

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

1 Key knowledge and worked examples

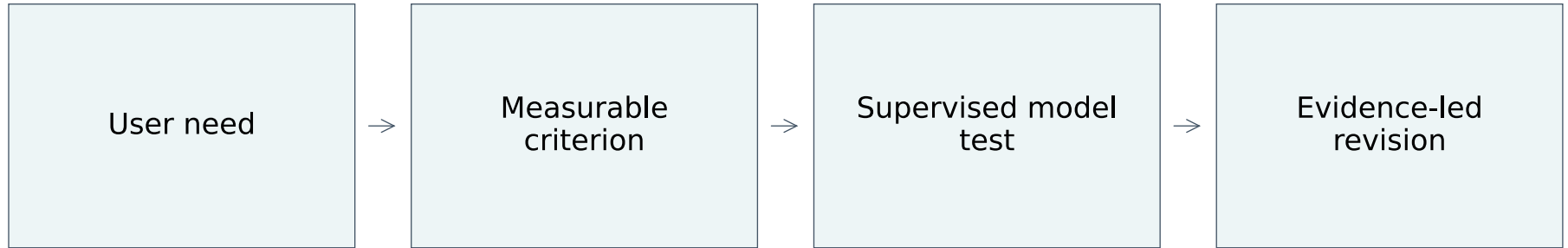
■ What would explain this observation?

- 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.
-

■ 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.
-

■ 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.

Exercises 2.1-2.3

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]

Exercises 2.1-2.3

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]

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

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.