualization of a complex process. Their purpose is to facilitate our understanding of the relationships between the speaker's emotional energy, his preparation, his ability to evaluate his audience's interest and adapt his speech to his listeners, and the other variables mentioned in figures 1, 2, and 3. If we fully understand the dynamics of the system we can learn how to gain greater control over the many interactive variables in public speaking.

The qualitative models are only a first step to quantifying the variables described in the model, a step towards a mathematical description of the process. Such a mathematical model would permit

additional analysis, allowing us to predict more precisely patterns that would emerge as different variables change. For example, if a student has correctly gauged his audience's interest in the topic, and has adequately organized, prepared and practiced his presentation, but does poorly on an exam in another class just before he is scheduled to deliver his presentation, his performance quality is apt to be poorer than if he had a high level of self-confidence before giving his presentation.

My study is only a first step. We are a long way from developing a mathematical model. Clearly there is a need for more accurate measurements of the many variables in the process, and for more clearly defined criteria for measuring levels of success. It may be helpful to collaborate with psychologists to develop questionnaires, exercises, and tests to measure the student's initial fears of speaking, his goals for learning for the semester, and his specific goals for a particular speech. We also need pre-tests and post-tests to measure the audience's learning from a presentation, and pre-tests and post-tests for the speaker's learning of the competencies required for successful public speaking.

In short, we need more objective tests to measure the success of the application of System Dynamics to public speaking--to measure the improvement of the teaching as well as the improvement of the novice speakers. The preliminary results of my study convince me that it would be worth the time and energy required to refine the conceptual models, design the measurement tools, and create a mathematical model, because they will contribute significantly to our understanding of human communication.

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