

1.1 Designing for actual users

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS ergonomics • specification

Objective

Designing for actual users. Supported HL concept preparation; original classroom practice, not an official IB paper or assessed learner work.

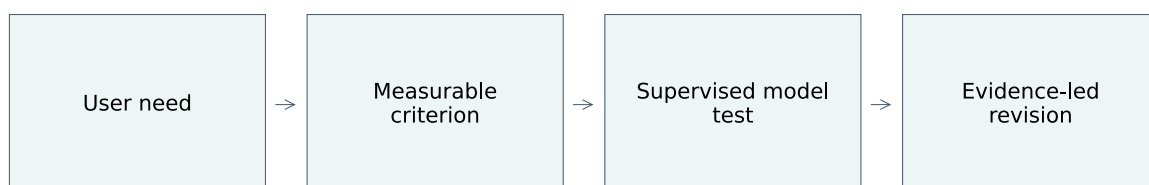
1 Key knowledge and worked examples

■ What would explain this observation?

- A handle that feels comfortable to its designer may exclude another user. Design evidence starts with the people and context of use.
 - Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.
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■ Build the model

- Anthropometric data describe body dimensions. **Ergonomics** concerns the relationship between people, tasks and products. A design **specification** turns a user need into a measurable requirement.
- ergonomics: Designing the fit between people, tasks and products; specification: Measurable requirements a proposed solution should meet.



■ Choose evidence that can test it

- Choose data for the target population and task. Clearance often needs a larger-user percentile; reach may need a smaller-user percentile. A single mean dimension cannot satisfy every design constraint.
 - Observe an approved low-risk task with consent, interview users without leading questions, and record measurable success criteria. Test an early model before committing to expensive materials. Do not collect unnecessary personal measurements.
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■ Work from known quantities

- State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution.
- Known: a handle must withstand a 40 N use force with a design safety factor of 2.5. Target test load = use force $\times$ factor = $40 \times 2.5 = 100$ N. The factor is a design assumption to justify; it is not a substitute for a supervised safety review.

Example:

A use force is 30 N and selected safety factor 3. Find target load. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

■ Check the conclusion and its limits

- A specification is not a list of vague wishes such as nice or strong. User testing should evaluate measurable requirements and reveal conflicting needs.
- Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Warn:

A population mean dimension always accommodates every user. This claim is false: A specification is not a list of vague wishes such as nice or strong. User testing should evaluate measurable requirements and reveal conflicting needs.

Key:

Designing for actual users: Choose data for the target population and task. Clearance often needs a larger-user percentile; reach may need a smaller-user percentile. A single mean dimension cannot satisfy every design constraint.

2 Practice

2.1 Which is a testable requirement? Choose one answer.

- A The handle must be nice
- B The handle must sustain a defined 100 N supervised test load
- C The designer must like it

[1]

2.2 A use force is 30 N and selected safety factor 3. Find target load. Show the relation, substitution and units. [2]

2.3 Decide whether this claim is true and justify: A population mean dimension always accommodates every user. [2]

2.4 Designing the fit between people, tasks and products: write the technical term. [1]

3 Exam-style questions

3.1 Fictional users require one-handed opening below 15 N; a prototype needs 18 ± 1 N. Evaluate this criterion and propose a measurable revision test. [4]

Solutions

2.1 B Choose data for the target population and task. Clearance often needs a larger-user percentile; reach may need a smaller-user percentile. A single mean dimension cannot satisfy every design constraint.

2.2 target load=use force×selected factor= $30\times3=90\text{N}$.

2.3 False. A specification is not a list of vague wishes such as nice or strong. User testing should evaluate measurable requirements and reveal conflicting needs.

2.4 ergonomics. ergonomics means Designing the fit between people, tasks and products.

3.1 Even 17 N exceeds 15 N, so this evidence fails the criterion. Revise and repeat force measurements with representative users and conditions. Passing one criterion does not certify every need.