National Changhua University of Education

Creative Engineering Design 2011

Prepared by Kerwin Wang

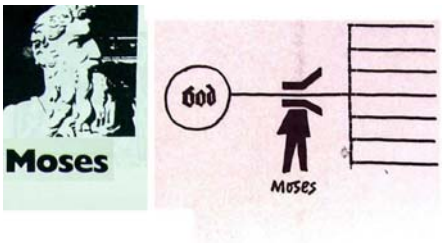
Department of Mechatronics Engineering

Creative Thinkers

Design Philosophy

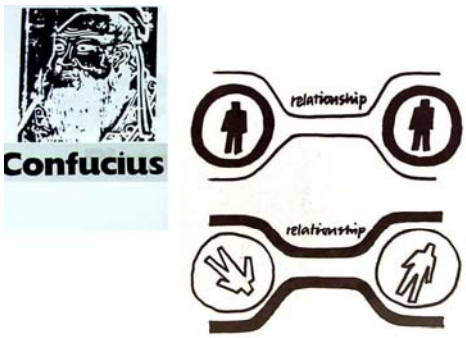
Funny Inventions

Useful Inventions



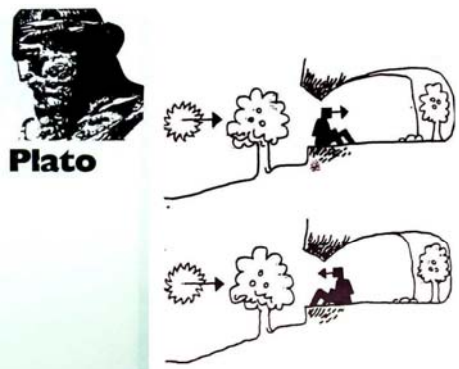
Moses acted as the loudspeaker who broadcast God's will as tight set of law that established a people and religion.

http://tw.wrs.yahoo.com/_ylt=A8tUxwnLV1dHYwYBAQlr1gt./SIG=12fbvjlui/EXP=1196992843/**http%3A//tw.knowledge.yahoo.com/question/%3Fqid=1405123020680

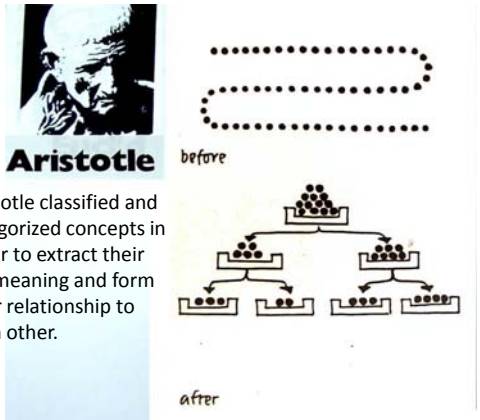


Confucius put all the emphasis on the relation itself.

(The Christian put more weight on encourage a man or woman to be right within himself/herself)



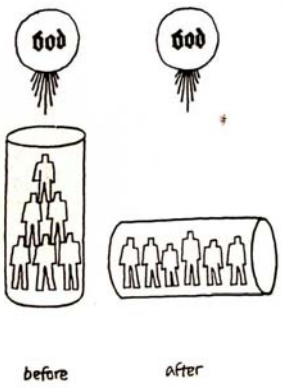
The ordinary man sits in his limited cave and sees only the shadow of reality. Plato insisted that the truth existed as true forms below the surface appearance of things. (Philosopher like to see the truth itself.)



Aristotle classified and categorized concepts in order to extract their full meaning and form their relationship to each other.

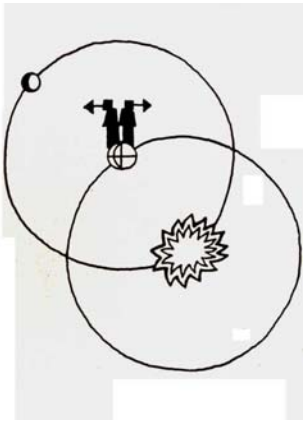
Jesus

He offered the kingdom of God in which all men were equal.



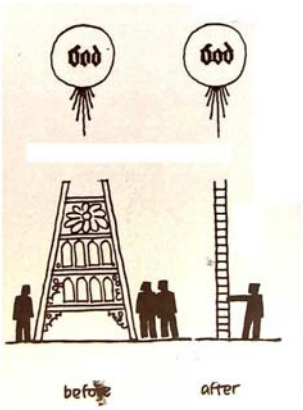
Copernicus

Copernicus set off the revolution in thinking that was to follow.



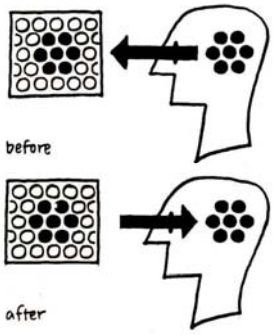
Luther

Man could communicate directly and on personal level with God without the intervention of Church.



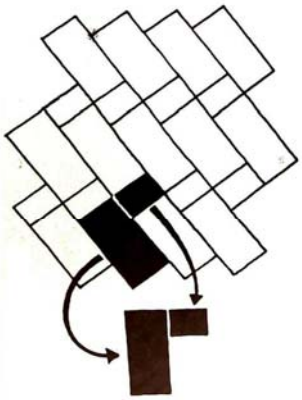
Bacon

The truth only came from careful observation.



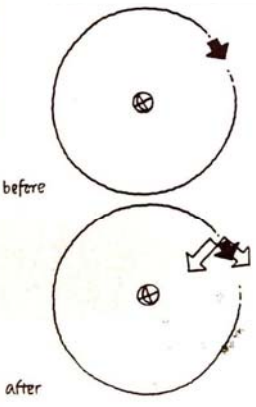
Descartes

Descartes' success in inventing analytical geometry convinced him that even the most complicated situation can be broken down into simple parts that are combined in a special way.



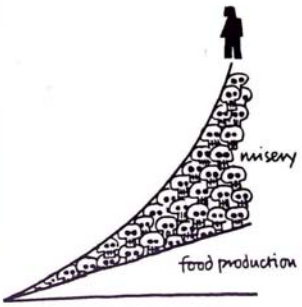
Newton

Newton explained many mysteries of the natural in a scientific way.



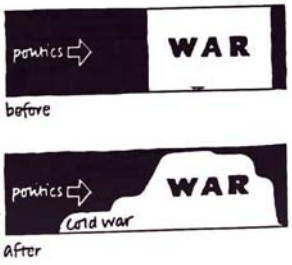
Malthus

He saw nothing in nature which would halt the geometric growth of population.



Clausewitz

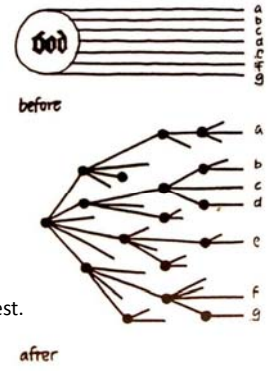
The father of management science, he was interested in action not in essence.



Darwin

Using Evolution to explain the

1. Differentiation of specifies.
2. Survival of the fittest.

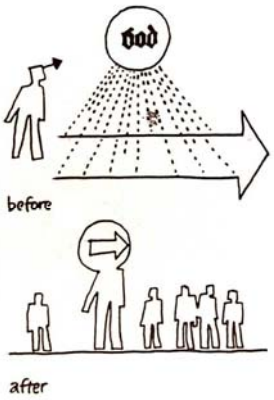


Nietzsche

Supermen theory

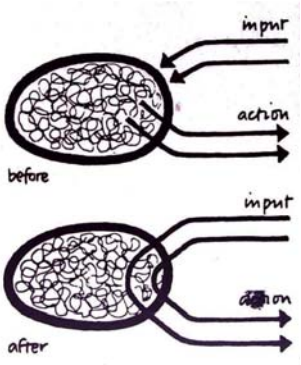
Nietzsche restore man's moral fibre.

God was dead.



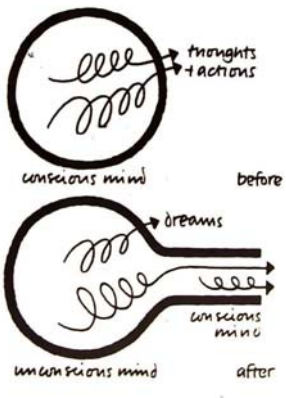
Pavlov

Human's behavior could be controlled and predicted.



Freud

The conflicts of the subconscious mind could be seen to explain much of human behavior.



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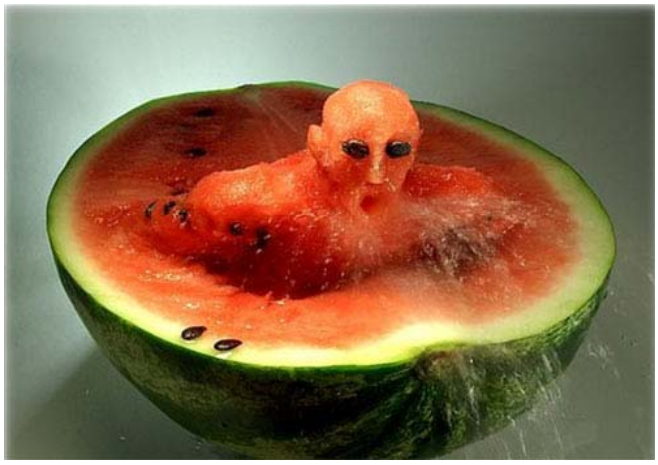
1. Weidenfeld and Nicolson, “The Greatest thinkers”
2. Beitz W. and Pahl G., Engineering Design: A Systematic Approach, The Design Council London
3. http://en.wikipedia.org/wiki/

Creativities

Creativities



Creativities

Hi Kerwin,

I'd be honored if you would show my images to your students. My websites are:

http://www.pbase.com/dsouzl
http://www.engagingimages.ca/welcome.html

Thanks and all the best!

..Lew D'Souza..

On Fri, May 1, 2009 at 4:25 AM, Kerwin Wang <kerwin@cc.ncue.edu.tw> wrote:

Dear Dsouzl,

May I show your creative images to my students in the "Creative Engineering Design" Class?
I think these pictures will give them very good inspiration.

All the Best!

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Changhua 50007, Taiwan
TEL 886-4-723-2105-7818

Great Images

From http://www.pbase.com/dsouzl/fun_stuff

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OK!!!

Let's take a break

and then

move to the

DESIGN

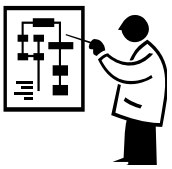
What is Engineering Design?

- Systematic thinking
- A process of converting information that characterizes the needs and requirements for a product into knowledge about a product.
- It is a data based decision making process.
- It is an Open System

Let's play an example!!

Engineering Design

- Problem Identification
- Creative Process (stress can enhance creative process)
- Limitations and Barriers to Creative Thought
- Tools Available to Designers



Problem Identification

- A Story
- Technical Brief
- Events
- Abstract
- Problem Statement

- Word Problem
- Work Schedule
- Mathematical Model
- Template
- Validation
- Synthesis

Creative Process

- IQ, Age, Education is not required to think creatively
- Brain Storming
- Combining old things is one way

Funny inventions

Funny inventions

Funny inventions

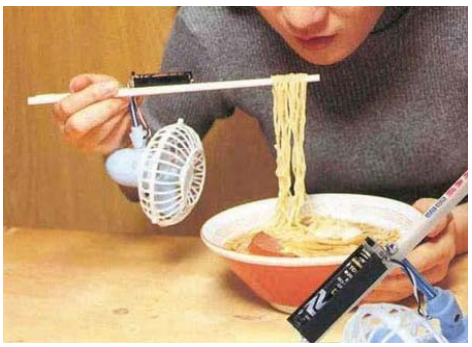
Funny inventions

Funny Design in Japan

Funny inventions

Funny Japanese inventions

Funny Japanese inventions



Funny Japanese inventions

Funny Japanese inventions

Funny Japanese inventions

Funny Japanese inventions

Funny Japanese inventions

Funny Japanese inventions

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Funny Japanese inventions

Funny Japanese inventions

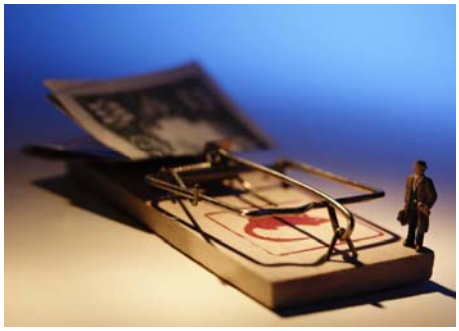
Funny Japanese inventions

Funny Japanese inventions

Limitations and Barriers

- Intellectual Barriers
- Emotional Barriers
- Social and Cultural Barriers
- Material Properties
- Technology Barriers
- Dilemma

Traps



Tools Available to Designers

- Continuous quality improvement (cascading chart)
- Planning tool (QFD)
- Time management tools (active network, master schedule, Gantt (PEI) chart,…)
- Ideation tools (brainstorming, mind-mapping, visual thinking, combing ideas, morphological matrix)
- Evaluation and analysis tool (knowledge box, evaluation table, on-conscious competence, ramification learning plan, up-to-date knowledge)

Tools Available to Designers

SIX THINKING HATS

White => An objective look at data and information.

Red => Intuition

Black => Logical negative (judgment, caution)

Yellow => Logical positive (feasibility)

Green => New idea & creative thinking

Blue => Control of thinking process

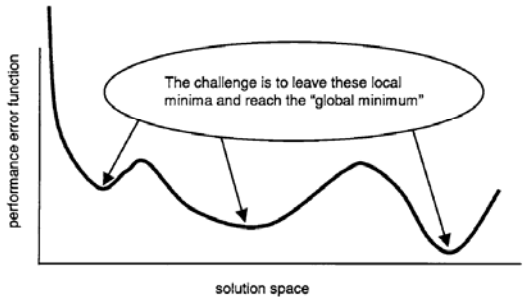
The way of thinking

- Lateral thinking
- Vertical thinking
- Critical thinking
- Objective oriented thinking

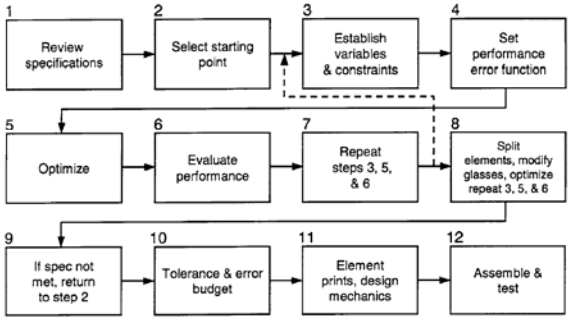
Be a Good System Designer

- A good system designer is like a conductor of an orchestra who get right materials and design parameters to play right function at the right place.

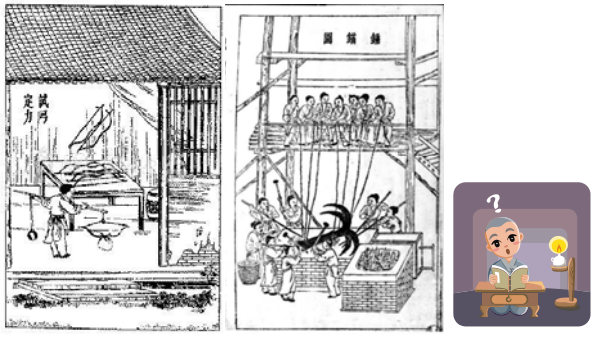
Design Space



Engineering Design Steps



Steps In Engineering Problem Solving



Chinese Technology in the Seventeenth Century: T'ien-kung K'ai-wu, Yingxing Song

天工開物, '宋應星' 1637

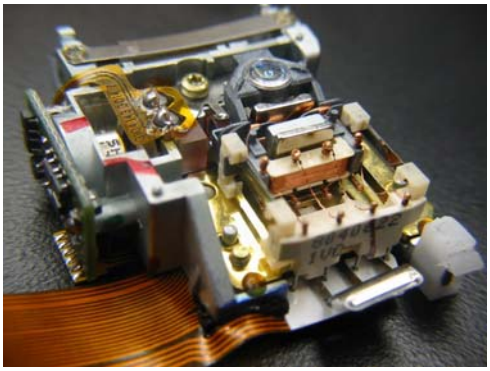
Steps in engineering problem solving

1. Understand the purpose of the problem.
2. Collect the known information.
3. Determine what information you must find.
4. Simplify the problem. State any assumptions you make.
5. Draw a sketch and label any necessary variables.
6. Determine which fundamental principles are applicable.
7. Think generally about your proposed solution approach and consider other approaches before proceeding with the details.
8. Label each step in the solution process. **U**nderstand the purpose of the problem
9. If you solve the problem with a program, hand check the results using a simple version of the problem.
10. Checking the dimensions and units and printing the results of intermediate steps
11. Estimate the range of the expected result and compare it with your answer.
12. Do not use the answer without considering what they mean. (Simulation always produce something .)

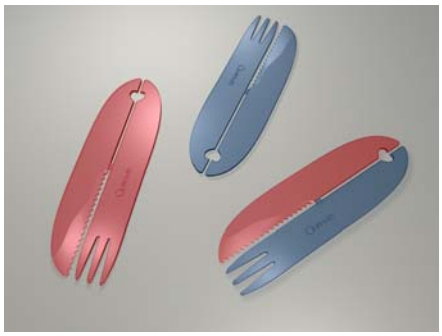
A Real Engineering Design Example

From :www.nissan.com

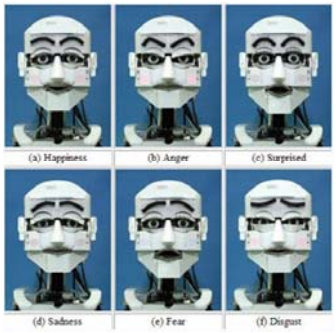
A Real Engineering Design Example



Great Inventions



A Real Engineering Design Example



http://consultaglobal.wordpress.com/2008/02/16/innovation-and-the-rationale-behind-emotional-design/

The 25 Most Promising Inventions of 2010

http://moudz.blogspot.com/2010/03/25-most-promising-inventions-of-2010.html

25 **nPower Personal Energy Generator**

- Place the little device into your bag or briefcase, plug in your cell phone, GPS, or iPod, and let your kinetic energy power up your gadgets while you walk.
- You can get an 80% charge in one hour through your own energy alone. Green and brilliant.

24. Flying Car: Terrafugia

- The Terrafugia Transition is more of a driving plane than a flying car, but its a promising first step. The worlds first street legal plane hits runways and highways in 2010.

23. Sony 3D-360 Hologram

- No glasses needed! Just turn on your tabletop unit and enjoy a 360-degree view of images and possibly video through this stereoscopic display. Sony isnt yet sure what to use it for, but ads, video games, and medical visualizations are just a few ideas.

22. Xeros Waterless Washing Machine

- The waterless washing machine isn't as sexy as some of the other gadgets arriving in 2010, but its conservation qualities should be applauded.
- It uses nylon beads and a spin cycle to clean your clothes, saving water while potentially reducing the need for dryers.

21. Recompute: The Cardboard Computer

- Cardboard is the new black. Legions of product made primarily of corrugated cardboard are hitting the market. This little beauty will benefit anyone who has ever broken that little sticker while changing out a sound card or adding memory to a CPU.

20. Powermat Wireless Battery Charger

- If youre tired of carrying around one charger per electronic toy, youre in luck. The Powermat lets you charge your iPhone, Blackberry, Nintendo DS, and most other gadgets on the same mat. One mat, one plug.

19. Samsung Water-Powered Battery

- Samsung is speeding past the AC plug, around the solar charger, and directly into the water faucet. Its new micro-fuel cell and genereator rpowers your cell phone through water alone. Jurys still out on whether it will work long-term.

18. Camaro: Tranformers Edition

- Love muscle cars? Have you seen Transformers more times than all your nieces and nephews?
- Then this head-turner is for you. Note that the car does not actually transform, nor does it come with any multi-weaponry.

17. Apple Tablet

- Its safe to say you will see a touchscreen-based tablet Apple product that will both fight with Kindle for books and netbook manufacturers for small computing.

16. The Honda Bicycle Simulator

- Honda has unveiled a new kind of bicycle. It doesnt actually go anywhere, but it does simulate real-life situations riders may face on the way to work or the store. Think of it as defensive driving for bicyclists.

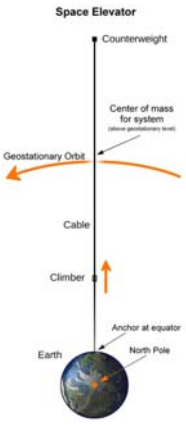
15. Panasonic 50-inch 3D 1080p Plasma TV

- This new kind of TV could be the reason. Once you spring for specialized glasses, a new Blu-ray player, and a bunch of 3-D DVDs, youll be ready for this TV.

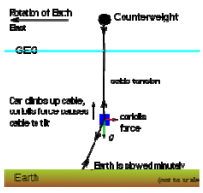
14. Gibbs Quadski

- Heres the scene. 007 is in the middle of an ATV chase, 4-wheelers spewing mud all around him as he speeds toward the sea. He looks like hes done for. Then, suddenly, he plows into the ocean and hits a button. The wheels on his ATV fold as he speeds away, spraying water on the bad guys.

13. Space Elevator



- The Space Elevator, formerly the stuff of science fiction, will become reality in 2010, when building teams will compete for cashand bragging rightsto actually get it done.



12. 2010 Brabus Mercedes-Benz Viano Lounge

- Tilt back in your leather lounge chair. Turn on the Sat TV. Load your Nespresso machine with the finest coffee beans in the world, then take a photo of it all with your iPhone. Load the photo and to your Twitpic from the on-board Sony Vaio laptop.

11. Plasma Scalpel

- Touted as a lightsaber for military doctors, the new plasma scalpel works by using ionized gas in a controlled light beam. This simultaneously slices and cauterizes a wound on the battlefield. Coming in 2010 to a war zone near you. Heres to hoping you never see one!

10. Touch Wood

- Theres only one thing cooler than corrugated cardboard in technology. Its name is wood. The Japanese are leading a trend called Mori Girl (Forest girl), which aims to limit the use of plastic by using sustainable wood instead.

9. V12 Dual-Touchscreen Notebook

- The new dual-LCD screen laptop could take the form of big iPhone-style touchscreens or, if theyre working with a different company (they wont say who it is), simply one of the neatest laptops ever to hit markets.

8. OnLive

- OnLive is simple: Play the hottest video games from your TV, PC or Mac over a broadband connection. No console, no discs.

7. MyKey by Ford

- Teens have a propensity for unsafe driving. Thats hardly news, but what parents can now do to encourage safe driving is. The MyKey can be set to control the vehicle by limiting speed, chiming when the gas tank is 75 miles from empty, and limiting the cars audio by as much as 44%. Kids will hate it. Thats probably why its such a good thing.

6. Tri-Specs

- You have your phone, your iPod, your headphones, and your wi-fi headset, in case you get a call. You have your sunglasses. Youre ready to goor are you? What if you could pull on your shades and have all of the above, in one cool package?
- Enter Tri-Specs. They come built-in Bluetooth wireless headphones for an MP3 Player or cell phone, retractable earbuds, built-in volume control, and even voice control. For $200, you can be the coolest kid on the block.

5. Microsoft Xbox360 Project Natal

- Now that Microsoft did the wireless controller right, theyre throwing it out the virtual Window in favor of Project Natal. Rumored to be coming at one of next years conferences, PN will have no controller or wires connecting you with the screen. Well see if it works.

4. Google Wave

- Its not email. Its not chat. Rather, a Wave is a document that acts like a conversation, live and changeable on the fly. Rich media drives the experience. But you wont really know how much you need it until Google actually gives it to you.

3. The KS810 Keyboard Scan

- This keyboard with a fully-integrated scanner takes product hybridization one step further.
- The KS810 keyboard contains a full-color, 600dpi scanner that lets you drop scans into most online applications. If keyboard scanning isnt your thing, product creator Lifeworks is also offering a keyboard with a built-in iPod dock.

2. Corrugated Cardboard Laptop Case

- Giles Miller has designed a customizable cardboard box for that perfectly fits your little Netbook. You can even put your own logo on it. Take that, Targus.

1. Gocycle Electric Bicycle

Coast in electric mode for up to 20 miles in this little sucker, then fold it up and take it with you. Of course, you might want to pedal every now and then, just to make it look like you're making an effort.

- http://moudz.blogspot.com/2010/03/25-most-promising-inventions-of-2010.html