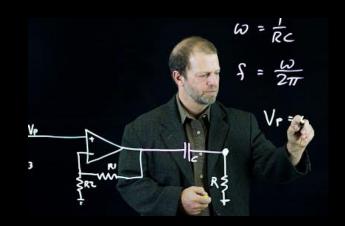
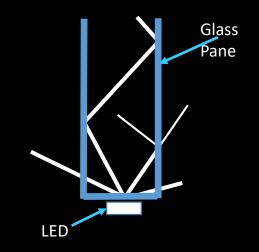


# Buzz Lightboard

### 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

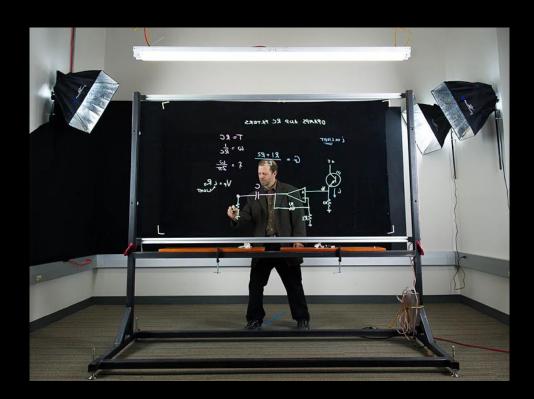




### Problem Statement

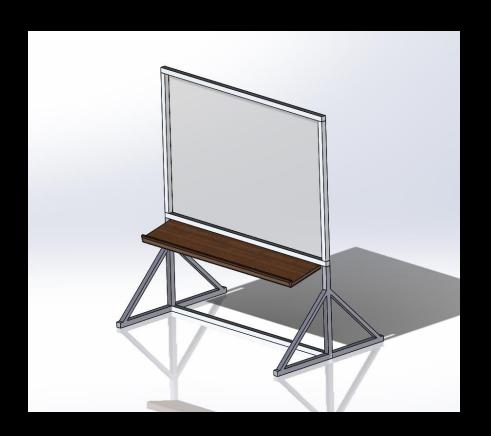
 The Center for Excellence in Teaching and Learning (CETL) at the University of Idaho requested we manufacture a low cost lightboard.

- MSRP ≈\$3000
- Our Budget \$2000



## Final Design Specs

- Goal: create a financially palatable lightboard that will be specially designed to gain faculty buy-in/interest via portability and user convenience.
- 1/4" 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



## 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

 A miniature lightboard with two different panes of glass allows simultaneous comparison throughout a range of tests.

#### Tests:

- Visual Comparison
- Projection Tests
- Lighting Arrangements
- Light Erosion



# Budget

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

Capstone Project Bud	get Tem	plate - S	ummer/	'Fall										
Project:			,					+						
Last Updated														
·		•	·	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						X		\$	100.00					
Building Material					X			\$	200.00					
LED Dimmer		X						\$	7.97					
LED Lights		X						\$	36.97					
12V Power Supply 60W		X						\$	24.97					
Neon Expo Markers		X						\$	7.50					
Background Materials							X	\$	50.00					
Caster Wheels						X		\$	125.00					
Prototype Glass		X						\$	105.49					
Prototype Frame		X						\$	-		Expenses			
								\$	-	\$ 1,418	Subtotal			
ME Shop Usage (est. Hrs):									Hours					
Aluminum Frame (Board)						X			10					
Aluminum Supports						X			12					
Wood Shelf						X			4					
Prototype		X							5					
									0					
									0					
					Gradı	uate Stude	nt Support	\$	-	including fringe				
							Overhead	\$	_					
						·								
							Totals	\$	1,418	\$ 1,500	\$ 82			
										Budget	Excess			

### Goals

### **Completed**

- Prototype
- Glass Visual 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

LightBoard Schdule															Color		Key															
Light Board Schadie	-									-					COIOI																	
										-				-		Purch														-	-	
																SNAPS		-														
																In P	rogres	S														
		Project:			Lię	ghtBoa	rd									Future	Due D	ates														
	ı	ast Updated:	8/2/201	18												Com	plete	d														
		Year														2	018															
		Month		June					July						Αι	ıg		S	ept			Oct				lov				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/	30 8/3	8/6	8/13	8/20 8/2	7 9/3	9/10	9/17 9/24	10/1	10/8	10/15 10/22	10/29	11/5	11/12	2 11/19	11/26	12/3	12/10	12/17	12/24	12/31
Contact Client	30 min	Jake																														
Team Contract	1 hr	Nate											4																			
	3 hr	Team							_	_	_	_	4	_				-						_								
Priliminary Budget	1 hr 2 hr	Team Team								-	_		-															ļ			-	
Client Interview Project Requirement Doc.	2 hr	Taylor								-	-	-	1																			
	2.5 hr	Nate											-																		-	
	1.5 hr	Nate		1		l		$-\dagger$		_	-		1					1		1			1			1					-	
Schdule Check #1		Nate																1													$\neg$	
Portfolio Check #1		Taylor											1																			
WikiPage Page	5 hr	Jake																													$\neg$	
LogBook Check #1		Team																														
SNAPSHOT #1	15 hr																															
Prototype Build																																
Identify Prototype Glass Selections	4 hr	Taylor																														
Solidify Prototype Design	5 hr	Team		1						$\perp$	$\perp$	_	-		-		_	1			-	$\vdash$	-		<u> </u>	1		-	$\vdash$		$\rightarrow$	
Purchase Prototype Glass	3 hr	Taylor		-	+ +					_	-	-	4	+			_			-	-			-		-					$\rightarrow$	
Purchase Prototype Aluminum Frame Purchase LED/Controller	1 hr 2 hr	Jake Talal											+	-				-													$\rightarrow$	
Prototype Construction	6 hr	Team			1									+			-	+		+	-			-		-					-+	
Review Prototype Take Aways		ream								_																					-	
Complete StoryBoard		Nate & Taylo	nr .										_							1				-							_	
Design Validation Plan	2 hr	Talal	,																													
Project Validation Proposal	2 hr	Taylor											T																			
Concept Design Review													1																			
SNAPSHOT #2																																
Portfolio WikiPage													1																			
LogBook Check #2		Team								_																						
Team Citizenship Grade		Team																														
Ordering Glass	├──	Taylor		-						-			1							-								-			$\rightarrow$	
Final Build Finalize Solidworks Model	4 hr	Nate								-			+																		-	
Create Engineering Drawings	4111	INALE											-																			
Create dFMEA													1																		_	
Create Final BOM													1																			
Detailed Design Review													1																			
LogBook Check #3																																
SNAPSHOT #3																																
Order Short Lead Parts	—												4					1														
Machining Parts	Н—			1					_	_	_	_	-		<u> </u>		4	1		1	<u> </u>							<u> </u>				
Lightboard Construction	-									_			-	-																		
Wiki Site Review				-							-		4	+			-	1		+	-		-			1					$\rightarrow$	
LogBook Check#4 Team Citizenship Grade				1				-+		-	+		+	+			+	+	+ + -	1									$\vdash$	+	$\dashv$	
Finalized Prototype (Hardware/Software)				1				-+		$\dashv$	$\dashv$		1					1		+	1		1							-	$\dashv$	
Testing Lightboard				1				_		+			Ť					1		1	1		1								$\overline{}$	
Modifications Based on Tests													-11					1		1			1								$\neg$	
Poster Development																																
Print Poster																																
Final Report (Portfolio)																																
LogBook Final Review										_			-	1												1						
Complete Lightboard (SNAPSHOT)	₩										_		4					1					1									
Work Area Check-out	—			1						_	_	_	4	-			-	+		1			-		-	-						
Project Files	<u> </u>														1					1	1			1				1				