

Exercise walk-through

1.1

Designing for actual users

International Baccalaureate · IB Diploma · Design Technology · HL

1.1 Designing for actual users

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS ergonomics • specification

Objective

Designing for actual users. Original classroom practice for IB HL; not an official IB paper.

1 Key knowledge and worked examples

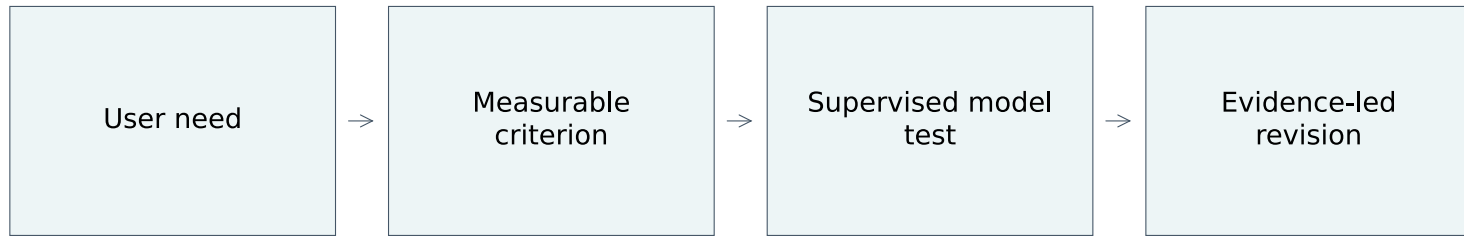
■ What would explain this observation?

- A handle that feels comfortable to its designer may exclude another user. Design evidence starts with the people and context of use.
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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.

In the lab: 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.

■ Work from known quantities

- 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.

Your turn: A use force is 30 N and selected safety factor 3. Find target load.

■ 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.

Not true: A population mean dimension always accommodates every user. Designing for the mean fits the middle of a distribution and excludes the tails - often half the users. Ranges and percentiles, not the mean alone, decide accommodation.

Key:

- Anthropometric data describe body dimensions.
- Choose data for the target population and task.
- Watch for: A specification is not a list of vague wishes such as nice or strong.

■ Write from a target load of 80 N

- A handle must withstand a 20 N use force. The selected safety factor is 4.
- Find the target test load. The factor is a design assumption, not a safety review.

Exercises 2.1-2.3

2.1 Which is a testable requirement? Choose one answer.

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

[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]

Exercises 2.1-2.3

2.1 Which is a testable requirement? Choose one answer.

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

[1]

2.1 B A testable requirement states a measurable quantity and pass condition, such as sustaining a defined 100 N supervised test load. “Nice” and designer preference cannot be measured or checked against evidence.

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

[2]

2.2 target load=use force×selected factor=30×3=90N.

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

[2]

2.3 False. Designing for the mean fits the middle of a distribution and excludes the tails - often half the users. Ranges and percentiles, not the mean alone, decide accommodation.

Exercises 2.4·3.1

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

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]

Exercises 2.4·3.1

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

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

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]

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.