Usability Studies and Design

Embedded Interface Design

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Learning Objectives

Students will be able to…

- Reflect on a typical usability study for embedded devices
- Understand the balance between Minimum Viable Product and Unique Value Proposition

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Pick a Thermostat…

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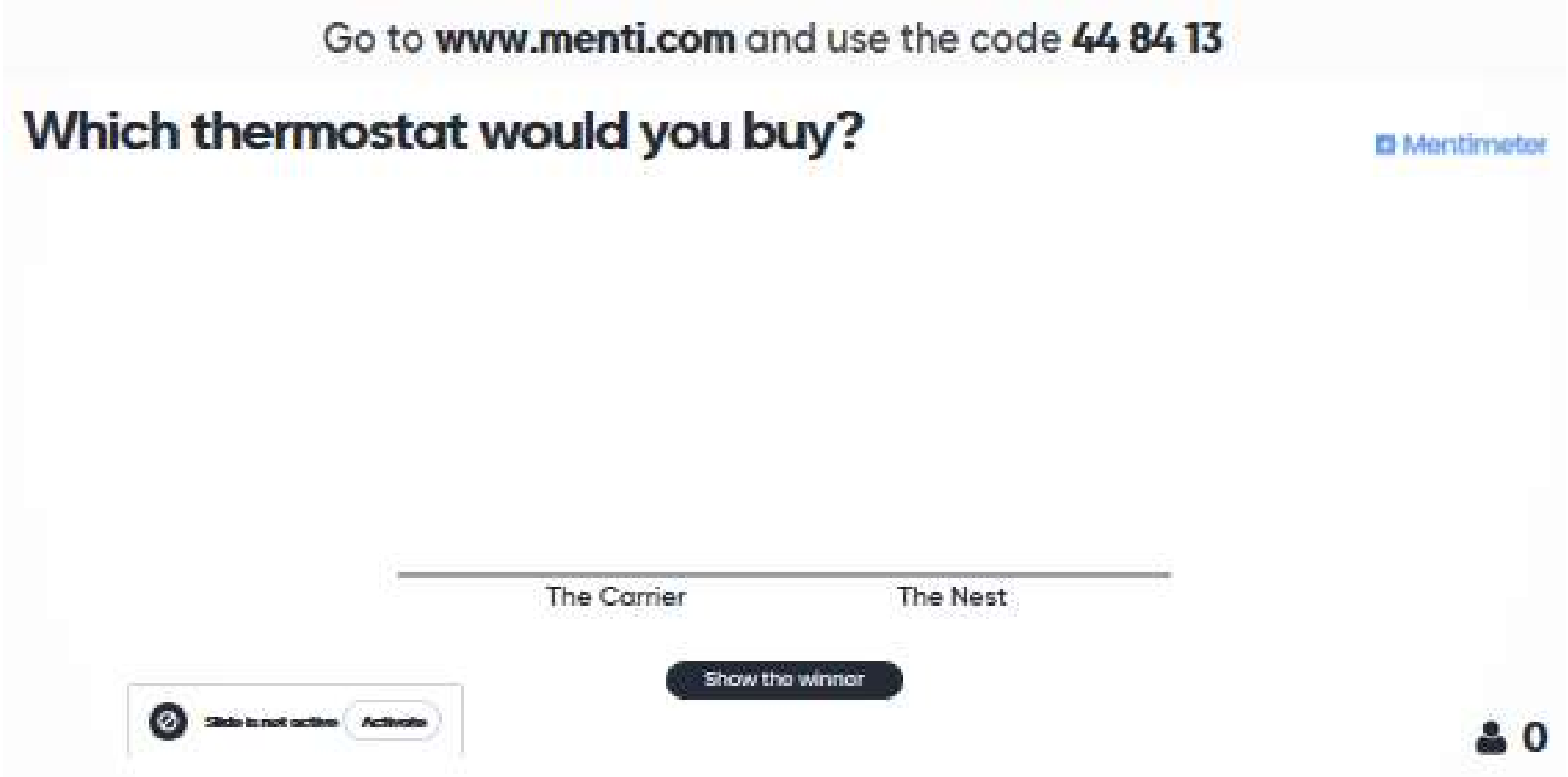

Consider picking a thermostat to buy…

- You might just buy the one your friend bought…
- You might buy the one that's on sale…
- You might buy one because it's popular, well reviewed, or just looks cool…

- If you're thinking about UX, you might pick the key operations or use cases you'd perform most often, and then try a number of devices
- Then you could buy the device that's most usable

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An example of a formal usability study

- Sacramento Municipal Utility District (SMUD) – Communicating Thermostat Usability Study – 2014 [1]
  - Extremely thorough example of a well-constructed formal usability test
- Goal: Understand features leading to ease of use and preference for thermostats
- Report includes typical elements:
  - Sample size assessment, task development, recruitment script, non-disclosure agreement, facilitator's guide, participant survey

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Participants judged designs via tasks

- The study involved a 3 day lab study of 12 different thermostats, including the visually striking and popular Nest thermostat
  - Each were tested by 26 to 28 participants, selected for a mix of age, gender, and other characteristics
- The study used a standard set of tasks to assess designs
  - Example: Identify current indoor temperature
  - Example: Change current heat target to 63 degrees F
- The study used time on task to assess efficiency and used surveys to gather preference scores

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Study Results

- Overall findings:
  - Users preferred color displays, good feel and sound
  - Users preferred larger screens and high ease of use
  - Best choice was a fairly generic thermostat
  - The Nest thermostat was 6 of 12 for preference, 11 of 12 for usability, 4 of 12 for appearance, 7 of 12 for feel and sound
    - Middle ranking for overall user experience…
- The final study assessment resulted in a list of key features for a successful thermostat
  - Very useful for improving current designs or making new ones

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Pick a Thermostat again…

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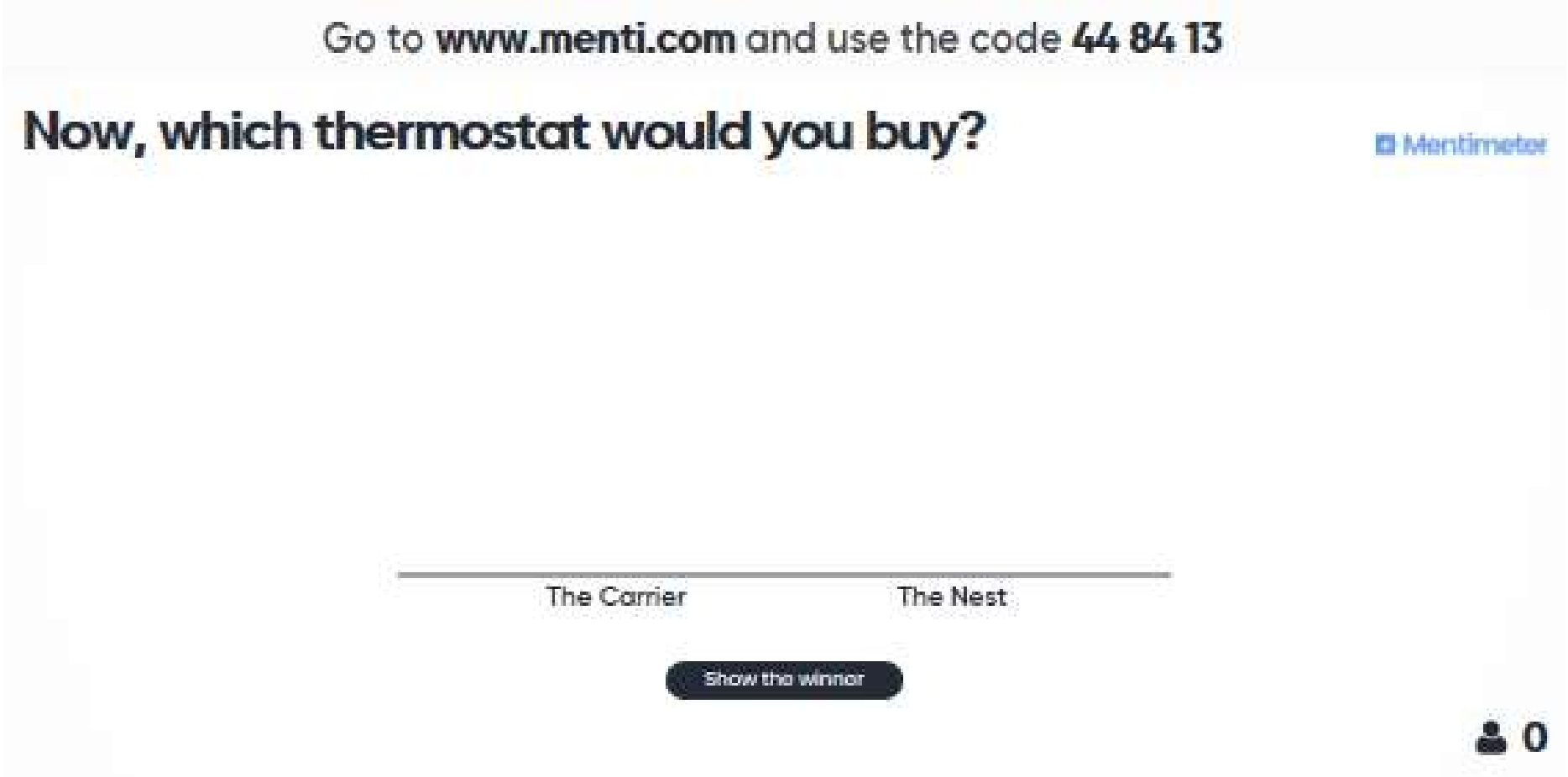

Usability is only part of a overall product design…

- In many class discussions, before looking at the usability study, students would choose a Nest over the top rated design
- Even after knowing the usability rankings, many students still picked the Nest as the thermostat they would buy
- Usability is only part of the answer
- A broad product analysis includes
  - Prototyping and features
  - Business and market analysis
  - Visual and industrial design development
- All this adds up to a User Experience Spectrum [2]

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Usability is Part of Design Value and Viability

- Unique Value Proposition (UVP)
  - Why is your product different and worth buying – design, features, usability
  - UVP must be unique, concise, relevant [3]
- Minimum Viable Product (MVP)
  - How do we do just enough design and development to produce and introduce a successful product

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UVP/MVP Balance

- UVP and MVP compete for a design balance
  - What need are you satisfying? What problem are you fixing?
  - What's your solution? What makes you stand out?
  - To whom are you selling? Can you get the product to market in time?
- If UVP is too large in scope, the product will come out slowly, and may overserve the customer
- If MVP is not sufficient, the product may underserve the customer, and although delivered in a timely fashion, will not sell

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Usability contributing to designs…

- Usability studies, and other methods, like rapid prototyping, are necessary to clarify the true needs of the user
- This shapes the definitions of both UVP and MVP for a product, ideally resulting in successful, timely introductions
- How much resource can we spend on UX processes?
- As engineers, we must remember, we are developing solutions for users to bring value to our businesses…

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Usability and design go together…

Making something elegant that doesn't do what the user needs is a fast fail [4]



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Danger: The Engineer's Conceit

- "I know what the user wants."
- "If I do my best work and design an interface, it'll be perfect."
- "My whole team likes this design, it's great!"
- "I know some people make mistakes in interface and product design, but I won't."

- The real answer:
  - UX processes, iteration, user profiles, user involvement, prototypes…
  - A path to making the right design

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References

- [1] http://www.herterenergy.com/pdfs/Publications/2014_Herter_CommunicatingThermostatUsability.pdf
- [2] https://ia.net/topics/the-spectrum-of-user-experience-1/
- [3] http://www.ux-lady.com/dont-ever-ever-forget-about-value-proposition/
- [4] http://www.boredpanda.com/useless-object-design-the-unusable-katerina-kamprani/

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