User Needs, Benchmarking and Product Requirements

Team 305: Nick, Jack, Diego and Uriah

Product 1: Emporia Vue: Gen 2 with 16 sensors

Link: emporiaenergy.com

Price: $164.99
Vendor: Emporia
Description: Home Energy Monitor

Positive reviews:

1. Easy to use - Latent
2. Simple to install - Latent
3. Does what it says it does - Explicit

Negative reviews:

1. Cyber Safety concerns due to wifi connection with low security - Explicit
2. Doesn't give much functionality info - Latent
3. Only works for specific setups (Isn't universal) - Explicit
4. Interface isn't great - Latent
5. Poor wifi connection - Latent

Product 2: SwitchBot Curtain Smart Electric Motor

Link: Amazon.com

Price: $84.99
Vendor: Amazon
Description: Curtain motor

Positive reviews:

1. Easy physical setup - Latent
2. Easy digital setup/ programming - Latent
3. Works exactly as advertised - Explicit
4. Isn’t in line of sight (non-invasive) - Explicit
5. Works for any size curtains - Latent

Negative reviews:

1. A little too noisy for comfort - Explicit
2. Doesn’t work well on non-smooth curtain beams - Explicit
3. Requires occasional calibration, sometimes is often needed - Latent
4. Too expensive for what you get - Latent
5. Short battery life - Explicit

Product 3: Rechargeable Wireless Tubular Roller Shade Motor Kit

Link: Amazon.com

Price: $92.99
Vendor: Amazon
Description: Curtain motor

Positive reviews:

1. Very good price for what it is (cost effective) - Latent
2. Good setup/use instructions - Latent
3. Works well - Explicit
4. Great adaptability in the sense of works with pretty much any shade curtain - Explicit
5. Great customer support - Latent

Negative reviews:

1. Requires some DIY experience - Explicit
2. Bad battery life (requires upgrades) - Explicit
3. Requires some programming experience to unlock full functionality - Latent

Product 4: SwitchBot Smart Motorized Blinds Kit

Link: Amazon.com

Price: $189.99
Vendor: Amazon
Description: Motorized Blinds.

Positive reviews:

1. Cost effective smart blinds - Latent
2. Nice user-friendly Interface - Latent
3. Easily programmable - Explicit
4. Aesthetically pleasing (is visible) - Latent
5. Easy Installation - Explicit
6. Compatible with Apple products - Explicit

Negative reviews:

1. Calibration can be a bit tricky - Latent
2. Short lifespan due to mostly being made of plastic - Explicit
3. Bad customer service - Latent
4. Isn’t always reliable and sometimes glitches or fails a little - Latent

Product 5: Dusk to Dawn A19 Outdoor LED Light Bulbs

Link: Amazon.com

Price: $15.99
Vendor: Amazon
Description: Sunlight sensor bulbs

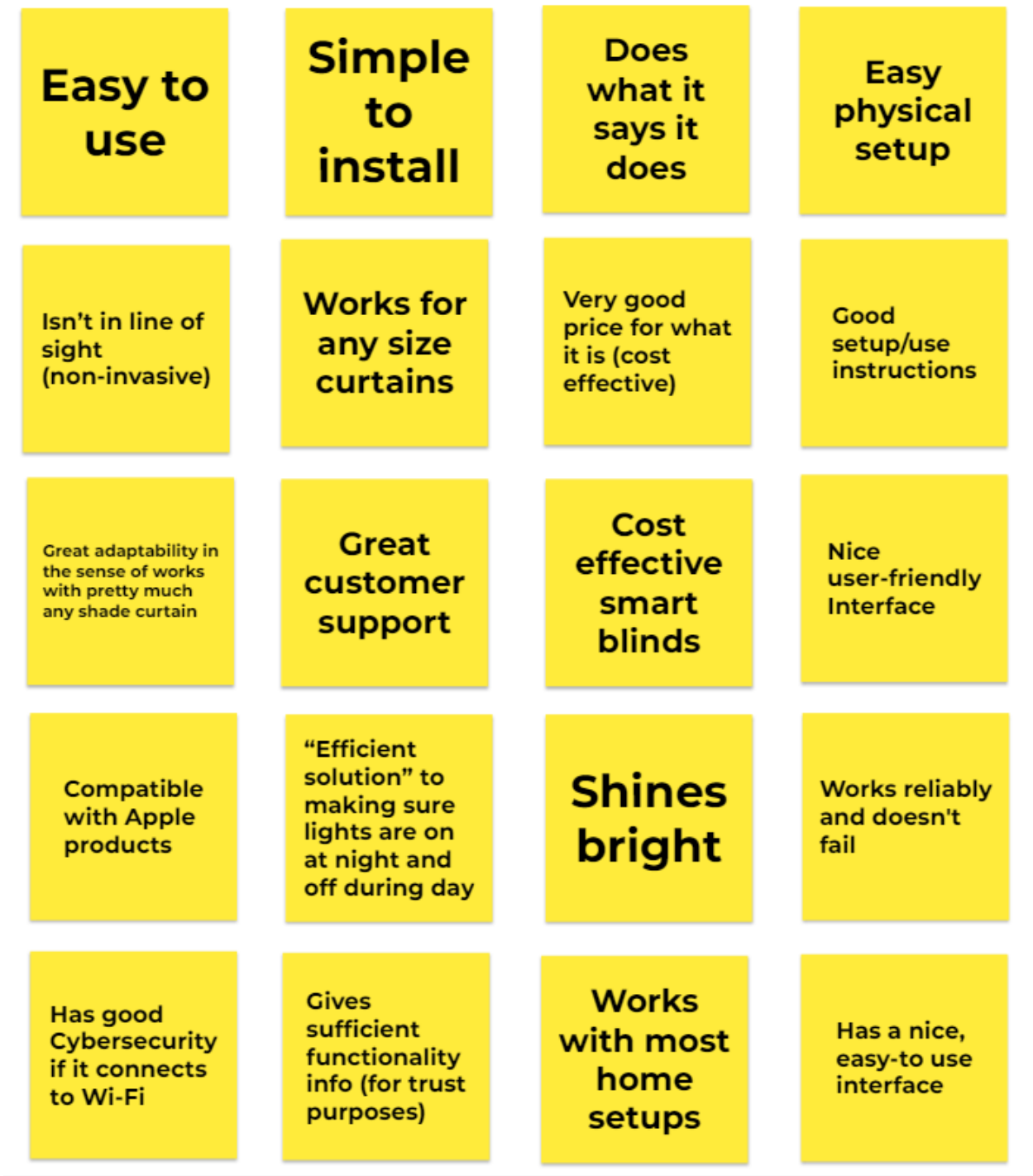
Positive reviews:

1. “Efficient solution” to making sure lights are on at night and off during day - Explicit
2. Extremely easy installation (is the same as a regular light bulb) - Explicit
3. Shines bright - Explicit
4. Works as advertised - Latent
5. Works reliably and doesn't fail - Explicit

Negative reviews:

1. Relatively short lifespan - Explicit
2. Low wattage (incompatible with some home systems) - Explicit
3. Doesn’t works outside because it isn't waterproof - Explicit
4. They come in bad packaging and often get damaged during shipping - Explicit

Jamboards:


Easy to use
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Easy physical setup
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Works for any size curtains
Very good price for what it is (cost effective)
Good setup/use instructions
Great adaptability in the sense of works with pretty much any shade curtain
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Cost effective smart blinds
Nice user-friendly Interface
Compatible with Apple products
"Efficient solution" to making sure lights are on at night and off during day
Shines bright
Works reliably and doesn't fail
Has good Cybersecurity if it connects to Wi-Fi
Gives sufficient functionality info (for trust purposes)
Works with most home setups
Has a nice, easy-to use interface

Easy digital setup/ programming

Works consistently and doesn't need constant calibration/ maintenance

Has to be affordable

Good quality to price ratio

Works well

Has to have good battery life

Should not require expertise in a specific field to be able to use

Should not require programming experience

Aesthetically pleasing (is visible)

Easy to calibrate and maintain

Good customer service

Reliable and "bug-free"

Extremely easy installation (is the same as a regular light bulb)

Has good longevity

Needs to be suitable for any potential setting relative to the product

Durable and can't get easily damaged

Connects to Wi-Fi well

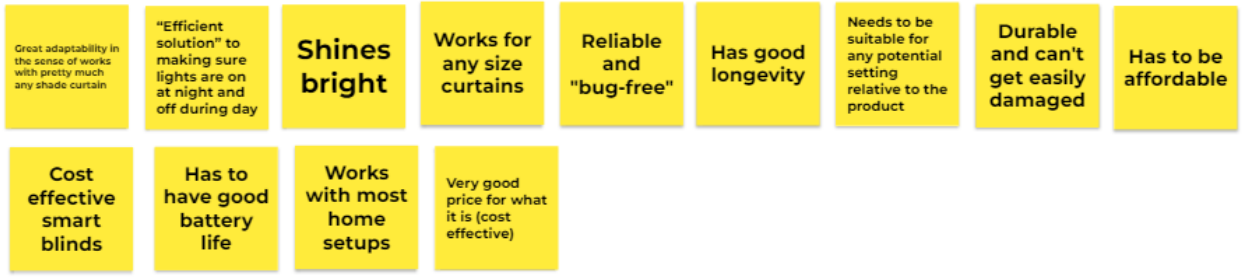
Works on any/ most surfaces

Doesn't make to much noise

Organized:

User- Preferences

Marketing



Ranking

★★★

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Easy physical setup

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Simple to install

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Doesn't make to much noise

Compatible with Apple products

Develop Requirements:

Introduction

Pretty much every house or apartment has windows and other home appliances that can be redundant in moving, changing, or turning off and on. This problem leaves room for technological solutions to automate and facilitate all those redundant activities. That being said, there is a market for products that have light-sensing capabilities which can in turn help users utilize these devices to adapt their systems to different times of the day and certain conditions when the appliances should be on or off. We have a solution that can utilize different sensors and motors to fully automate redundant household functions that will elevate the quality of life for the users .

Objectives

Our main objective is to design and develop a simple yet efficient home automation system. It must include at least one motor that is activated through a sensor as well as another sensor and a reliable power supply, all while the design and functionality satisfies the user and stakeholder needs gathered in earlier research.

Use case #1

Uriah lives in a large house in the middle of the Arizona desert and he needs to close the blinds in his house when he leaves or else the whole house heats up too much. It takes him way too long to constantly go around the whole house individually, closing and opening all the blinds. He decides to invest in a home automation system that can sense the temperature and brightness to open or close all the blinds for him. He can now save a lot of effort and time by not having to worry about whether his house will be too dark or too hot due to the outside temperature and brightness.

Use case #2

Jack lives in a small apartment with a couple of windows. However, he is always extremely busy and can’t afford to waste time with simple things such as opening or closing the blinds for sunlight into his apartment, which also doubles as his office. He decides to get a home automation system to automate and control the amount of sunlight he receives without having to stop working. Jack can now live in a more efficient manner.

Aspects

1. Product Design

1.1. Design must be efficient and easy to understand/use
1.2. Has to be aesthetically pleasing
1.3. Needs to be durable and built for longevity after constant use
1.4. Needs to be heat and solar deterioration resistant

2. Software/ Functionality

2.1. System will utilize a variety of sensors to monitor environmental conditions
2.2. Has Wi-Fi functionality
2.3. Must have customizable programming

3. Interactivity/ User experience

3.1. Installation must be simple without much modification needed
3.2. Maintenance should be quick and easy or non-existent
3.3. User interface needs to be straightforward

4. Customization

4.1. The user should be able to adjust the sensitivity and timing of the sensors
4.2. The user should be able to monitor the status of the devices
4.3. The user should be able to modify the components as needed

5. Manufacturing

5.1. Materials should be good quality while also being cost efficient
5.2. Material will be durable and have longevity

6. Safety

6.1. Shouldn’t have any sharp features to prevent unnecessary injury
6.2. Shouldn’t run on abnormally high power
6.3. Needs instructions on how to operate safely
6.4. Shouldn’t be made of materials that are potentially hazardous