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ABSTRACT

Classical western logic, built on a foundation of true/false, yes/no, right/wrong statements, leads to many difficulties and inconsistencies in the logical analysis and organization of international business communications. This paper presents the basic principles of classical logic and of fuzzy logic, a type of logic developed to allow for answers that can cover the entire spectrum from yes to no with all values in between. Principles of classic logic that are discussed include statements, the validity of arguments, and three common types of invalid reasoning or logical fallacies. The paper contrasts and compares the two systems and illustrates how fuzzy logic can assist the business communicator in analyzing situations and documents. It also shows how an understanding of the principles of fuzzy logic helps the business communicator better organize letters, memos, presentations, reports, and other types of business communications. The paper concludes that an understanding of fuzzy logic is particularly important for those engaged in international communications, because of its power and widespread use by trading partners of the United States. (JDD)

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PAPERS ON INTERNATIONALIZING BUSINESS AND PROFESSIONAL EDUCATION

FUZZY LOGIC: A NEW TOOL FOR THE ANALYSIS AND ORGANIZATION OF INTERNATIONAL BUSINESS COMMUNICATIONS

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ABSTRACT

In the real world, messages rarely have clear cut "yes" or "no" responses. This is particularly true with international communications, where the correct response must have the proper degree of shading to be successful. However, classical western logic, is built on a foundation of only true or false statements. This yes/no, right/wrong approach leads to many difficulties and inconsistencies in the logical analysis and organization of business communications.

A new type of logic, called fuzzy logic, was developed to allow for answers that can cover the entire spectrum, from yes to no, with all values in between. Fuzzy logic has been applied, with spectacular results, to the design and control of a wide variety of processes and products. Fuzzy logic is now widely used and studied in Japan and China.

This paper presents the basic principles of classical and fuzzy logic. It contrast and compares the two logical systems. The paper illustrates how fuzzy logic can assist the business communicator in analyzing situations and documents. It also shows how an understanding of the principles of fuzzy logic helps the business communicator better organize letters, memos, presentations, reports, and other types of business communications.

The paper concludes that an understanding of fuzzy logic is particularly important for those engaged in international communications, because of its power and widespread use by trading partners of the United States.

LOGIC AND SUCCESSFUL INTERNATIONAL BUSINESS COMMUNICATIONS

The construction of business communications is normally considered a four-stage process. The first stage involves preparing an outline of the document. The second stage involves preparing a rough draft of the document. The third stage involves editing the draft for grammar and proper content. The

last stage involves the preparation of a final, formatted document for distribution.

Each of these stages demands the proper understanding and application of logic. The document outline must be structured logically. Ideas must be organized and presented in the proper logical order, even in the rough draft. The editing stage must ensure that thoughts, concepts, and conclusions are supported in a logical fashion. Even the formatting in the final document must support and reinforce the logical flow of the message.

In short, a thorough understanding and application of logic is the cornerstone of successful and intelligent business communications. And, in international business communications, where language and cultural differences between the sender and receiver can obscure the message, the proper logical structure of the document becomes even more important.

While business communications professionals agree on the importance of logic in document design and preparation, they also realize that many business persons find it difficult to apply logical principles and arrive at logical conclusions.

There are two basic explanations for this predicament. The first and foremost reason for this circumstance is that few business students now receive any academic training in formal or symbolic logic. The second reason is far more subtle, and in the long run it may be much more important. It is because even those familiar with classical logic feel uncomfortable applying it to business situations. To them, the "black or white" nature of classical logic itself seems almost irrelevant and incapable of dealing with "real-life" scenarios, with all their attendant "shades of gray."

In order for business communications professionals to handle these difficulties with logic in domestic and international messages, both aspects of the problem must be addressed.

CLASSIC LOGIC

Introductory courses in computer programming stress the understanding and use of the basic principles of classic symbolic logic. However, few business school curricula require computer programming courses. Rather, business computer courses now stress applications like spreadsheets. Fortunately, the basic principles of symbolic logic are relatively straightforward and can be easily explained and illustrated.

Classic symbolic logic is concerned with statements and the validity of arguments. A **statement** is a sentence that is either true or false, but <u>not</u> both true and false. To avoid the complications and distractions of natural language, a simple statement is converted into an artificial language in which statements are denoted by letters, such as p, q, r, s, ... The **truth value** of a simple statement is either true or false. A

compound statement is formed by combining simple statements with **connectives**. The true value of a compound statement depends only on the truth value of the simple statements from which it is formed. Connectives are operators whose meaning is defined, such as **not**, **and**, **or**, **neither ... nor**, **if ... then**, **unless**, **because**, and such. **Truth tables** are used to show all possible truth values of compound statements.

The operator "**if p, then q**" is termed a conditional. It is particularly important in logic. Many business situations are presented in the form of a conditional. The conditional is symbolized as $p \rightarrow q$; where **p** is called the hypothesis or antecedent, and **q** is called the conclusion or the consequent.

A **tautology** is a statement that is always true. Tautologies play a key role in logic and in the validation (proof) of arguments. The eight major tautologies are:

TAUTOLOGY	SYMBOLIC FORM*
1. Trivial Tautology	$p \Leftrightarrow p$
2. Law of Double negation	$p \Leftrightarrow \sim(\sim p)$
3. Law of the excluded middle	$p \vee \sim p$
4. Direct reasoning	$[(p \rightarrow q) \wedge p] \Rightarrow q$
5. Indirect reasoning	$[(p \rightarrow q) \wedge \sim q] \Rightarrow \sim p$
6. Law of transitivity	$[(p \rightarrow q) \wedge (q \rightarrow r)] \Rightarrow (p \rightarrow r)$
7. Law of contraposition	$(p \rightarrow q) \Leftrightarrow (\sim q \rightarrow \sim p)$
8. Disjunctive syllogism	$[(p \vee q) \wedge \sim p) \Rightarrow q$

* where p, q, and r are simple statements and the symbol $\Rightarrow$ means implies, the symbol $\Leftrightarrow$ means logical equivalence, the symbol $\rightarrow$ means conditional, the symbol $\vee$ means or, the symbol $\wedge$ means and, and the symbol $\sim$ means not.

A **valid** argument asserts that the conclusion follows from the hypothesis according to one or more tautologies. A **proof** of a logical argument is then established, by:

1. translating statements from natural language (English in this case) into symbolic form
2. applying one or more tautologies and simplifying the argument
3. translating the results back into natural language statements.

There are three common types of invalid reasoning or **logical fallacies**. These are: the **fallacy of assuming the consequent**, the **fallacy of denying the antecedent**, and the **false chain pattern**.

Open statements are statements that can be either true or false, depending upon the value of the replacement of variable. Symbolic logic can be extended to open statements by restricting or **quantifying** the value of the variable, to change the open

statement into a true or false statement. Quantifiers of the form **for all**, **all**, **for each**, or **for every**, are called **universal quantifiers** and are symbolized by an inverted A. Quantifiers of the form **there exists**, **some**, or **there is at least one**, are called **existential quantifiers** and are symbolized by a backward E.

A statement with a universal quantifier is true if and only if the replacement set for the variable is the universal set for the statement. That is, the statement is true for all values of the variable. A statement with an existential quantifier is true if and only if the replacement set for the variable contains at least one value (is nonempty). That is, the statement is true for at least one value of the variable. [1]

EXAMPLES TO ILLUSTRATE CLASSICAL LOGIC PRINCIPLES

A few examples will serve to illustrate these definitions and the basic principles of symbolic logic.

Are these statements?

1. Ten plus eight equals twenty.
2. Symbolic logic was first described by George Boole in his book **An Investigation of the Laws of Thought**.
3. Mickey Mouse is President of the United States.
4. Read this paper!
5. What are you doing?
6. 10 + x = 20
7. He is the President of the United States.

The first three sentences are either true or false and, therefore, are statements. Sentences 3 and 4 are not statements, since they do not have a truth value of true or false. Sentences 6 and 7 are open statements, since their truth value depends on the value of a variable. The variable is "x" in sentence 6, and the pronoun "he" in sentence 7. If x is 10 sentence 6 is a true statement, and if "he" is Bill Clinton sentence 7 is a true statement.

A classic example of how value systems get in the way of logical reasoning with natural language statements can be shown with the two following arguments:

1. If a person uses heroin, then he smokes pot.
   If a person smokes pot, he uses heroin.

2. If the dog is poisoned, it is dead.
   The dog is dead; therefore, it was poisoned.

Logically, both arguments are identical, and both use the invalid form of reasoning called the fallacy of assuming the consequent. The logical fallacy is obvious in the second argument, but, the strong emotional content of the first argument tends to make the invalid reasoning more difficult to detect. Using symbols for

the statements in an argument removes the emotional content of language, and makes the invalid reasoning readily apparent.

TRUTH TABLES

A truth table is a device that shows the truth values of compound statements depending upon the connectives used and the truth values of the simple statements. Here are the truth tables for compound statements connected with **and**, **or** and **not**.

		and	**or**	**not** p	**not** q
p	q	$p \wedge q$	$p \vee q$	$\sim p$	$\sim q$
T	T	T	T	F	F
T	F	F	T	F	T
F	T	F	T	T	F
F	F	F	F	T	T

Here are the truth tables for compound statements with the conditional **if p, then q**, written symbolical as $p \rightarrow q$, and its related operators, the **converse**, $q \rightarrow p$, the **inverse**, $\sim p \rightarrow (\sim q)$, and the **contrapositive**, $\sim q \rightarrow (\sim p)$.

		conditional	**converse**	**inverse**	**contrapositive**
p	q	$p \rightarrow q$	$q \rightarrow p$	$\sim p \rightarrow (\sim q)$	$\sim q \rightarrow (\sim p)$
T	T	T	T	T	T
T	F	F	T	T	F
F	T	T	F	F	T
F	F	T	T	T	T

Here are the truth tables for compound statements with the operators **biconditional**, $p \leftrightarrow q$, **either p or q**, $(p \vee q) \wedge [\sim (p \wedge q)]$, **neither p nor q**, $\sim p \wedge (\sim q)$, and **p because q**, $q \rightarrow p$.

		Bi-conditional	**Either p or q**	**Neither p nor q**	**p because q**
p	q	$p \leftrightarrow q$	$(p \vee q) \wedge [\sim (p \wedge q)]$	$\sim p \wedge (\sim q)$	$q \rightarrow p$
T	T	T	F	F	T
T	F	F	T	F	T
F	T	T	T	F	F
F	F	F	F	T	T

TAUTOLOGIES AND REASONING

Valid arguments depend on tautologies. Arguments based on the trivial tautology, $p \Leftrightarrow p$, (a rose is a rose), the law of double negation $p \Leftrightarrow \sim(\sim p)$, (the attainable is not unattainable) are self evident.

Valid arguments based on the law of the excluded middle, $p \vee \sim p$, are more interesting. For example, the valid argument "you are with us or you are not with us" is often extended to arguments like "if you are not with us, you are against us" and "if you are not part of the solution, you are part of the problem." Indeed,

the "lack of the middle ground" in classical logic is a sticking point. We shall return to it later when we consider an alternate to classical logic.

Direct reasoning and indirect reasoning are the foundation of our approach to the representation of knowledge. Direct reasoning is also known as *modus ponens*. Direct reasoning goes as follows:

> If Mary gets an A on the final in Business Communications, then she passes the course.
> Mary gets an A on the final in Business Communications.
> Therefore, Mary passes the course.

Note that the argument consist of two premises or **hypotheses**, and a conclusion. The argument is valid if $[(p \rightarrow q)\wedge p] \Rightarrow q$. The truth table for direct reasoning is illustrated below:

TRUTH TABLE PROOF OF DIRECT REASONING

p	q	$p\rightarrow q$	$(p\rightarrow q)\wedge p$	$[(p\rightarrow q)\wedge p]\rightarrow q$
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

Indirect reasoning, $[(p \rightarrow q)\wedge\sim q] \Rightarrow \sim p$, also known as *modus tollens*, uses the concept of denying the consequent as the basis of the proof. Consider the examples:

> If Mary gets an A on the final in Business Communications, then she passes the course.
> Mary does not pass Business Communications.
> Therefore, Mary did not get an A on the final.
>
> If Peter got an A on the final in Business Communications, then I am a monkey's uncle.
> I am not a monkey's uncle.
> Therefore, Peter did not get an A on the final.

The truth table for indirect reasoning is illustrated below:

TRUTH TABLE PROOF OF INDIRECT REASONING

p	q	$p\rightarrow q$	$\sim q$	$(p\rightarrow q)\wedge\sim q$	$\sim p$	$[(p \rightarrow q)\wedge\sim q]\rightarrow\sim p$
T	T	T	F	F	F	T
T	F	F	T	F	F	T
F	T	T	F	F	T	T
F	F	T	T	T	T	T

The law of transitivity, $[(p\rightarrow q)\wedge(q\rightarrow r)] \Rightarrow (p\rightarrow r)$, allows us to extend our knowledge to other situations. Let:

p: Joe does his homework in Business Communications
q: Joe will pass Business Communications
r: Joe will graduate with a BS in Business

If Joe does his homework in Business Communications, then Joe will pass Business Communications.
If Joe passes Business Communications, then Joe will graduate with a BS in Business.
Therefore, if Joe does his homework in Business Communications, then Joe will graduate with a BS in Business.

The other tautology of interest is the disjunctive syllogism, $[(p \vee q) \wedge \sim p)] \Rightarrow q$. Consider the two statements:

p: The tiger is behind door 1.
q: The tiger is behind door 2.

According to the disjunctive syllogism tautology:

The tiger is behind door 1 or the tiger is behind door 2.
The tiger is not behind door 1.
Therefore, the tiger is behind door 2.

INVALID REASONING

The last area of classical logic we will illustrate is that of three common logical fallacies; the fallacy of assuming the consequent, the fallacy of denying the antecedent, and the false chain pattern. The fallacy of assuming the consequent was illustrated earlier in this discussion. Here is another example:

If a person jogs ten miles a week, then she is in good condition.
This person is in good condition.
Therefore, she jogs ten miles a week.

The argument is of the form $[(p \rightarrow q) \wedge q] \rightarrow p$. The truth table for the fallacy of assuming the consequent is illustrated below:

TRUTH TABLE PROOF FOR THE FALLACY OF ASSUMING THE CONSEQUENT

p	q	$p \rightarrow q$	$(p \rightarrow q) \wedge q$	$[(p \rightarrow q) \wedge q] \rightarrow p$
T	T	T	T	T
T	F	F	F	T
F	T	T	T	F
F	F	T	F	T

Note that the truth table shows that the fallacy of assuming the consequent is not always true, and is therefore an invalid form of reasoning.

The fallacy of denying the antecedent is illustrated by:

If a person jogs ten miles a week, then she is in good condition.
This person does not jog ten miles a week.
Therefore she is not in good condition.

Note that the invalid argument is of the form $[(p \rightarrow q) \wedge (\sim p)] \rightarrow \sim q$.

The false chain pattern is illustrated by:

Blue-chip stocks are a good investment.
Stocks paying a high rate of return are a good investment.
Therefore, blue-chip stocks pay a high rate of return.

In the illustration, p: good investment, q: blue-chip stocks, and r: high rate of return. The form of the invalid argument is $p \rightarrow q$ and $p \rightarrow r$, therefore, $q \rightarrow r$. Because of complex wording, false chains can be difficult to detect.

AN ALTERNATE TO CLASSICAL LOGIC - THE PARADOX OF THE EXCLUDED MIDDLE

Even the ancient Greeks ran into problems in applying classical logic. One type of problem can be classified as "haziness at the edges." For example, according to Plutarch, when Thesus returned from slaying the Minotaur, the Athenians preserved his ship. As the planks rotted, they were replaced with new ones. When the first plank was replaced, everyone agreed the ship was still Thesus' original vessel. Adding several more planks made no difference. Eventually, the Athenians had replaced every part of the ship. At what point was the ship no longer the original vessel?

In applying classical logic to the development of the mathematical theory of sets, Betrand Russell ran into the paradox of the excluded middle. Russell's paradox can be stated as:

A set contains all sets and only those sets that do not contain themselves. Does it contain itself?

It must contain itself, but can't. A contradiction.

The paradox of the excluded middle is also illustrated by the ancient Greek riddle: "A Cretan states that all Cretans lie. Is he lying?" Analyzing the riddle we find: If the Cretan is lying, then his statement is true and he is not lying. On the other hand, if the Cretan is telling the truth, then his statement is true, and he is lying. In other words, we have a contradiction because the Cretan cannot be lying and telling the truth at the same time.

These conundrums add substance to our previous intuitive reaction against statements like "if you are not with us, you are against us." It is clear that there must be another alternative approach

to classical logic that has a more realistic bearing on the world as it is.

What seems to needed is continuous logic values, rather than a discrete, beveled, logic - a logic that can smoothly handle real-world gradations.

FUZZY LOGIC

This fuzzy logic is exactly what was suggested by Lotfi Zadeh in 1965. Fuzzy logic is based on the idea that sets can have members that belonged only partly to them, based on **membership values**.

To illustrate the concept, suppose we ask the question "Is a package heavy?" and "Is a package large?"

To apply classical logic, we must draw a line at a specific weight, say 75 pounds, and state that it is "heavy" if it weighs 75 pounds or more, and all other packages are not heavy (light). Similarly, with "largeness," we must draw a line at size, say 50 inches in the longest dimension, and state that a package is "large" if it is 50 inches, or more, in the longest dimension, and all othr packages are not large (small). With fuzzy logic we can have degrees.

Therefore, if we have eight packages:

			TRUTH VALUES			
			HEAVY		**LARGE**	
Package	Weight pounds	Length inches	**classic**	**fuzzy**	**classic**	**fuzzy**
A	30	40	F	0.1	F	0.4
B	50	20	F	0.2	F	0.2
C	60	70	F	0.4	T	0.8
D	74	60	F	0.6	T	0.7
E	80	36	T	0.7	F	0.35
F	90	45	T	0.85	F	0.45
G	100	55	T	0.9	T	0.6
H	120	90	T	1.0	T	0.9

With classic logic, only packages E through H are heavy. With fuzzy logic all the packages are "heavy" or "large" to a greater or lesser degree, depending on their arbitrary membership value.

Fuzzy logic supplies more information, and is more discriminating, as well. Another point is that membership values are <u>not</u> probability values. Probability has its basis in classical logic and treats events that occur or do not occur. Membership values merely associate items with a set, with no relation to probability.

FUZZY LOGIC OPERATIONS

Now, we can examine fuzzy logic operations. With fuzzy logic, truth values of compound statements depend upon membership values of items within each set.

The complement (**not**) value is the membership value needed to reach 1. The complement of a pitcher of water 0.7 full is 0.3. The complement of package A in the above example on heaviness is 0.9 and on length is 0.6. The union (**or**) of two values is the maximum of either membership value. The results of the operation: "Package A (0.1) **or** package D (0.6) is heavy" is truth value of 0.6. The intersection (**and**) of two sets is the minimum of either membership value. The results of the operation: "Package A (0.4) **and** package D (0.7) are large" is the truth value of 0.4.

Fuzzy logic is extended with **hedges**. Hedges are terms that modify sets. They include **very**, **somewhat**, **quite**, **more or less**, and other terms that alter the range of a set. Very, for example, narrows down a set. The set of **very heavy** packages in the above example could be packages G and H. The set of **more or less** long packages could be packages D, F, and G. Graphs are often used to show the membership in fuzzy logic sets.

Hedges can also be used to partition the continuous range of membership values into discrete chunks. Room temperature can be used to illustrate hedges used for chunking. The temperature can range from:

very cool
moderately cool
slightly cool
neutral
slightly warm
moderately warm
very warm

These fuzzy sets can and do overlap. A temperature of 80 degrees does not fall fully into moderately warm or very warm, but has memberships in both sets.

Fuzzy logic has had its greatest commercial successes in expert systems. An expert system is a computer program that attempts to mimic human expertixe for problem solving applications.

Expert systems are normally divided into four parts; (1) a long sequence of "if/then/else" rules (the knowledge base for the application), (2) an inference engine to examine the knowledge base and select the rules to be applied based on a (3) database of information or facts on the current situation, and a (4) user-interface to collect and display information.

Fuzzy logic allows the injection of uncertainty into the rule structure of the knowledge base and modifies the inference engine so that rules can fire partially and fuse the results. Fuzzy rules are of the form:

> [1] If the room temperate is slightly warm AND it is not changing much, THEN reduce the heat a little.
> [2] If the room temperate is neutral AND it is not changing much, THEN do not change the heat.
> [3] If the room temperate is very warm AND it is increasing rapidly, THEN reduce the heat a lot.

If the room temperate were 74 and not changing, both rules [1] and [2] could fire and the inference engine could fuse the results to change the heat a "very" little.

Fuzzy logic expert systems are in widespread use. Their wide range of applications include controlling trains, stock and bond selection, autofocus control for cameras, speech and handwriting recognition, and loan application administration. Fuzzy logic expert system design tools are now available and fuzzy logic controllers based on these expert systems are embedded in a variety of machines, ranging from camcorders to washing machines.

APPLYING FUZZY LOGIC TO BUSINESS COMMUNICATIONS

Fuzzy logic breaks the law of the excluded middle. That is, fuzzy logic variables may be multivariant. This allows fuzzy logic systems to manipulate subtle concepts like cool or warm, and dirty or clean - fuzzy ideas and concepts similar to those that must be handled in real-world business communications.

An examination of the principles of classical and fuzzy logic shows logic how can be applied to business communications. First, classical logic requires the definition statements. Similarly, fuzzy logic requires the definition of fuzzy sets. Classical logic defines set membership and results based on a "yes/no," "true/false" criteria. Fuzzy logic uses a subjective membership value system, so that items can be partially set members.

Next, classical logic strips the "confusion of language" from the statements and reduces them to symbolic form. Highly structured rules of logical inference are applied to determine the truth values of the resulting compound statements. Fuzzy logic, on the other hand, uses the subjective membership values and hedges to dilute or restrict set membership and set membership values. Several rules can partially fire and the results can be fused together. In that way, fuzzy logic obtains "consensus" of the rules governing the particular situation, rather than just a "yes" or "no" answer.

APPLICATION GUIDELINES

Application of fuzzy logic to business communications follows these same guidelines, in a direct three-step process:

1. Analyze the goals or requirements of the document to determine the basic informational elements under discussion and develop the fuzzy sets, membership values, and hedges needed for these informational elements.

2. Establish the nature of the logical arguments and/or rules required to meet the goals. Perform any necessary logical reductions by applying the rules for **anding**, **oring**, **complementing**, or **implication**.

3. Review the results and complete the document. Modify membership value criteria and arguments, if needed, to ensure that goals are met. Translate any logical constructs into natural language and defuzzy concepts when possible. Finally, remember to personalize your finished messages.

APPLICATION EXAMPLE

Let's apply these steps to a practical example. The company is upset that the computer network is being used incorrectly. There are several problems: (1) unauthorized use of network for personal correspondence and solicitation is creating a sort of electronic junk mail situation clogging the system; (2) too many long documents are being transmitted; (3) private documents are being sent that should not be transmitted over the network for security reasons; (4) too many documents are being forwarded or copied to individuals who should not be concerned with the material.

The assignment is to "write a brief informative memo on the use of the network for correspondence to overcome these and other problems."

STEP 1 - INFORMATIONAL ELEMENTS: The goal of the document is to develop a set of instructions for the network for business correspondence. From a logical point of view, we must define set membership in (1) the network, (2) correspondence, and (3) problems to cover the informational elements.

The "network" is relatively easy to define. It means the company local E-mail and Internet. The sets covering "correspondence" and "problems" are fuzzy. As a first cut for this document, we can assume "correspondence" includes personal correspondence and business correspondence. Next, based on the verbal problem statement, we can partition business correspondence into private, public, originals and copies. Length hedges can be long, proper, and short. Source hedges can be original, forward, and copy.

The initial set of problems include unauthorized use, long document transmission, private document transmission, excessive document forwarding, and excess document copies. Again, we are involved with fuzziness concepts for the terms long, private, and excessive.

STEP 2 - LOGICAL ARGUMENTS OR RULES: This assignment calls for a collection of rules to guide the use of the company's computer network. These rules will be of the "if/then/else" form. Here is an example of a short set of such rules for this assignment:

[1] IF message involves company business AND is short THEN send over computer network.
[2] IF message is private OR does not involve company business THEN do not send over computer network.
[3] IF response to message involves other individuals directly THEN send copy ELSE do not send copy.
[4] IF original of message is important to other individual directly THEN send include original with copy.

STEP 3 - RESULTS: The fuzzy logic analysis seems to have produced a compact, logical set of rules upon which to base our memo. Defuzzying these rules provides the core of the memo:

To ensure that the company's computer network will serve you better in the future, please observe the following:

1. Send only messages that involve company business.
2. Keep your messages short.
3. Do not send copies of your response or forward copies of originals to other people, unless you are sure they really need that information.
4. Do not send anything that is company private over the network. The network should not be considered secure.

By following these simple rules, we can assure you that our computer network will be available for you when you need it.

Thanks for your help and understanding.

THE POWER OF FUZZY LOGIC IN BUSINESS COMMUNICATIONS

As can be seen, fuzzy logic can serve as a powerful tool in assisting the business communicator in analyzing and organizing business documents. It is particularly important for those engaged in international communications because of its power and widespread use by trading partners of the United States. A better understanding of the principles of logic in general and fuzzy logic in particular will allow the business communicator to prepare better organized and more comprehensible letters, memos, presentations, reports, and other types of business communications.

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