

UNCERTAINTY TERMINOLOGY

Discussion led by Jane Booker, TSA-1

Can we agree?

Can we agree to disagree?

What Do We Mean By:

Uncertainty

Vagueness

Errors (bands/bounds/limits)

Noise

Random

Probabilistic

Variation

Confidence

Fuzzy

Uncertainty

Where does it come from (sources of)?

By chance or randomness

By lack of knowledge or unobservable

By vagueness or ambiguity

By????

Could also ask whose uncertainty?

Yours?

Natures?

UNCERTAINTY

“Ranges from a mere lack of absolute sureness to such **vagueness** as to preclude anything more than guesswork” Webster

UNCERTAINTY

NUMERIC UNCERTAINTY

“Uncertainty in numerical quantities is usually addressed using statistics. Often times this form of uncertainty is called variability.” Ross

VAGUENESS & IMPRECISION

NON NUMERIC UNCERTAINTY

“**Vagueness** can be used to describe certain kinds of uncertainty associated with linguistic information or intuitive information. Examples of vague information are that the data quality is 'good', or that the transparency of an optical element is 'acceptable'.

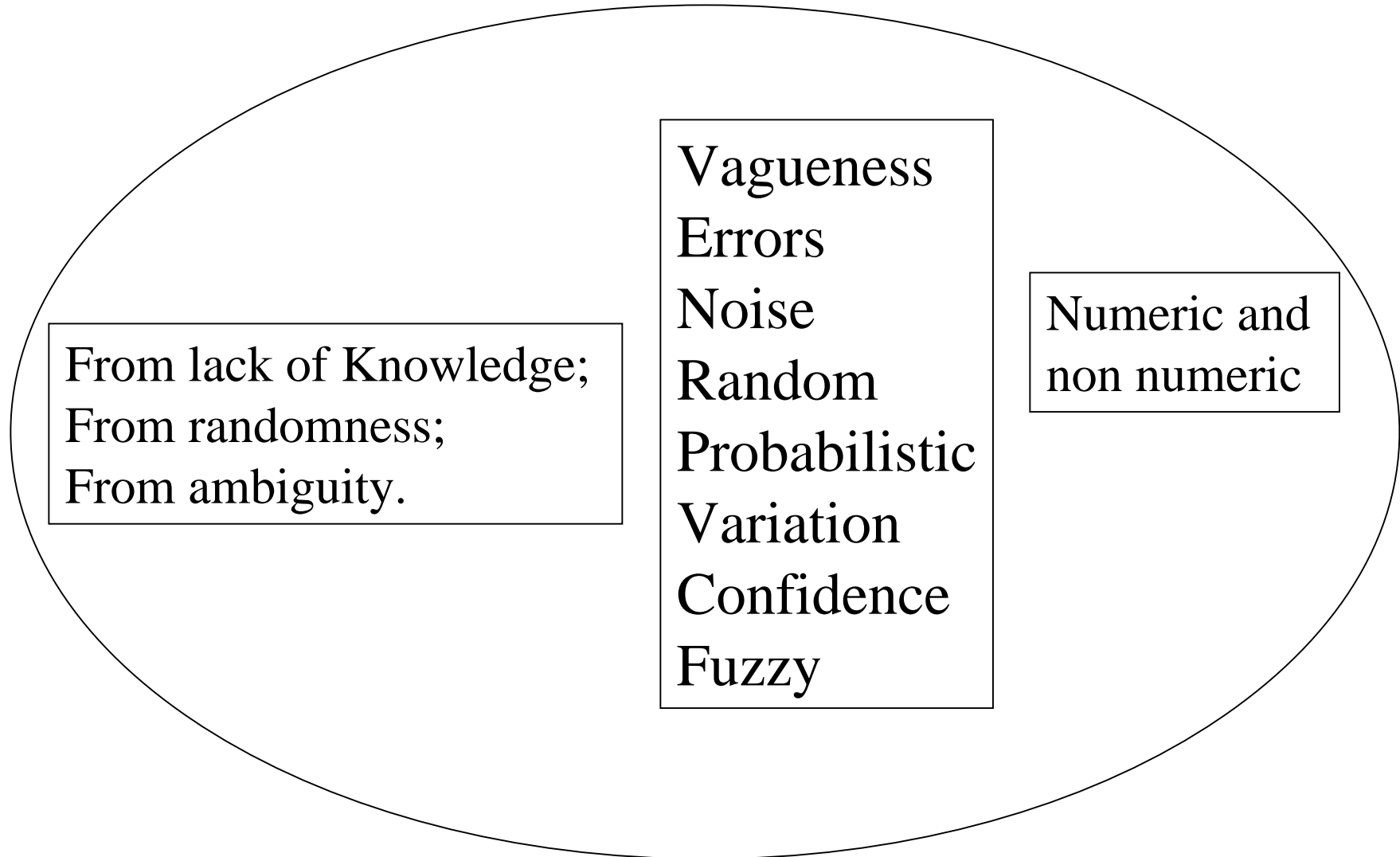
Imprecision can be associated with quantitative or countable data as well as non-countable data. An example of the latter might be, the length of a flaw in an integrated circuit is 'long'. “ Ross

VAGUENESS & IMPRECISION

“**Imprecision** can be used to quantify random variability in quantitative uncertainty and it can also be used to describe a lack of knowledge for descriptive entities (e.g., acceptable transparency, good data quality).

Vagueness is usually related to non-measurable issues.” Ross

Uncertainty



VAGUE

“Not clearly, precisely or definitely
expressed or stated.

Not precisely determined or known;
uncertain.” Webster

Random = Chance

“Applies to that which occurs or is done without careful choice, aim, plan.

Chance emphasizes accidental occurrence without prearrangement or planning.” Webster

Fuzzy and Random

“**Fuzziness** describes the ambiguity of an event,
whereas

chance (randomness) describes the uncertainty
in the occurrence of the event.” Ross

Fuzzy

“**Fuzziness** describes the ambiguity of an event, whereas” Fuzzy refers specifically to the fuzzy set theory and fuzzy logic.

Non probabilistic \Rightarrow does not follow probability theory axioms, but follows fuzzy set theory axioms.

Variation

“The degree or extent to which change, deviation or modification occurs; a thing which is somehow different from another” Webster

Confidence

“Firm belief; trust; reliance; assurance; a being or feeling certain” Webster

Errors

“Deviation from the truth, accuracy, correctness; a comparison” Webster

Not a mistake or deliberate; could be careless or randomness.

Noise

“Sound that interferes with the sound impulse being communicated; discordant; unexpected; disagreeable” Webster

Uncertainty

Where does it come from (sources of)?

By chance or randomness => variation / probability

By lack of knowledge => unknown

By vagueness or ambiguity => fuzzy