Engineering Design
ENGR 13x2

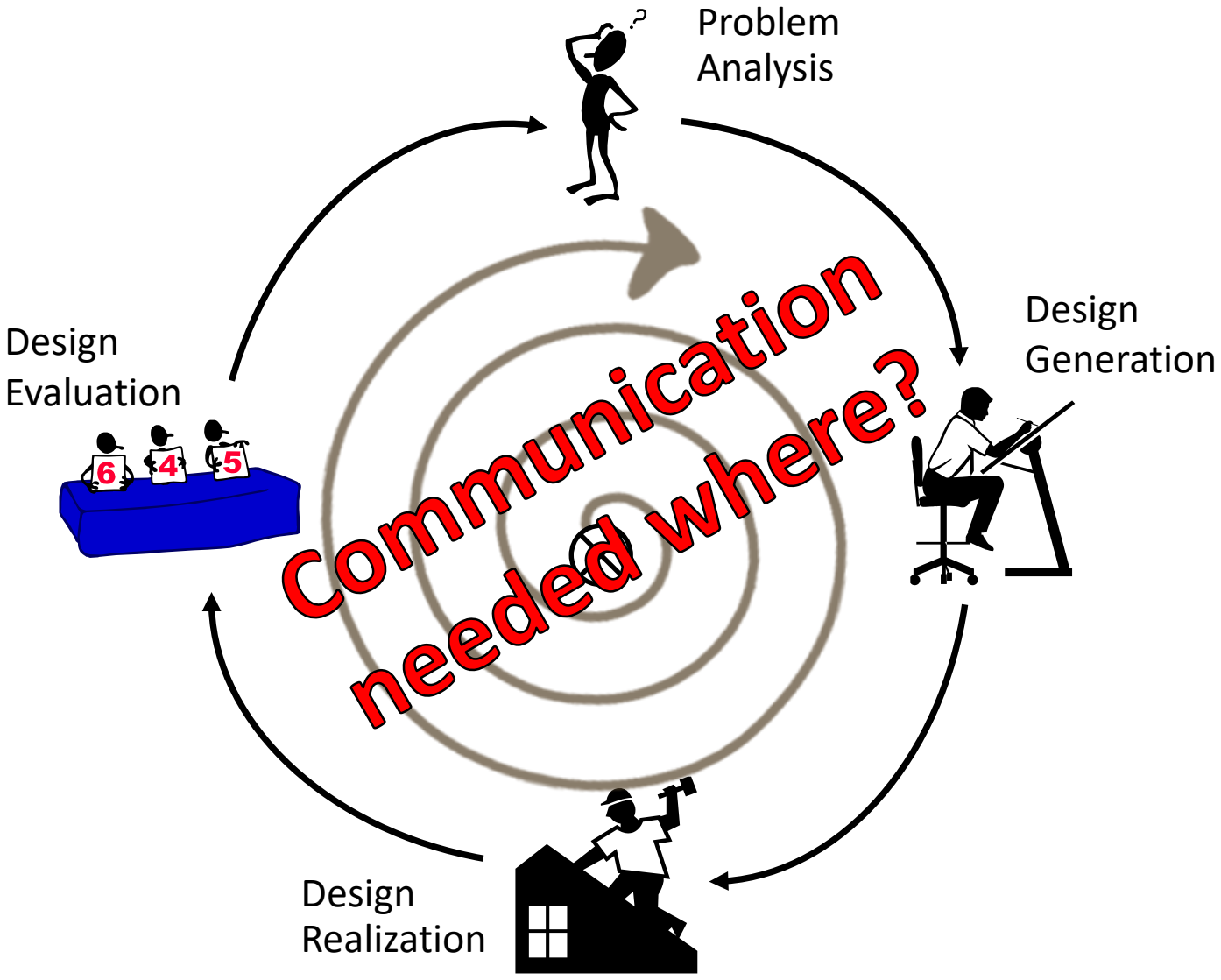
Communications

Agenda

Engineering Communications:

- Purpose/Process
- Barriers
- Methods -- strategies & shortfalls
  - Electronic Comm. (email, texting, IM)
  - Data Depositories
  - Presentations
  - Proposals and Reports
  - Manuals

Engineering Design Process



Forms of Technical Communication

- Emails
- Reports
- Presentations
- Drawings
- Proposals
- Demonstrations
- Meetings

Communication

- Your ability to communicate effectively will probably impact your career more than anything else.
- What good is a computer with no interface or output devices?

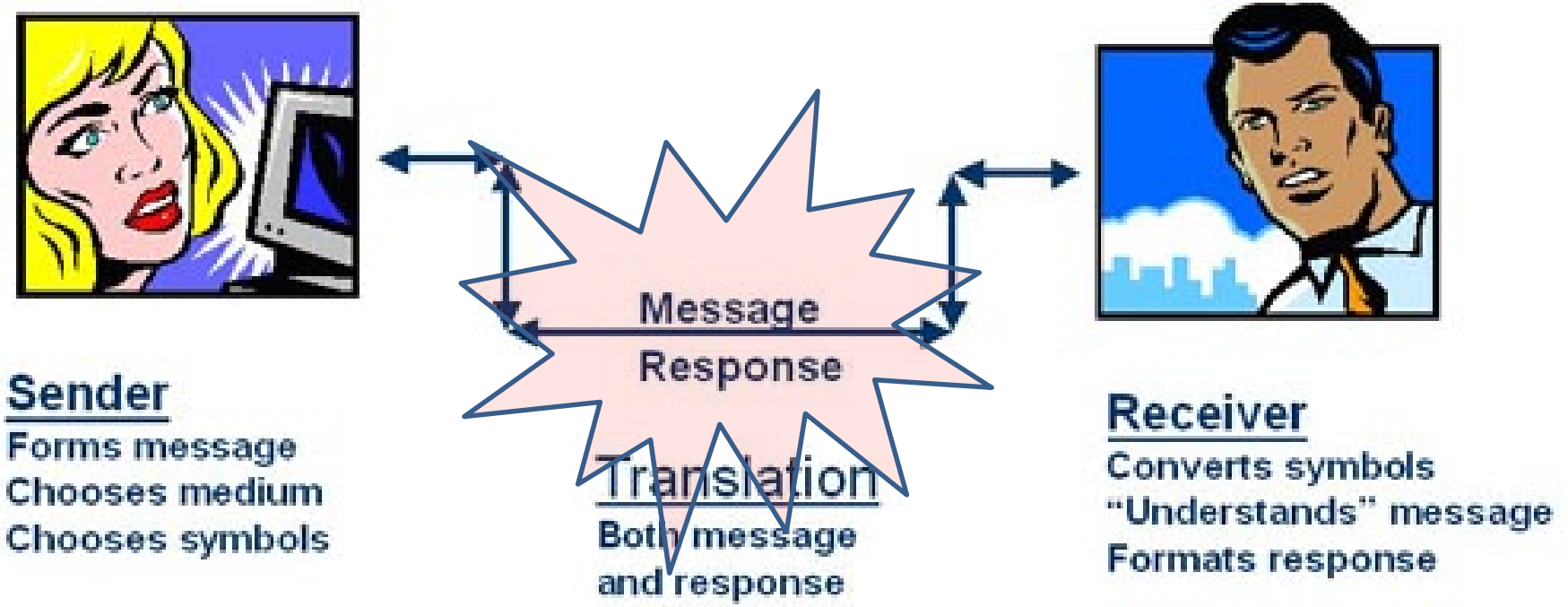
Purpose & Processes of Communication

- Convey or request information
  - I need to know something
- Convey feelings
  - I need to express an emotion
- Develop relationships
  - I want to know you better

Purpose & Processes of Communication

- Modes:
  - Written (reading)
  - Verbal (voice)
  - Visual (graphics)
  - Physical behaviors
    - Body language
    - Tone of Voice
    - Proximity
    - Gestures

Purpose & Processes of Communication



- True communication requires feedback (was the message understood as intended?)
- Sender and receiver change roles with each iteration (talk & listen)
- Listening is one of the most difficult skills for many people.
  - Active listening: Listen, process, and restate to ensure you got the message right (feedback) before making your response (taking turns).

Not Just Words…

- Body language
- Eye contact
- Facial expressions
- Posture
- Gestures
- Proximity
- Tone of voice

Information Transmission

Words – ??

Voice Tone – ??

Body Language – ??

Not Just Words…

- Body language
- Eye contact
- Facial expressions
- Posture
- Gestures
- Proximity
- Tone of voice

If verbal and non-verbal do not match, people typically believe the non-verbal!

Information Transmission

Words – **7%**

Voice Tone – **38%**

Body Language – **55%**

Barriers to Communication

- If what I **mean to say** and what you **think I said** do not match then there is a communication breakdown

- What can cause this?

Barriers to Communication

- Sender issues
  - I do not know what I want to say
  - I do not choose the right words
  - My word structure is incorrect or confusing
- Receiver issues
  - I am not listening
  - I have preconceived notions about what you are saying
  - I don’t understand the vocabulary, jargon, acronyms, etc.

Barriers to Communication

- Environmental issues
  - Something is distracting (noise, activity, temperature, hunger, etc.)
- Cultural issues
  - We communicate through our cultural “filter”
    - Some examples . . .

Improving Communication

- Know your audience
  - Technical or non-technical?
  - Cultural issues?
  - Business or casual communication?
- Sender issues (what can you control?)
  - English Comp 1: Proper word usage, grammar, spelling
  - Non-verbal communication
- Environmental issues
  - Control what you can
  - **When** you say and **where** you say can be as important as **what** you say

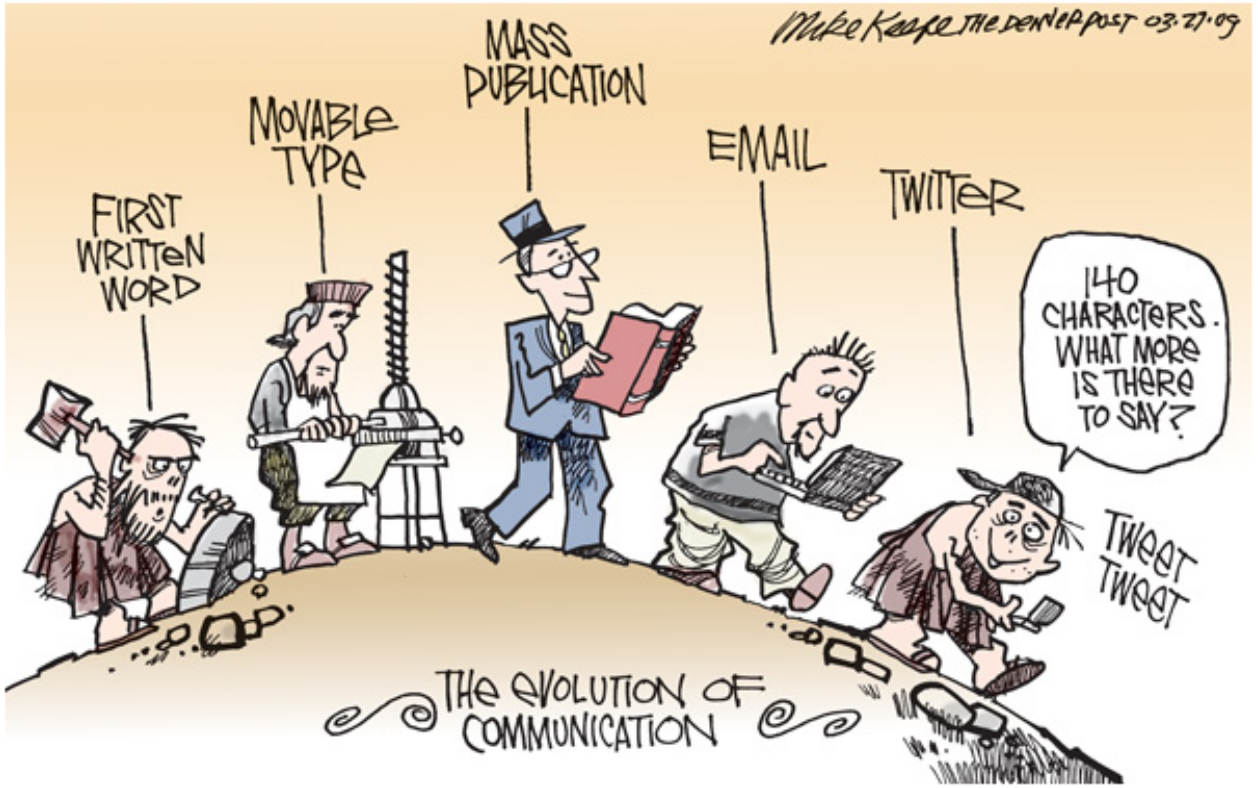
Communications Exercises

- Visual Skills – Counting Experiment

https://www.youtube.com/watch?v=vJG698U2Mvo

Impact of Technology

- Technology has improved our ability to communicate over great distance, but exacerbates some of the communication barriers.



Electronic Communications

- Electronic communication issues:
  - Not face to face: No body language
  - If text only: No voice tone or expression
  - May be asynchronous
  - May be re-broadcast to other audiences
  - Many opportunities to be mis-understood
  - Anonymity may foster candid response or callous response

Electronic Communications

- Email considerations:
  - No chance to adjust your message based on the reaction of the recipient
  - E-mail is permanent and very easy to forward to someone else
  - Carefully consider who should receive a copy of your e-mail (CC and BCC)
  - Sender: Be courteous, concise, and *proofread*.
  - Receiver: Assume good will on the part of the sender.
- Texting and IM:
  - Good for transient and time critical info
    - "I'm running late – start the meeting without me."

Data Depositories

- Common data locations (Dropbox, Google Docs, etc.) can aid communications
  - Put the big stuff there and reference it
- Need to watch version control
  - Who is making changes and why?
- Don’t assume uploading a document replaces telling the team the document is ready for them

Presentations

- Informal
  - Example: Meeting with manager and/or coworkers on project status
  - Short preparation time
  - Bring key materials and know key points to make

- Formal
  - Example: Design Review for project sponsor; Presentation at a technical conference
  - Longer preparation time
  - Prepared materials
  - Audio-Visual Equipment often used

- Tips for all presentations:
  - Know your purpose (why are you there?)
  - Know your audience (why are they there?)
  - Know your venue (size, layout, equipment, …)

Reports and Proposals

- Usually between 2 and 20 pages
  - Longer and no-one will read it
- Introduction
  - Summary of entire report
  - Reader can quickly determine if report is useful for them
- Setup - If an experiment was conducted, discuss the physical setup
- Data – display and explain how data was collected
- Analysis – Discuss method and equations used
- Conclusions – Summarize your claims and immediately refer back to their justification

- What really happens: Readers skim!
  - Summary – Is anything here useful to me?
  - Conclusions – OK, did they really do anything useful?
  - Data – this is great what kind of tests did they run?
  - Analysis – I want to do this as well… Better learn their method.

Steps to Make a Good Report

- **Define the Reader**
- Create Topic Headings (skeleton or outline)
- Divide and conquer (writing assignments)
  - Define format, font, deadline & content expectations
- Assemble inputs and tie together (1st Draft)
- Read & Revise
  - Writer + Separate Reviewer/Editor(s)
  - Circulate draft to group to search for errors, gaps and unintended redundancies
- Revise Again!!!
- Group Lead/PM review final version personally

GOAL: Clear story told with one voice

Instruction Manual

- User's perception of a product is often derived directly from the quality of the instruction manual.
- Typical contents:
  - Introduction
  - Setup
  - Operation
  - Safety
  - Troubleshooting
- Likely used as a "reference source."
  - Make information easily extractible and understandable without reading the entire manual.

Typical Writing Errors

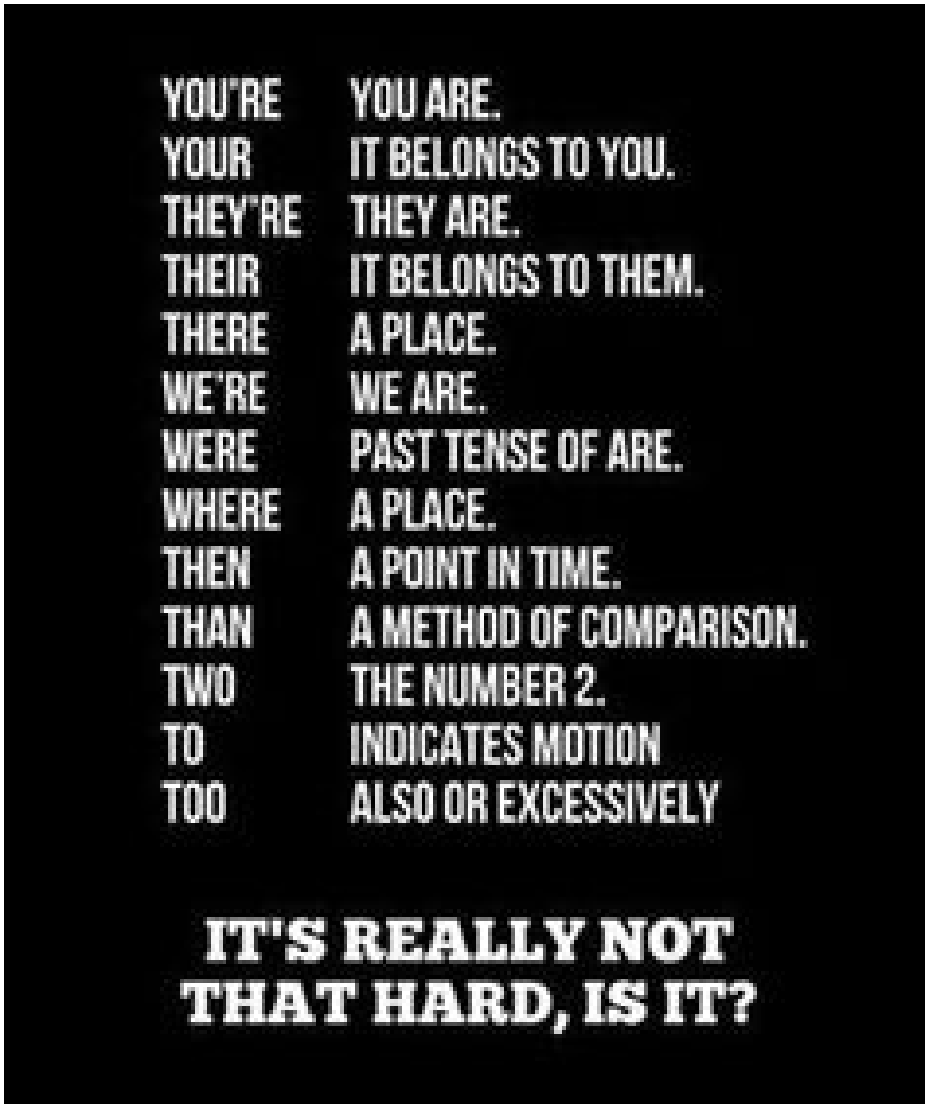
- Grammar list on pg 284 of textbook
- Typo's & spelling
- Poor grammar & construction
- Poor logic

Good Resource:

OSU Writing Center

- *Appointments and walk-in sessions*
- *440 Student Union (main office)*
- *Satellite offices across campus*
- *Additional resources on website*

https://osuwritingcenter.okstate.edu/




THIS ISN'T WHAT I WANTED.
I KNOW.
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YOUR COMMUNICATION SKILLS ARE SO POOR THAT I GAVE UP TRYING TO UNDERSTAND WHAT YOU WANTED AND INSTEAD PUT SOME RANDOM NUMBERS ON A SPREADSHEET.
4-21
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WHY DIDN'T YOU JUST ASK ME TO CLARIFY?!
APPAREN-TLY YOUR LISTENING SKILLS NEED WORK TOO.