Shared rooms, conflicting sleep schedules, limited freetime, and niche reading positions all contribute to an environment hostile to reading in the evenings. The Goodlights are a series of three reading lights that strive to ease these issues through effective, but aesthetically pleasing fixtures.





# THE GOODLIGHTS

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# Introduction

This design report outlines describes the design thinking and process behind The Goodlights, providing insight into their imagined context, articulating their target users—their living environment, schedule, shared tastes and needs—and what physical spaces these products would be used in. It will then describe our full design process, starting first with problem definition and ideation, describing our prototyping choices through two iterations, rough and detailed, accompanied by a summary of the feedback received for both iterations. It will then conclude with our reflections on what direction we see the Goodlights being taken in, and what their ideal form would manifest as.

# User Statement

The Goodlights are a series of three individual lights intended to be used by high school to college-aged young adults who attend school or work during the mornings and afternoons, live in a shared space, and enjoy reading. This demographic has a constrained schedule, meaning their downtime is limited to evening and night-time. This rigorous schedule interferes with their ability to reach their reading goals. The later it gets natural lighting is diminished further, for customers in college dorms, lighting may be insufficient outside of daylight hours and overhead lights may disturb our users' roommates trying to sleep.

#### Digital vs. Paper Readers:

Our product is intended to be used by those who favor physical books over digital alternatives such as e-readers, phones, or audiobooks. Most devices have an illuminated screen that cannot light up large areas, and thus does not call for an independent, dedicated light source. Instead, our users favor printed books (which is more common than those who prefer other alternatives, according to a Forbes article (Duffer)). While these lights are not needed for most devices there is, however, a small category of e-readers with an unlit display, their appeal: they're more book-like... and in need of good external lighting.

#### **Roommates vs. Sharing a Bed:**

For the Goodlights, we are more so focusing on users that share a room, as opposed to a bed, with another person. Similar problems arise for both groups, needing to adjust light and sound levels in accordance to different peoples' sleep and work schedules. However, the intensity of this issue is higher for the latter group, as having two beds on opposite ends of a room allows for more light levels (such as one provided by a bed-side lamp), instead of having someone right next to you (which might require a small flashlight, or some other highly directional light). Although this variation does not entirely prohibit people who share a bed with another from using our products, when ideating and designing our product, we operated on the assumption that a user could use a moderately directional light without disturbing another individual. Additionally, after considering shared living environments, we reached the conclusion that this was a situation most faced by university students living in oncampus housing or children to late teenagers living in shared rooms with their siblings. We paired the latter demographic down to exclusively late teenagers high-school aged—as this demographic would have more agency over their purchases, would have more limited schedules due to schoolwork, and are more likely to stay up later in the evening.

### **Style/Aesthetic:**

Our product calls from the stylistic choices of the designer Alain Monnens, meaning a minimalistic and neutral aesthetic. His style is generally widely appealing, and is often shown in office spaces and corporate settings in an unobtrusive manner. His motto, "Design is the art of reducing" is very clear in his simple designs that only call attention when necessary. These stylistic traits mean the aesthetics of our products would not limit the user demographic substantially, as anyone with a modern and clean stylistic preference would find our products appealing. For example, Architecture's Digest lists "Industrial", "Minimalism", and "Scandinavian" as some of the most popular interior design styles of 2022, all of which align very well with Monnens'-and therefore our-products' styles (Nast).



1. Monnens' work is displayed in minimal, modern, and clean environments (alainmonnens.com)

### Limitations:

Readers are highly variable in preferences, as different people find different positions comfortable and can shift a lot, even throughout one reading session. The brightness of the light goes a long way as well, and readers go so far as to develop a preferred reading light color tone, ranging from white to blue to yellow. The Goodlights thus needed to be as manipulatable as possible both physically and electronically, a priority that occasionally limited other functions or possibilities.

For example, two of the lamps had a corrugated tube that could be manipulated in any direction–something that really improved the lights' adjustability. However, it was tricky to make sure the lights remained stable and secure on their mounts or stands, and designing a stand that wouldn't shake or wobble as the light was adjusted was something we had to be very conscious of. Also, the final assembly for the triangular light would flex and even bend during testing.

Another drawback of choosing this particular user group is their tendency to treat things with less-than-optimal care. College students especially have a track record of breaking things, with dorm social environments, frequent packing and moving and the generally chaotic lifestyle many of them lead. This demographic is also not known for superb memory with turning off lights after leaving an area. When dealing with a potentially forgetful user it is necessary to have proper safety precautions in place.

#### **Budgets**:

A benefit of our user group, however, was the budget range we had to cater to. As a part of the assignment, our products had to be goods one could find at a store such as Target or Walmart, meaning nothing overly complex or expensive. To accomplish this there was a subgoal of this project to keep costs as low as possible, using almost entirely recycled/salvaged parts was a large factor in reducing cost. This fits neatly with our target users, who generally operate with smaller budgets, and are a demographic that are often catered to by Target and Walmart.



2. Competing products moodboard, featuring desklights, wall mounted 180 degree lights, clip-on lights, and book overlay lights.

# **Design Process Statement**

# **Problem Definition**

Initially assigned the prompt "It is difficult for me to read at night", we began mind mapping more specific causes that could result in this issue. After identifying 5 different overarching causes, we settled on a physical catalyst—poor visibility due to diminished light. We then narrowed this down further as a constraint caused by a shared living space. Although we initially thought this could mean both roommates or a significant other sharing the same bed, we soon realized that—although seemingly minor—there was a distinction in situations that would affect our design. Thus, we settled on the former. After contemplating our user group further, as elaborated on in the user statement, we articulated our problem statement:



How can we design three different iterations of a light that allows for nighttime reading in a dark, shared room?

> 3. A mind map centered around the prompt "It's difficult for me to read at night", which possible more specific causes connecting to it, with overarching categories of physical, social, mental, or emotional.

Having established functional needs, we began considering our aesthetic goals. Our assigned designer to emulate was Alain Monnens, a Belgian industrial designer who works primarily with lighting and furniture. We identified a number of key stylistic and functional choices that persisted through the work featured in his portfolio.

#### Neutral Colors and Smooth Textures:

Often working with grayscale and shades of brown, Monnens' color choices prominently feature neutral color palettes. Although he does occasionally utilize brighter tans and has a few products in yellow and blue, these are not the norm throughout his work. Powder-coat metal, light wood, smooth leathers are all materials represented often in Monnen's work, and all of his designs have a consistent quality of smoothness.

### Geometric Visuals:

Monnen's work features a lot of geometric and classic shapes, such as equilateral triangles, squares or cubes, circles or spheres, and even for more unique pieces of his, such as Crane, their forms are comprised of basic shapes that are clear to the eye upon closer inspection.



#### Simple and Functional:

Consistently repeated throughout his

portfolio and website, Monnens prioritizes the function and simplicity of his design overelaborate detail or visual clutter. Seeing design as, "the art of reducing" and describing his work as "no nonsense" and "minimalist in style with maximalist function", Monnens clearly designs his work with the intentions for his products to be simple in appearance and straight-forward, but efficient in use. This culminates into a consistent portfolio of clean-cut, modern, smoothly integrable works that—without a doubt—accomplish their intended purpose.

*4. Crane, a light designed by Alain Monnens* 



5. An assembled mood board of material swatches, color palettes, and samples of Alain Monnens work providing a visual depiction of patterns and themes within his work.

# Ideation

We strived to integrate these components into our series of thumbnail sketches, as well as balance out our list of functional priorities. A product that:

- Allows for reading at night with sufficient illumination
- Does not disturb others in the room
- Accommodates various reading position preferences
- Considers varying reading condition preferences

Our series of thumbnails represents our process of balancing each idea quality until we found a few concepts that reached a happy medium. For example,

Thumbnails H, I, and J were contained lights that would certainly avoid disturbing others in the room, but had limited amounts of illumination, and would not work well for varying book sizes. Thumbnails B, C, and D aesthetically fit with Monnens's

style and would provide a lot of light, but weren't



6. Ten thumbnail drawings depicting various light concepts, described further in text

particularly adjustable or directional, and would likely bother others in the room trying to sleep. We eventually decided to further modify Thumbnail B, then take the modified version, along with A and E to a pin-up and further articulate the ideas.

After presenting our pin-up to a group of other DISII students, we received a lot of useful feedback. Popular components included the corrugated pipe-esque metal wire heavily featured in Pin-Up #1 and in the bends on Pin-Up #2 and #3. A number of the group had desk lights that used it, and their experiences were generally positive, with its high levels of maneuverability being popular. There



7. A thumbnail depicting two wall-mounted light concept pin-ups. Striped sections represent bendable metal tubing, and yellow coloring is used to represent the emitted light and its directionality.

was a lot of discussion surrounding how the lights were mounted as well. With #2's significantly lesser amount of positioning options, people were skeptical of having it wall-mounted. as that would restrict a reader to only one side of a bed. This concern also touched #1, as, although much more maneuverable with the full length of corrugated pipe, people believe a considerable length of it

would be used to angle the light in any direction other than perpendicular to the wall. Aesthetically, people were most drawn to #3, with the clear triangle shape,

and seemed to appreciate the manner in which it folded up. However, less enthusiasm was shown for the concept of unscrewing the light and using it as a handheld tool, as balancing a flashlight and book could be unwieldy, and simply increasing the maneuverability of the light would achieve the intended purpose.



8. A third pin-up drawing depicting a triangular wall-mounted light that hinges using bendable metal tubing and has a detachable head.

With this feedback, we decided to revert to a design more similar to the initial thumbnail (A) for Pin-Up #1 and significantly modify the design of Pin-Up #2. Including a rotatable, wall-mounted cylinder base for #1 would ideally improve its range of motion as less of the corrugated pipe would be needed to angle the light towards where a user would actually be holding a book. To balance out the exclusively wall-mounted series of lights, we decided to switch Pin-Up #2 from a lesser alternative to #1 and #3, and instead design it to be a version-but not lesser-of #1 that would be on a standing base that could be set on a bed-side table.

# **Prototyping and Testing**

### **Research Plan**

Before creating a series of prototypes, we made a research plan to map out a timeline and create a list of research questions to guide our prototyping decisions, user tests, and further iterations.

## **Rough Prototyping**

We first and foremost prioritized depth of function with these rough prototypes. Many of our research questions revolved around the maneuverability of the



**9**. A paper research plan outlining our problem statement, user group, research questions, future testing methods, and project timeline.

lights, as we considered it one of the most crucial features of the Goodlights. Therefore, we wanted to show the full range of movements the ideal form of the lights would have to understand what we'd need to improve upon early on, striving for medium to high fidelity for that metric with this iteration of prototypes. The supplies we used to create the stems and movable parts of the lights were very similar to those we would use in the final forms, albeit with diminished visual fidelity (which was not a priority at the time). With our limited supplies and time, a drawback of these rough prototypes was the lighting function. We utilized fairy lights and LEDs to represent lightbulbs, which sacrificed more visual fidelity, but got the general point across. It also meant the placement of light switches was not accurate to the ideal, which was

unfortunate, since including an intuitive light switch position was a factor we wanted to consider, and was integrated into one of our research questions. However, this was a function we decided we would refine in the detailed prototype.

# **Rough Prototype Testing**

We first conducted an internal test with the Goodlights before moving onto a take-home test. We identified



10. An internal user testing the capabilities of rough prototype #3

three overarching themes in the critical feedback:

- 1. Stability: Prototype #2, now on an elevated stand, felt very unbalanced to many of the users, making them hesitate in moving the light to its full range of motion with the concern it would tip over or begin to droop over time.
- 2. Resistance: In all three prototypes, some users mentioned that the joint or pipe resistance was slightly too strong and somewhat dissuaded them from moving certain parts, especially on Prototype #3, as they were not certain of which parts they were allowed to move. (however, two other testers stated that they liked the resistance of the lamps, as it made them feel more stable, so it seems like this is a preference that varies a lot per person. This did, however, come with a conditional: "I like the resistance of manipulating the light [#2], especially if it were more bottom heavy")
- 3. Signifiers: Combining with the issue of resistance, in Prototype #3, all of the straight segments look basically the same, besides length. This led users to be unsure of which they could manipulate, and in what direction, thus requiring them to use a lot of trial and error to configure the light how they wanted. A quote from one tester states, "it feels fragile, and if there was indication that I can grab the light and certain joins, I think...that would help".

We also received a lot of positive reviews regarding the appearance of the prototypes, especially Prototype #3, and the ability to control the hue and brightness of the lights (a built-in feature of the LEDs and string lights we used) was a feature that was universally liked.

During a take home test, we received further feedback, a lot of which echoed the feedback received in the internal test. The tester highly preferred Prototype #1 and #3, and used them in locations beyond just their bed, using them as desk lights as well. Although Prototype #2 was easier to move around, it simply felt too unstable to use consistently, and when placed on a desk, was too high to be practical. However, with our temporary mounting system for Prototype #1 and #3, (a clamp and a plank of wood) those lights did feel very bulky at times, especially Prototype #1 which was difficult to change into a more compact, out of the way shape. Again, however, we received positive feedback on the many light settings and overall manipulability of the lights.



13. Prototype #2 being used during a take home user test, set to the dimmest setting.

11. Prototype #1 set up in the studio workspace



12. Prototype #3, first being used by Aaden to test mounting methods.



#### **Detailed Prototyping**

The detailed prototype iterations evolved to address user feedback and improve their overall design. For the first iteration, we purchased brighter LED lights with remotes from Amazon to address user complaints about the prototype being too dull and lacking remote control capabilities. A new thin white plastic cylinder and caps were 3D printed, while still utilizing the same flexible light fixture from the previous prototype. The LED lights were then installed into the cylinder and light head.

In the second iteration, we kept the same cylinder and lighting upgrades as the first iteration, but made additional improvements to the prototype in the third iteration. We made plastic washers to make the joints smoother and move more effectively. The entire prototype was also painted matte black for a sleeker appearance, based on user feedback from the bare metal rough prototype. A user described the lights as "industrial-looking", which although intended to be complimentary, was not quite the style we were aiming for.

Finally, we opted for a no-heat LED light bulb to avoid any potential safety hazards. We also cut the steel lamp shade and shortened it to improve the proportions and aesthetics of the prototype. Overall, the detailed prototypes have many differences from the rough prototypes to improve their functionality, appearance, and safety features. Through both prototyping processes, the team listened to user feedback and made necessary adjustments to create high-quality prototypes that met the needs of its users.

#### **Detailed Prototype Testing**

For our extended user test, a user was given a set of The Goodlights with remote control, dimming, and color changing capabilities to use throughout their week. The purpose of the test was to evaluate the effectiveness of the lights in meeting the user's needs and to identify any potential issues that may arise during extended use. The user reported that the lights were easy to set up and use. Using a C-clamp to mount the lights to the bed frame. They particularly enjoyed the convenience of the remote control, which allowed them to adjust the brightness and color of the lights without having to get up and manually adjust them in iterations one and two. The brighter no heat LED light also received positive feedback, as our tester was able to fully illuminate the room with the triangular light. The user also noted that due to the intensity of the light coming from the triangle light it might not be best suited for reading in a cramped environment, as the light was "overwhelming...especially when trying to wind down in the evening".

Throughout the duration of the week, the user reported that the lights were durable and reliable. They were able to withstand frequent use without any meaningful wear and tear. The plastic washers installed in the prototype were particularly effective, as they helped to keep the joints smooth and prevent any looseness over time. The user did note a potential issue with the power cord. The cord was not long enough to reach the nearest outlet, which limited the placement of the lights in the room. Another issue they had with the triangle light was its exposed wiring. The extended user test provided valuable insights into the

effectiveness of the LED lights with remote control capabilities. The feedback received from the user helped us make necessary adjustments to the initial designs to ensure that it met the needs of its users and provided a highquality lighting solution for a variety of settings.



14. Detailed prototype #1





*16. Detailed Prototype #2 on a dimmer setting* 

14. (left) Detailed prototype #2

15. (right) Detailed Prototype #3 in an extended position





17. Detailed Prototype #3

# Conclusion

# **Final Concept**

The majority of the changes from our detailed prototypes to hypothetical final concepts are aesthetic alterations. Due to our limited supplies, budget, and mechanical capabilities, we haven't quite captured Alain Monnen's sleek, modern style—something we would ideally be able to remedy in our final concepts. As opposed to the exposed bolts of Detailed Prototype #3, the final Goodlight would hide these mechanics would corrugated pipe or instead recreate the same join function with bendable metal. Also, although these lights are intended to be used separately, they are still a series. Due to the very similar forms of Product #1 and #2, Product #3 feels out of place, and the sense of unity between the pieces is lost. Whether by differentiating #1 and #2 in regards to appearance a little more, or by introducing visual components from #1 and #2 into #3, we hope hypothetical future productions of the Goodlights would clarify their status as a series.

Due to working with recycled parts, the light lampshades of all three prototypes are not quite the shapes we are aiming for. Our final 3D modelled versions depict more geometric lightshades, referencing light shapes Monnens has displayed in his portfolio.

Our 3D modelled lights also specify inconspicuous plug locations, a feature we did not have as much agency over in our prototypes. The plugs would be out of the way and not interfere whatsoever with moving the lights in their desired position, but have enough reach to not be restricted by outlet locations. Another mechanical specification we would like to clarify in our final concepts are the light switch positions. Suggested internal feedback recommended touch activated lights, and we believe these would be an excellent choice, as making sure the user doesn't need to reach around in the dark to switch on a light is an aspect we're seeking to ensure.



18. CAD Render #1 from upper-left angle



19. CAD Render #1 from lower-right angle



20. CAD Render #3 from right side



# Conclusion

In conclusion, the Goodlights sought to fulfill a purpose, and we would say that it accomplished this. There are many ways in which we could improve upon the product in further prototypes, as user feedback revealed preferences we had yet to consider, and the final concepting stage allowed us to survey the big picture state of the Goodlights as a series. Fundamental shifts in the mechanics of the Goodlights may allow us to better fulfill our intended goals, and more time may have allowed us to maintain features and details we were unable to prototype, but at its current stage, our prototypes of the Goodlights have been satisfactory in serving its intended users.

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