

Buzz Lightboard

Talal Aldoussari, Jake Jermyn, Nate Sherwood, Taylor Spence

Overview

- What is a lightboard?
 - A see through whiteboard that is an effective online teaching tool
- How does it work?
 - Total internal reflection
 - Frustrated total internal reflection to illuminate the ink in contact with the glass
- Why is it useful?
 - Provides a more engaging and personal experience to the typical online class
 - Stimulates the viewer and engages learning in new ways





Problem Statement

- The Center for Excellence in Teaching and Learning (CETL) at the University of Idaho requested we manufacture a low cost lightboard.
- MSRP ≈\$3000
- Our Budget \$2000
- Goal: create a financially palatable lightboard that will be specially designed to gain faculty buy-in/interest via portability and user convenience.

Glass Options



- Regular Plate Glass
 - Window Glass
 - Cheaper (≈\$4/ft^2)
 - Poor Light Penetration

- Starphire Glass
 - Low Iron Glass
 - Expensive (≈\$12/ft^2)
 - Better Light Penetration

Prototype Design







Demonstration

Final Design Specs

- ¼" thick 4' X 6' glass sheet
- Ergonomic for wide range of users
- Capable of fitting through doorways
- Caster wheels for mobility
- Adjustable shelf
- Aesthetically appealing



Plan to Budget

- Purchase locally
- Approach about sponsorship
- Laser etch shelf





Budget

- Prototype Sunk Cost
 - \$105.49
- Final Components Purchased
 - LED dimmer, lights, pwr. supply
 - \$77.41
- Total Remaining Budget
 - \$1,317.10

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Capstone Project Bud	lget Tem	plate - S	ummer/	/Fall						
Project:	CETL Lig	htBoard								
Last Updated	7/30/2018									
				2018				Item		
Expense Items	June	July	Aug	Sept	Oct	Nov	Dec	Total		
Equipment/Tools:										
								\$-		
Supplies / Parts / Services:										
Glass board				Х				\$ 460.00		
Extruded Aluminum				Х				\$ 300.00		
Wood						Х		\$ 100.00		
Building Material					Х			\$ 200.00		
LED Dimmer		Х						\$ 7.97		
LED Lights		Х						\$ 36.97		
12V Power Supply 60W		Х						\$ 24.97		
Neon Expo Markers		Х						\$ 7.50		
Background Materials							Х	\$ 50.00		
Caster Wheels						Х		\$ 125.00		
Prototype Glass		Х						\$ 105.49		
Prototype Frame		Х						\$-		Expenses
								\$-	\$ 1,418	Subtotal
ME Shop Usage (est. Hrs):								Hours		
Aluminum Frame (Board)						Х		10		
Aluminum Supports						Х		12		
Wood Shelf						Х		4		
Prototype		Х						5		
								0		
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					Grad	Shor	Overhead	\$	meraamg	
						University	/ Overhead	\$ 71	5% of all e	expenses
							Totals	\$ 1.499	\$ 1500	\$ 11
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Goals

Completed

- Prototype
- Glass Comparison
- Purchase LEDs
- Frame Layout Test

Upcoming

- Perform Prototype Tests
 - Projection
 - Lighting Arrangements
- Create Video Comparing Glasses
- Solidify Final Design Concept
- Purchase Full Size Sheet of Glass
- Purchase Framing Material

Schedule

LightBoard Schdule																Color		к	ev															_		
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	L	ast Updated	: 7	7/29/20	18												Completed																			
		Year	r							1							2018																			
		Month	n		June			1		Ju	ıly			1	1	Au	ıg			Se	pt				Oct				N	ov				Dec		
Task Description	Duration	Assign	6/11	6/14	6/18	6/19	6/25	7/2	7/6	7/9 7/12	7/16	7/23	7/26	7/3)	8/3	8/6 8/13	8/20	8/27	9/3	9/10	9/17	9/24	10/1	10/8	10/15	10/22	10/29	11/5	11/12	11/19	11/26	12/3	12/10	12/17	12/24	12/31
Contact Client	30 min	lake																																-	_	
Team Contract	1 hr	Nate																																		
Client Interview Questions	3 hr	Team																																-		í —
Priliminary Budget	1 hr	Team																																		1
Client Interview	2 hr	Team																																		1
Project Requirement Doc.	2 hr	Taylor																																_		
Priliminary Final Model (Solidworks)	2.5 hr	Nate																																		-
Budget	1.5 hr	Nate																																		1
Schdule Check #1		Nate																																		1
Portfolio Check #1		Taylor																																		1
WikiPage Page	5 hr	Jake																																		-
LogBook Check #1		Team																																		1
SNAPSHOT #1	15 hr																																			-
Prototype Build																																				-
Identify Prototype Glass Selections	4 hr	Taylor																																		
Solidify Prototype Design	5 hr	Team																																		
Purchase Prototype Glass	3 nr	Taylor																																		<u> </u>
Purchase Prototype Aluminum Frame	1 nr	Jake																																		
Purchase LED/Controller	2 nr 6 hr	Toom																																		
Prototype Construction	0111	Tealli																					-											\rightarrow		
Complete Step/Reard		Nato & Tavi	or																																	
Design Validation Plan	2 hr	Talal																																		
Project Validation Proposal	2 hr	Taylor																																-		
Concept Design Review																																				1
SNAPSHOT #2														1																						1
Portfolio WikiPage																																				1
LogBook Check #2		Team																																_		-
Team Citizenship Grade		Team																																		1
Ordering Glass		Taylor																																_		í –
Final Build																																				-
Finalize Solidworks Model	4 hr	Nate																																		-
Create Engineering Drawings																																				
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Create Final BOM																																				
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Lightboard Construction																																			_	(
Wiki Site Review																																				í T
LogBook Check#4																																				1
Team Citizenship Grade																																				1
Finalized Prototype (Hardware/Software)																																				í
Testing Lightboard																																			_	
Modifications Based on Tests																																				
Poster Development																																				
Print Poster						L		I					I																					$ \rightarrow $		i
Final Report (Portfolio)					<u> </u>	<u> </u>	<u> </u>	<u> </u>					<u> </u>																							i
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Complete Lightboard (SNAPSHOT)	I					 							 	-																				\rightarrow		
Work Area Check-out						<u> </u>							<u> </u>																			_		\rightarrow	\rightarrow	<u> </u>
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Questions?