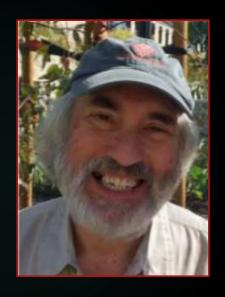
February 27, 2020

Designing Exoskeletons and Prosthetic Limbs that Enhance Human Performance - Steven H. Collins, PhD

ENGR110/210 Perspectives in Assistive Technology



David L. Jaffe, MS
Instructor

14

Years



Questions, Comments, Suggestions, or Concerns?







Please notify me of your comments, suggestions, and concerns so I can explain / address / correct them before the end-of-term course evaluation.

Attendance Sheet, Evaluation Form, and Meet with Dave Signup



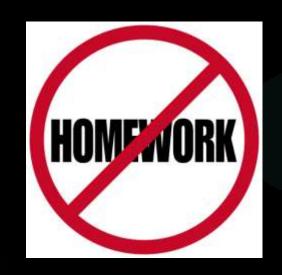


For all students:

- Attendance Sheet
- Meet with Dave signup

For everyone:

Class Session Evaluation Form







Live a gog with a legible fort	Perspectives in Assistive Technology - 2020 Class Session Evaluation Form
Lexture Print Co.	orar Disprises & Mitto duction for Assistive Technology (Banks), Jaffe, Mit
	errolled (buden?). II - Yes. II - No. question/laws into hely the teaching learn access in tay? I class sension. Please rate the following invest
200 mg	where a view all presentations appealing unjuries, understandability, a year of following concepts and ownersh, shelly of east on storm, quiety of Privers Food ables, see all supporting mode incloses and constables adds (Shelly Shell ables), and appealments, convening and storm, properties a presentation of the presentation, place and management of a status time, appoint only for questioning and place pagement, providing adds all events amongton, and determine about most of the properties and pagements.
3 2 3 M	Antiston curtaint, high primed, relevance to the broad record elevative britainings, presentation of eleformation, appropriate level of detail and lectrocal curtaint, clearally along it prevented material.
Submit jour commit Supply your name	with specificing, and suggestions, especially if you found perform of the lack with the performing or 5 types what a response sufficiently back of the form of you when more report.
	certain, see, or search at macrosm, expressing expensivly interesting or provided a new paragraphic of
How much did you	confrontsday (into 2 To a year dold 3 and 3 a notice) strated 3 at the 3 eathers

(Seed tobbons)	diseased Executed Standard	Street section.	Name of Street, Street,
Service Services		ganger trade	Committee of Street, or other Designation of Street, or other
	States that your		Millionia handi
	Ad River		Drivet Stanforsterly
	Proper Shall - U.S. 6-9		Desert Schallenberg
	Control Self-Water		Periodic Systems (Individual)
	Production of the Control of the Con		Name Order Driver
	Service, S.A.		Road, Stell
	(WHICH SHEET WAR)		THE CONTRACTOR
	Platte, Nachard Michigan		300-3144
	STREET STREET, STREET		beek, His compe.
	Smoth A. Arigo Vision		States, 107-01
	Participation (Participation)		Ster Strip, Almeric
	help below how		St-16 (red feather.
	262000-000-		Sales Contracts
	Seberminens		Street Street Street
	Steller, Spri.		SANGE TRANSPORTED
	Street, or opening		Sept. (IN SEC.)
	SHEET, THE PARTY SHOWS		Perchasilian Indiana
	Print, Publisher		THE THE
	Desirable class from		Li Antonio
	Total Total		tion for Marrison
	particular characteristics and the control of the c		
	per selections		
	Deposit Control of the Control of th		
	to be had been		
	Name of Street, Street		
	WHICH SALES TORKS		
	Minks hills from		
	Refract Algorithms.		
	many too		
	Allert Size		
	Minings, har Delicate		

Other times in Peter	n Thornton 110 son Building, Room 113
less & lims	Near from Name & Specify 15 would time titest
Madrasley - lancery 19 th Marriag - lettlers - 27.15ers	
Allegian - Ultim - 6.85m	
Thursday - Helisary M ²	
Marring - 8-Milery - 17 Allers	
Marian - Lpn - 3 Xyrn	
Before chia - 3-85pm, month channels War class - Beth	
Mildey - Jensety 28 th decreasy - 8 Milder - 17 Milder	



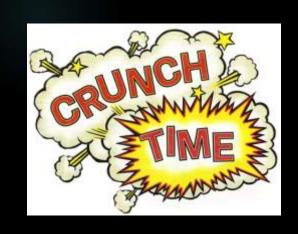
Reminder - Work with Diligence

- ▶ Time is your team's most precious resource
- ▶ 12 days until project presentations!
- 2 weeks until project demonstrations





Week 8



- It's crunch time
- Brainstorm, Select, Prototype, Test, Analyze, Repeat
- Inform me of your team's progress









Week 9 Class Sessions

► Tue, Mar 3rd
Film Screening in Peterson Atrium



Thu, Mar 5th
 Wheelchair Fabrication in Developing Countries

Excused from Film Screening



- ► Teams can request to be excused from the film screening on Tuesday to work on their projects
 - ► All team members must be up-to-date on missed lectures
- Fixed: The Science / Fiction of Human Enhancement DVD is available for overnight loan by students

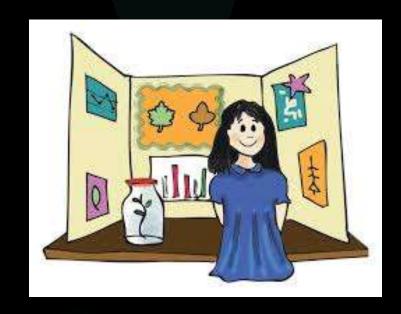
Week 10 Class Sessions

► Tue, Mar 10th
Student Team Project Final Presentations



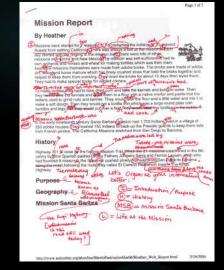
Thu, Mar 12th
Student Team Project Demonstrations, Course Evaluations, and Celebration

Students working on 1 and 2 unit projects are required to attend





Mid-term Report Markups



- Teams are welcome to meet with me to discuss reports
- Some are comments, some are suggestions, some are corrections
- Some relate to syntax, spelling, grammar, format
- Reports should reflect a professional engineering style
- Not just for my viewing, practice writing professional journal articles and funding proposals
- An example for your future employer
- Reports and presentations are key professional communication skills that must be mastered



Discussion Topic Preferences



- 33 Assistive Robotics Robotic technology benefitting people with disabilities and older adults
- 28 In the News
- 24 Ten Commandments of Making Adam Savage's Maker Faire video
- 23 Ethical / Moral Dilemmas Related to Disability
- 22 Product Pricing
- 21 Overview of Accessibility How this design feature relates to products, with many examples
- 21 The Upside of Failure Learning from prototypes that didn't work
- 16 Vintage Assistive Technology Products and devices from the past
- 16 Video Theatre Watch and discuss videos of new products and prototypes
- 14 Who is Disabled? Making a determination with limited information
- 10 Innovative Marketing Metrics How we use words to measure and advertise
- 7 Famous people with disabilities Focus on TV characters

Which is Most Innovative?





How much more Innovative?





Innovation Quotes



"In a book I'm (Lee Vinsel) writing with Andrew Russell, *The Innovation Delusion*, we examine the origins of our culture's current obsession with Innovation. We make a distinction between actual innovation, the introduction of new things and practices into society, and innovation-speak, the empty-headed and misleading ways people have come to talk about technological and social change in the past few decades."



Innovation Quotes





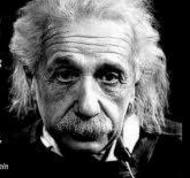
Innovation is overused, focus on impact

"Innovation. It's kind of an odd word because it has a very vague definition. Generally, it means to create something so different from what's been done before that simply calling it "new" isn't quite right. The fact that the definition of innovation seems to evolve with each new technology breakthrough doesn't make it any easier." Kasey Panetta - Editor ECN

"Innovation is something that is both familiar and new." Chief Innovation Officer

If Einstein took ENGR110/210, he would have said, "If I had a quarter to design and fabricate a solution, I would have spent significant time understanding the problem".

"If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask, for once I know the proper question, I could solve the problem in less than 5 minutes."



Innovation Links





Word 'Innovate' Said 650,000 Times at SXSW So Far (satire)

Employees Most Innovative When Brainstorming Dramatic Quitting Scenarios (satire)

Innovate the Way You Innovate! (a real conference!)
"Forget everything you've ever learned about innovation and invention."



Innovation Questions



- Is Innovation a design feature or property of a device?
- ▶ Is Innovation a binary feature or one that has a range?
- Is Innovation used because there is an unavailability of other means to measure the qualities of a device or design?
- Does the use of Innovation indicate a desire avoid a measurable engineering term?
- Does the use of Innovation mean that there is a lack of evidence that the device is actually useful?

Innovation Questions

- What does it mean if XXX is Innovative?
 - Product
 - Person
 - Idea
 - Company
 - Process
 - Course
- What is the unit measure of Innovation?









- Certainly Innovation is generally thought as something positive and desirable, but why would someone use a word that is doesn't have a strong meaning or is actually measurable?
- My conclusion: "Innovation" is a marketing / advertising term, not a scientific term
- Saying something is Innovative implies that it a good product, worth purchasing. Of course in advertising, one doesn't actually have to prove that it is a good product.

Innovation

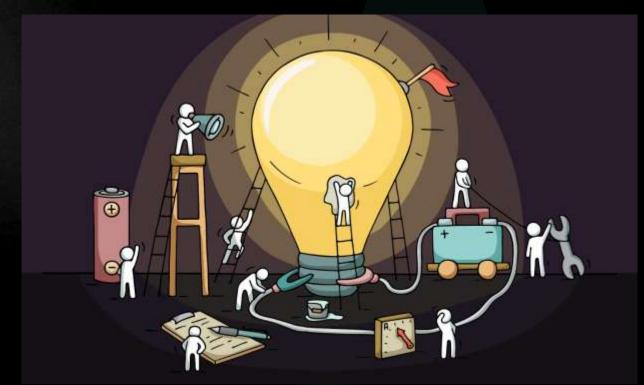


Beware of terms that describe a product, a person, an idea, a company, a process, or a course that do not have an objective measure.

Examples:

Artificial Intelligence, Machine Learning

So, engineering students should not to use innovation or innovative without describing exactly what they mean and their measurement technique.



Tuesday





Film Screening - Fixed: The Science / Fiction of Human Enhancement

Peterson Atrium

Teams can request to be excused from the film screening on Tuesday to work on their projects

All team members must be up-to-date on missed lectures

Fixed: The Science / Fiction of Human Enhancement DVD is available for overnight loan by students



Today





Designing Exoskeletons and Prosthetic Limbs that Enhance Human Performance

Steven H. Collins

Stanford University - Mechanical Engineering

Short Break







Break Activities

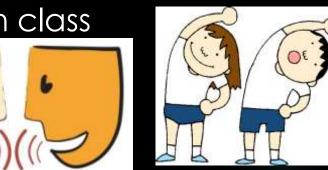




- Grab a cookie
- Stand up and stretch
- ▶ Take a bio-break
- ▶ Text message, web-surf, email
- ▶ Talk with classmates
- Reflect on what was presented in class









Questions?





Adjourn



class dismissed



Laptops Galore





Time for Questions?





End the class



