Engineering (Design) Communication

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Outline

- Recap
- Engineering (Design) Communication
- Formats
  1. Technical reports
  2. Oral presentations
  3. Design reviews
  4. Engineering drawings
  5. Manufacturing specifications
- Deliverables for your project
- How to ensure a positive outcome
- Summary

Recap

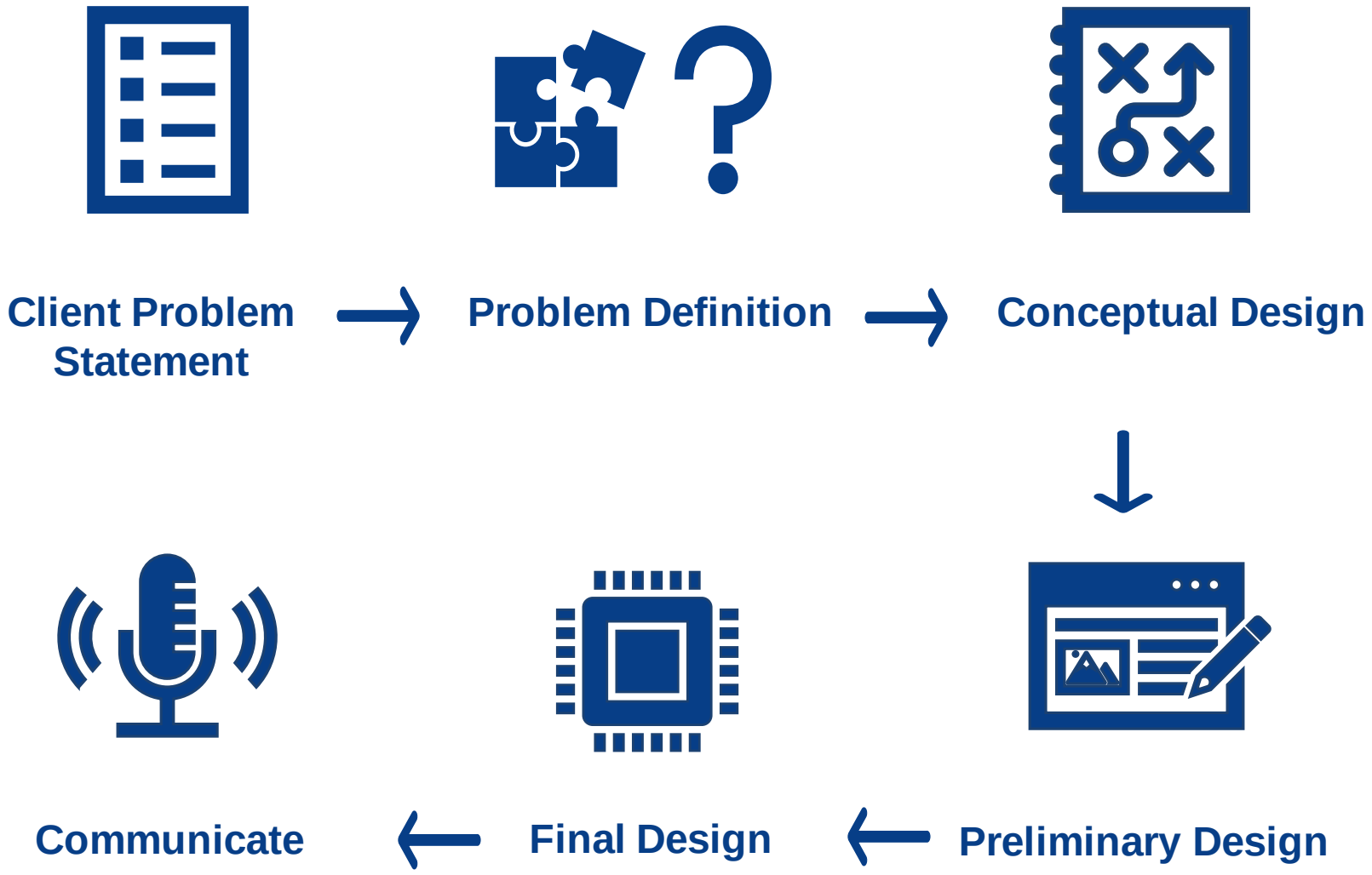
Engineering (Design) Communication

1. Technical report
2. Oral presentations
3. Design reviews
4. Engineering drawings
5. Manufacturing specifications

Deliverables for your project

How to ensure a positive outcome

Summary


Client Problem Statement
Problem Definition
Conceptual Design
Preliminary Design
Final Design
Communicate

Teamwork

We all work in different ways

Teamwork is about being self-aware and aware of others
(work, thinking and learning styles)

Academic writing

How can you communicate your ideas?

Intellectual Property

What ideas can you protect?
How can you protect your ideas?

Deliverables

Assessment	Date	Content	Weighting
~~**Interim Presentation**~~	~~1 June~~	~~A presentation with Q&A to exhibit your design so far~~	~~20%~~
Reflections on professional practice	Throughout	Reflection on your contributions to the project and your technical and professional competencies development	5%
Project report	13 June	A formal technical report detailing the design process and delivered technical solution	35%
Interview, Demo and Competition	18 June	Explain to the examiner how your EEERover works and answer their questions. Then compete head-to-head with other groups to compete the challenge in the quickest time	40%

Recap

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Learning Outcomes

By the end of this session you should be able to:

1. Define the purpose of Engineering Design Communication
2. Enumerate some of the forms it can take
3. Describe in detail the structure and contents of 5 of them

Communication

- Takes place during the entire design process, but has greater importance in the last phase
- It forms the basis for the manufacture / approval of the product or system
- Once we have developed our selected concept (final design) we need to communicate it
- The project not complete unless results communicated to client or stakeholders

Communication in the context of Engineering Design (ED)

Purpose of communication:

- Document design (process and outcome)
- Describe how it will become a physical product / operating system
- Inform client or stakeholders of outcomes and /or process

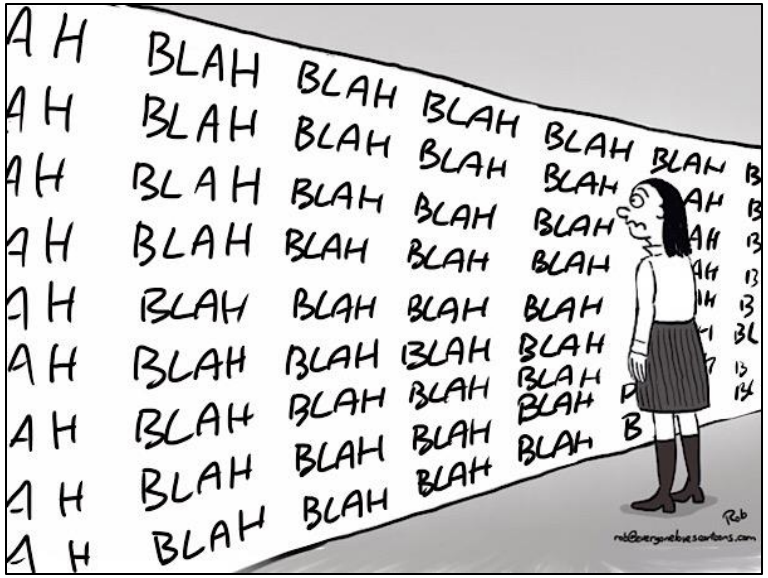
General advice

Applies to all technical communication:

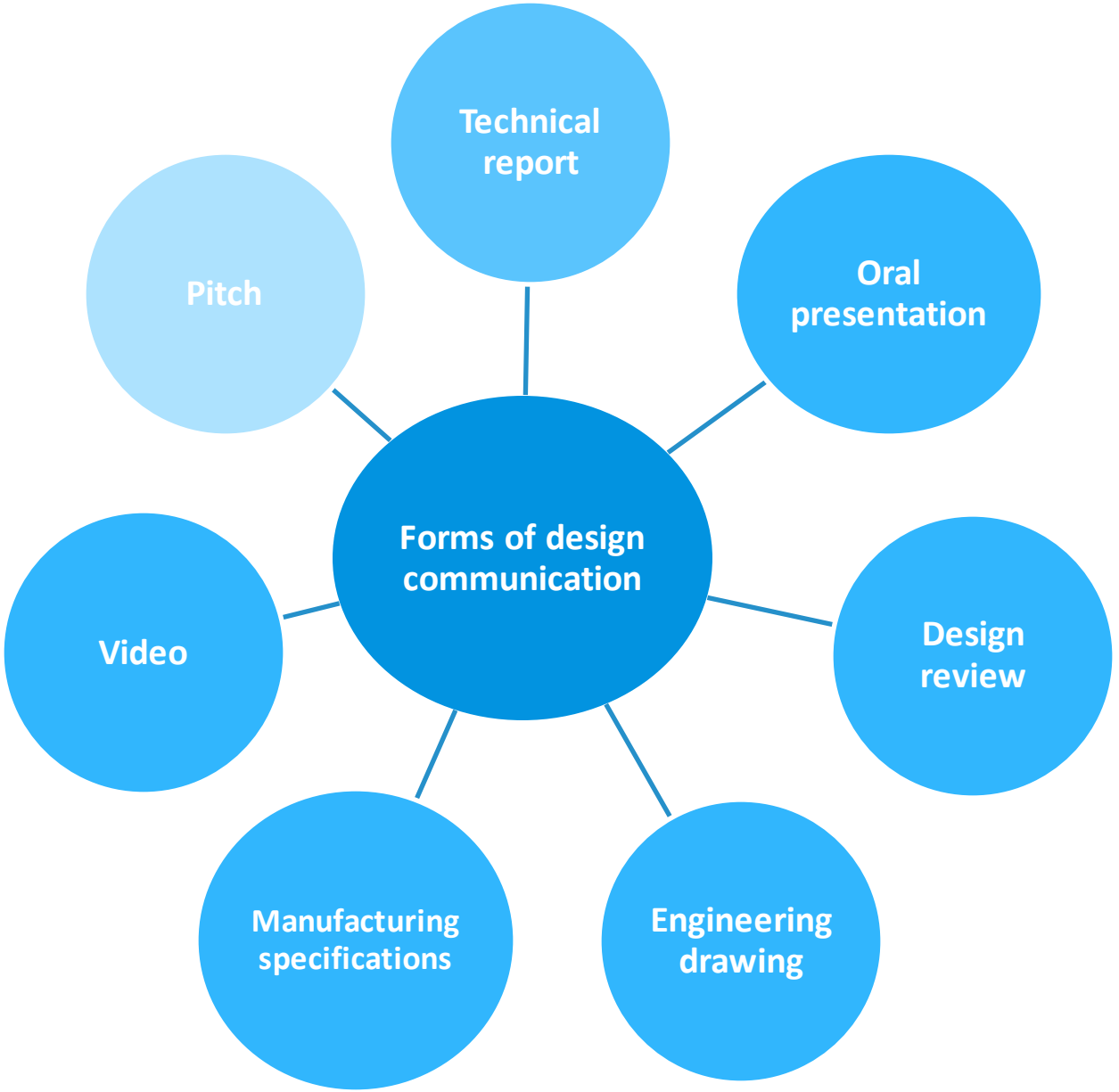
1. Know your purpose
2. Know your audience
3. Choose and organise content and format around 1 & 2

General advice

4. Write precisely and clearly
5. Design your pages well
6. Think visually
7. Write ethically



https://www.everyonelovescartoons.com/blog/2019/2/19/do-people-notice-your-writing


Technical report
Pitch
Oral presentation
Forms of design communication
Video
Design review
Manufacturing specifications
Engineering drawing

Recap

Engineering (Design) Communication

1. **Technical report**
2. Oral presentations
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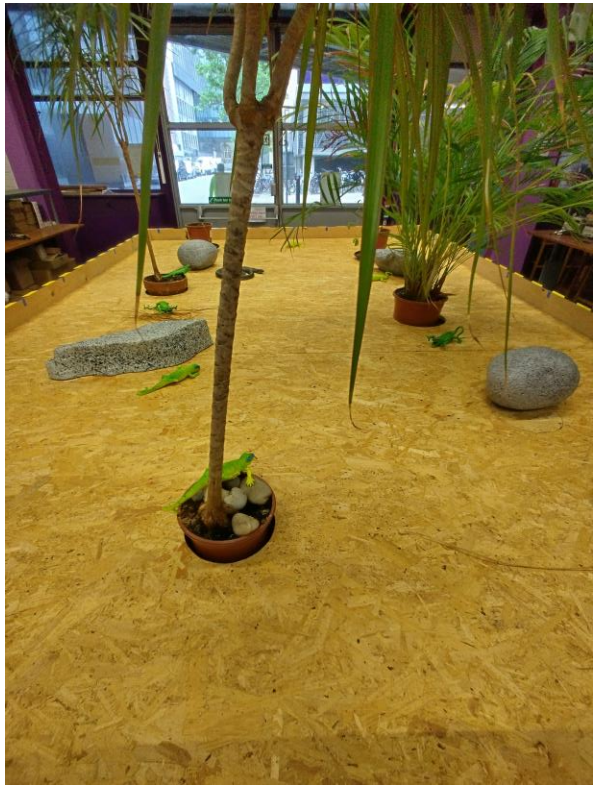
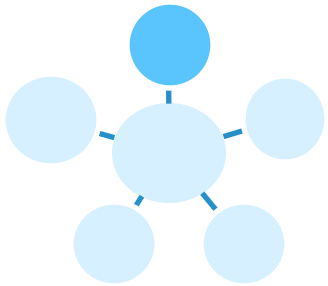
Summary

1. Technical report

- The purpose is to ensure client / stakeholder accepts the design and technical choices made
- It must clearly present:
  - Design problem (brief – specification)
  - What needs must be met (specification)
  - Alternatives considered (preliminary design)
  - Decisions made
  - Basis for decisions
  - Final design
  - Future work



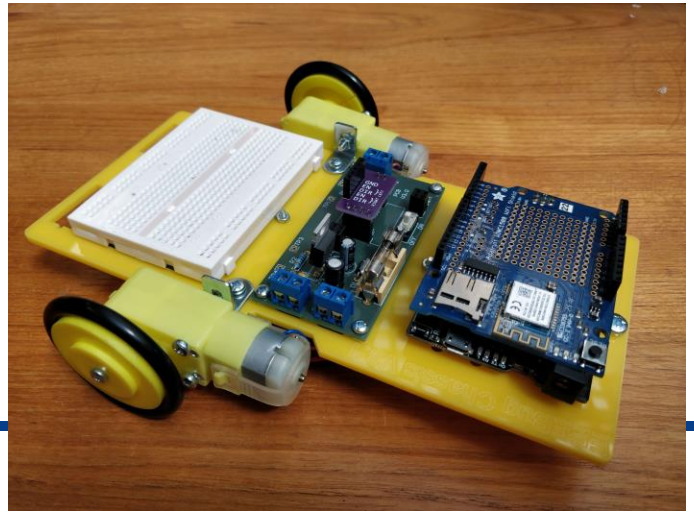


Technical report

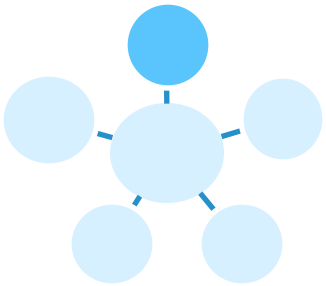
- The results of the process must be summarised clearly and concisely
- Include only essential information in report
- Move technical / support material to the appendices

Technical report

- Find out what recipient wants do with information
- Use understandable language as your client might not be technical (but remain formal)
- Wider audience than those involved in project



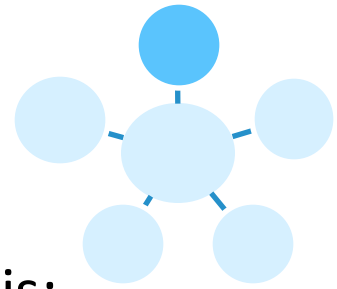
Technical report



Writing

- Determine structure of report
- Start writing an outline first
- Results vs. process
- Three important aspects:
  a) Presentation
  b) Structure
  c) Style

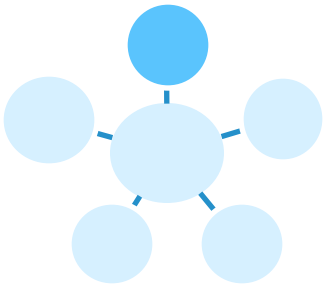
a) Presentation



The following simple steps should help you achieve this:

- Use 10 pt (at least), justified margins
- Number the pages
- Include a cover page with:
  - assignment title
  - module reference and name
  - your name, student number, course and year
  - the title and name of the lecturer the work is submitted to (check the correct spelling of their name)
  - the date of submission
  - “Imperial College” logo (optional)

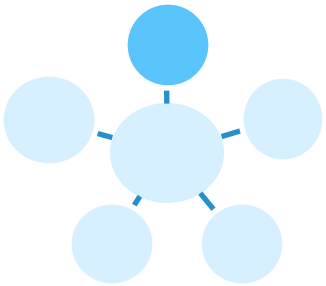
b) Structure



Please note:

- This is a generic structure for a technical report
- Different assignments might mean the addition of new sections or the removal others

b) Structure



Sections:

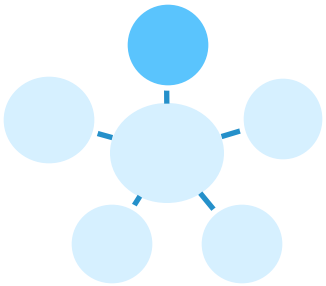
- **Cover Page** : As detailed in the previous section
- **Contents Page :** Headings and page numbers

  (Remember to include appendices and references)
- **Abstract:** States the purpose of the report.

  Should be concise (around 300 words)

  Write this section last (suggestion)
- **Introduction / Background:** Helps put the report in context

b) Structure



- **Main Body of the report:**

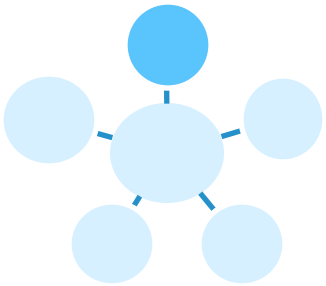
  The headings for this section are report-specific

  Decide the headings according to the brief for your assignment

- **Discussion:** What is significant about the results obtained? What do they mean? Critical evaluation
- **Conclusion:** What have you concluded from the results?

  Include recommendations for future work.

b) Structure



- **References:**

  Reference all sources and credit all images

  Check which system you are expected to use (IEEE, Harvard, Vancouver or other)

- **Appendices:**

  Include all non-essential (but important) information

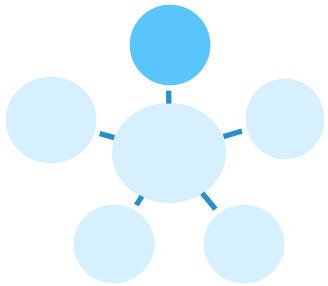
  Make reference to the appendices in the main body of the report - connect

c) Style

- Consider the audience for the report and tailor your writing
- Remember that you are writing a technical document. Your statements should be backed by facts, and not based on personal opinion or feelings
- Use a readable style with concise sentences
- Reduce the number of words used to the minimum needed to get your message across

  Avoid flowery language

c) Style



- Do not try to write the entire report at once
- Start with an outline of the sections and what information might be included in each of them
- Once you have completed the outline, write the first draft of the report and review it
- Get someone to read it and provide feedback
- Write the final version of the report, refining the first draft and including the feedback received

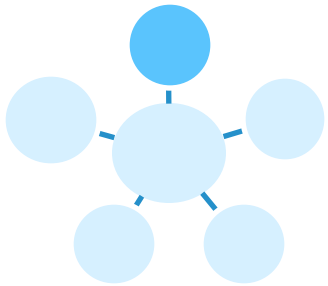
c) Style

- The report should flow as a whole. Maintain logical linkage between sentences, paragraphs and sections
- You are writing an objective piece of work, use the passive voice rather than the active voice

  Active voice – I carried out the experiment

  Passive voice – The experiment was carried out

c) Style



The tense of the verb should change according to the type of statement being made:

Past tense: used to describe the work done to come up with the findings presented in the report
(example: three samples of the material were tested under operational conditions)

Future tense: used for plans that extend into the future

(example: future work will include testing a statistically representative sample under operational conditions)

Recap

Engineering (Design) Communication

1. Technical report
2. **Oral presentations**
3. Design reviews
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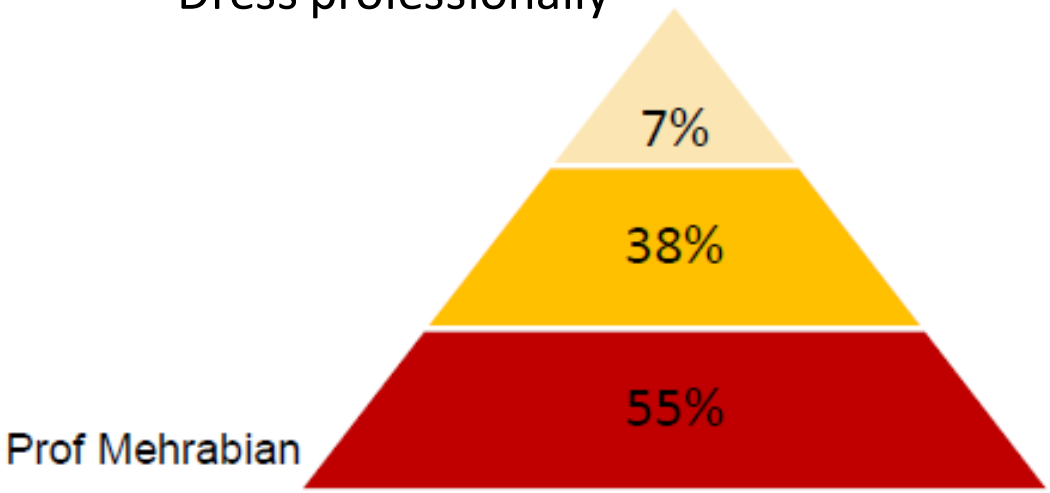
Deliverables for your project

How to ensure a positive outcome

Summary

2. Oral presentations

- Might take place at various stages of the process
- Guidelines:
  - Prepare rough outline
  - Develop presentation
  - Support materials
  - Rehearse
  - Dress professionally



Recap

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Summary

3. Design reviews

- Different to other types of presentations
- The design team presents design choices made during the project (in detail) to a technical audience who offer suggestions, raise questions and assess design
- Must remain about the design rather than the people

Recap

Engineering (Design) Communication

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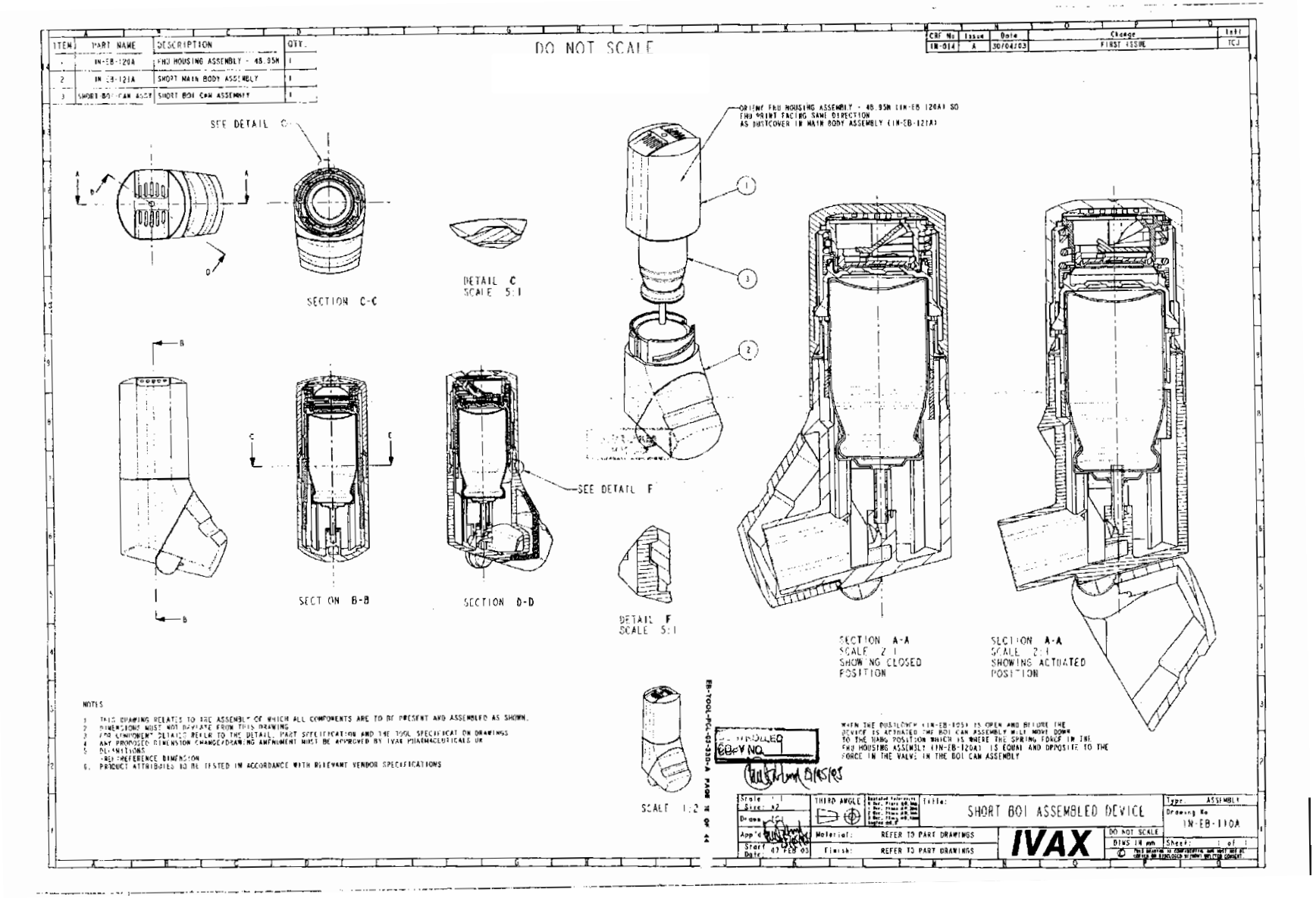
How to ensure a positive outcome

Summary

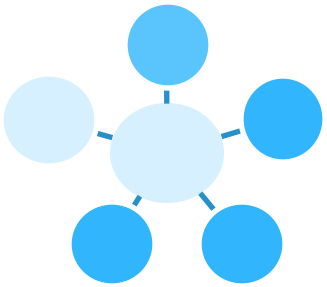
4. Engineering Drawing

- Universal means of communication to convey ideas and intentions
- Communicates an exact requirement or specification which cannot be misinterpreted
- Can become part of legal contract between customer and supplier


DO NOT SCALE
SECTION C-C
DETAIL C
SCALE 5:1
SEE DETAIL F
SECTION B-B
SECTION D-D
DETAIL F
SCALE 5:1
SECTION A-A
SCALE 2:1
SHOWING CLOSED
POSITION
SECTION A-A
SCALE 2:1
SHOWING ACTUATED
POSITION
SCALE 1:2
SHORT BOI ASSEMBLED DEVICE
IVAX
IN-EB-110A

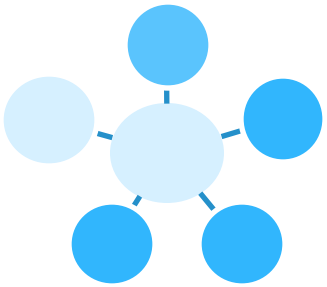
IMPERIAL

Engineering Drawing

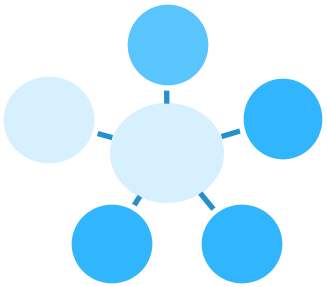


- Include only information required to ensure clear communication
- Use only standard symbols and abbreviations
- Ensure accurate dimensioning without unnecessary details
- Governed by ISO 8888:2020

BS (ISO) 8888:2020



- The standard that governs engineering drawings
- Incorporates information contained in ISO
- A summary of the most important features will be covered today
- Refer to the standard for additional information

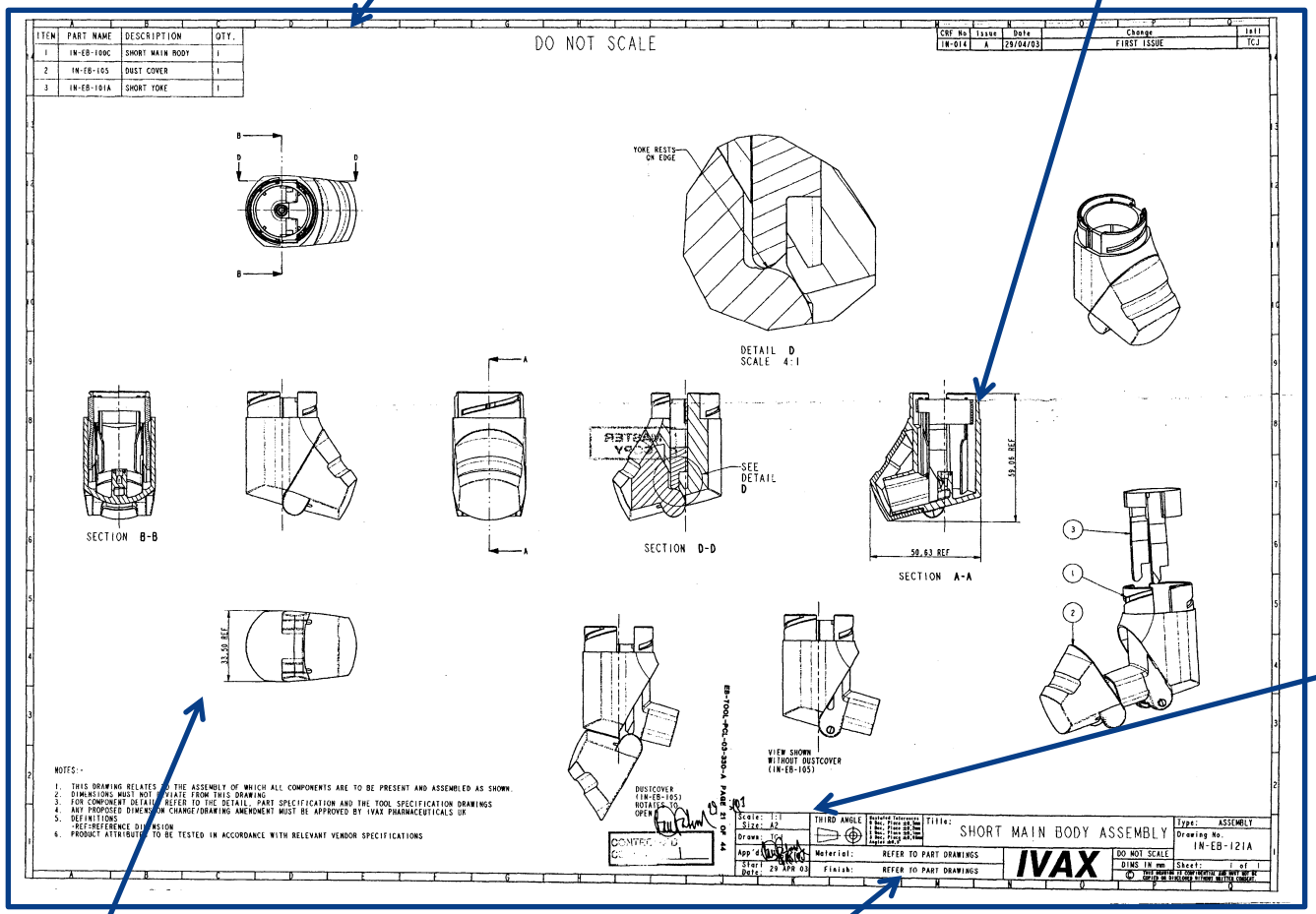


Contents of a Drawing

1. Representation
2. Title block
3. Border and grid reference system
4. Scale
5. Dimensions

Border & grid ref system

Representation



Scale

Dimensions

Title block

Recap

Engineering (Design) Communication

1. Technical report
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5. **Manufacturing specifications**

Deliverables for your project

How to ensure a positive outcome

Summary

5. Manufacturing specifications

- Form the basis on which the designed product / system will be built and assembled
- Characteristics:
  - Unambiguous
  - Complete
  - Transparent
- Allow for product to be correctly made without referring to designer

Recap

Engineering (Design) Communication

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Summary

Final Report Contents

- Process and outcomes
- Formal documentation of all the technical and non-technical work carried out
- Design decisions and final design
- What would you do if you had more time? – Future work
- Reflection

Final Report Guidelines

- Deadline: 13th June 2024
- Ask Dr Merdan for submission details
- File name: “Group Name – surnames”
- Main assessment areas:
  - System Design (30%)
  - Implementation (30%)
  - Results (25%)
  - Teamwork (15%)

Word limit

- Max **10,000 words**

  Cover, Contents and References pages do not count

  Include word count on front cover

- All essential information should be in the main body

  Appendix - words do not contribute to word count BUT your report should make sense without the appendix

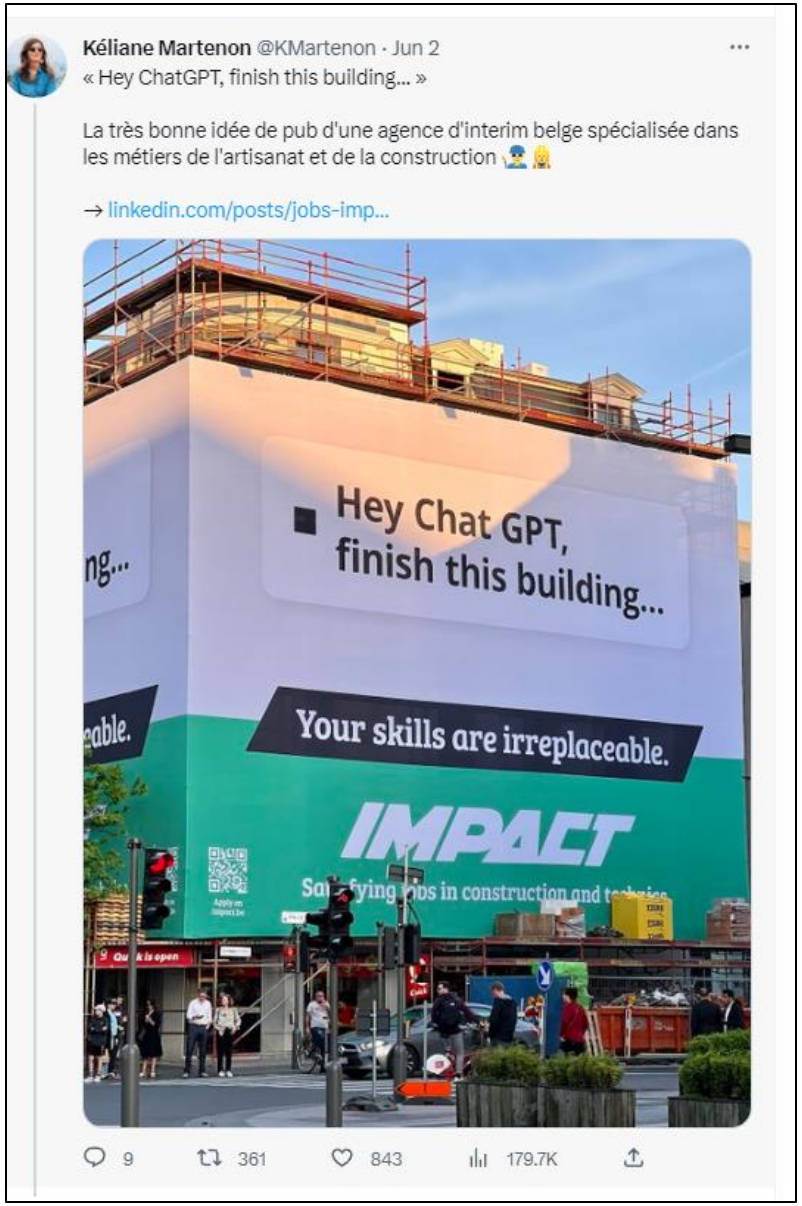
  Reference appendix(ces) in main body

		High	Medium	Low
System Design	30%	Top-level requirements refined by exploring the problem space. Definition of quantitative specifications. Division of problem into submodules. Requirements and interfaces defined for all submodules.		Vague or incomplete specifications. Weak system-level design
Implementation	30%	High-quality technical solutions for all elements of the project. Consideration of alternatives and justification for design decisions. Unambiguous documentation of the solution.		Some design elements not documented, even if they work correctly. Doubts over referencing of research material
Results	25%	High-quality evidence that solution meets all requirements at both subsystem level and top level. Appropriate tests designed.		Testing incomplete or not relevant to specifications. Doubts over accuracy of results
Teamworking	15%	Documentation of group member contributions to the project. Integrated report with consistent style and formatting.		Sections from different authors compiled with little overall editing. Basic content on system-level design and implementation

Code

- Do not include all your code in your report

  Add only the snippets needed to understand what you are doing in the report text
- Place full code in a GitHub repository
  - Link from report
  - Repository must be private (give access to examiners only)
- Comment your code
- Structure in such a way that the assessor can easily understand the logic and the contents


Kéliane Martenon @KMartenon · Jun 2
« Hey ChatGPT, finish this building... »
La très bonne idée de pub d'une agence d'interim belge spécialisée dans les métiers de l'artisanat et de la construction
→ linkedin.com/posts/jobs-imp...
Hey Chat GPT, finish this building...
Your skills are irreplaceable.
IMPACT
9
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843
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Recap

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Summary

Where are you now?

http://dave-amy.com/castle-rock/where-are-we-going

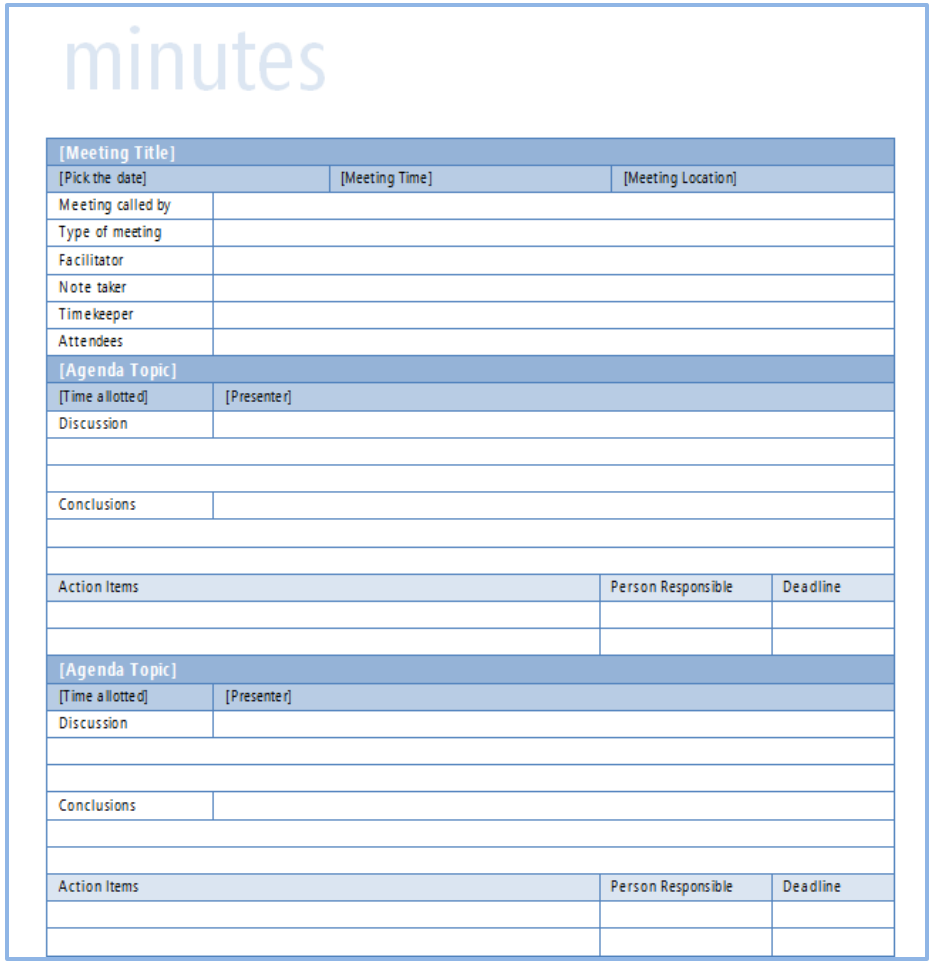
Planning

- Compile a detailed **project plan**
- Update it often
- Add detail as you find out what the next steps will be
- Your final project plan will not remotely resemble the original one
- That is expected

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

Meetings

- Hold **regular team meetings**
- Review progress since last meeting
- Allocate work to be carried out for next meeting
- Keep minutes



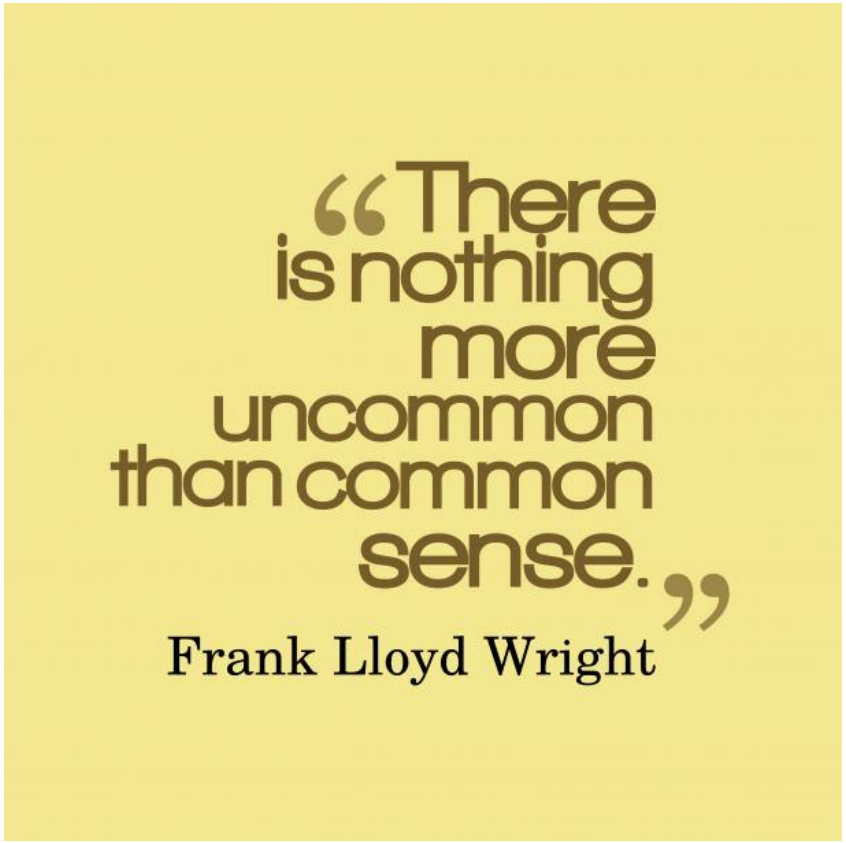
minutes

[Meeting Title]			
[Pick the date]		[Meeting Time]	[Meeting Location]
Meeting called by			
Type of meeting			
Facilitator			
Note taker			
Timekeeper			
Attendees			
[Agenda Topic]			
[Time allotted]	[Presenter]		
Discussion			
Conclusions			
Action Items		Person Responsible	Deadline
[Agenda Topic]			
[Time allotted]	[Presenter]		
Discussion			
Conclusions			
Action Items		Person Responsible	Deadline

http://bkay.org/meeting-minutes-template.html

Communication

- Establish a **good communication strategy** (Whatsapp, Snapchat, text, email)
- Document repository (GitHub)



If in doubt, ask:

- Dr Merdan
- Mrs Perea
- Academics
- Laboratory staff
- GTAs

http://www.quotescover.com/frank-lloyd-wright-quote-about-sense/app/high-resolution-image

http://www.wright-house.com/frank-lloyd-wright/fallingwater-pictures/falling-water-fall-house.html

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