EI1102 Introducción a la Ingeniería II

Julio Lira

Ingeniería
UNIVERSIDAD DE CHILE

Presentación de Información
(Cap. 9)

- Parte muy importante en un proyecto → no descuidar
- “Invertir” tiempo en comunicar correctamente

Representación Gráfica

Objetivos (*Tufte, 1983*):

- Presentar la información
- Hacer el lector pensar en sustancia más que en metodología o en diseño gráfico.
- No distorsionar el mensaje de la información.
- Estimular al ojo para que compare distintas partes de la información.

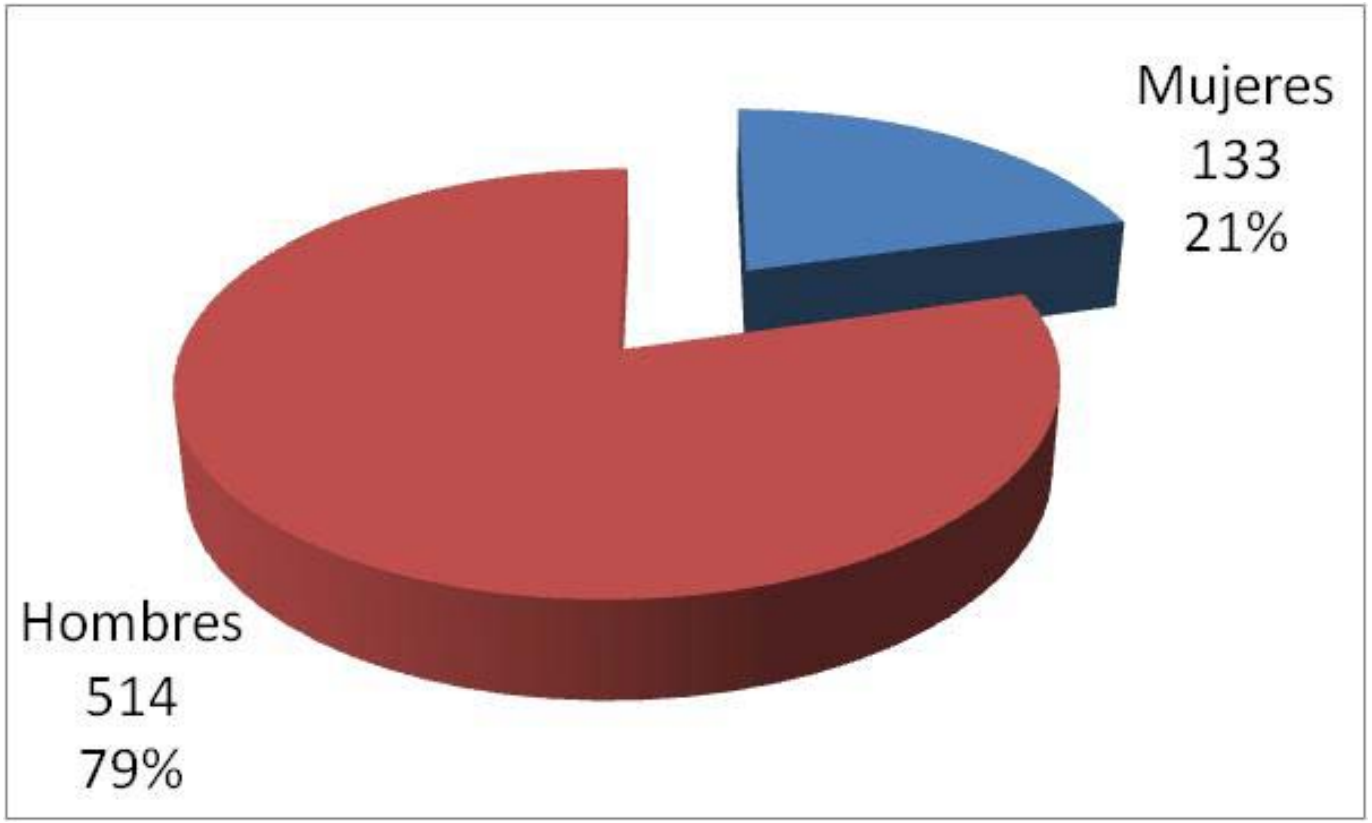
Representación Gráfica

Objetivos (*Tufte, 1983*):

- Revelar niveles de información, desde una mirada general a una fina.
- Tener un propósito claro (por ejemplo descripción, comparación, exploración)
- Integrarlo con otras descripciones de información.

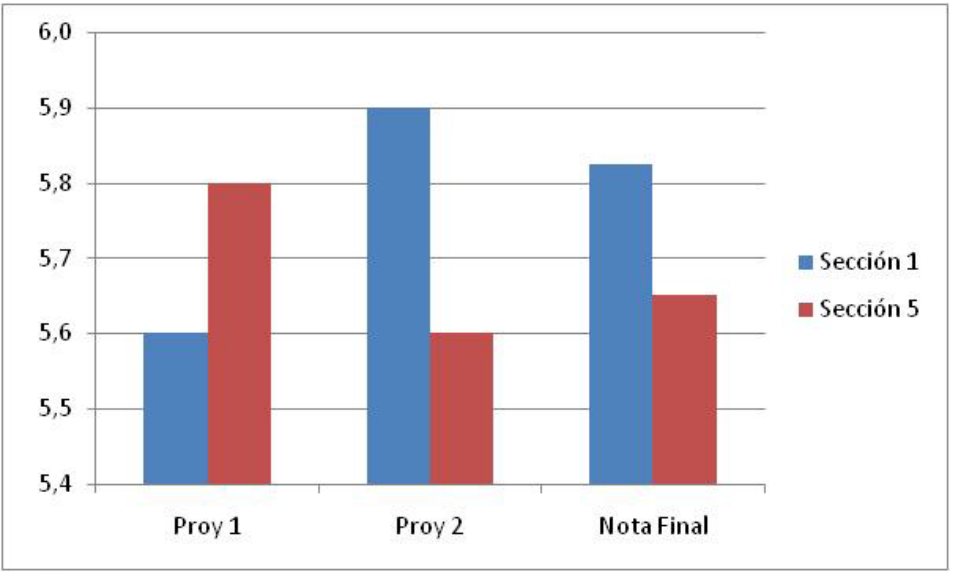
Distribuciones de Datos

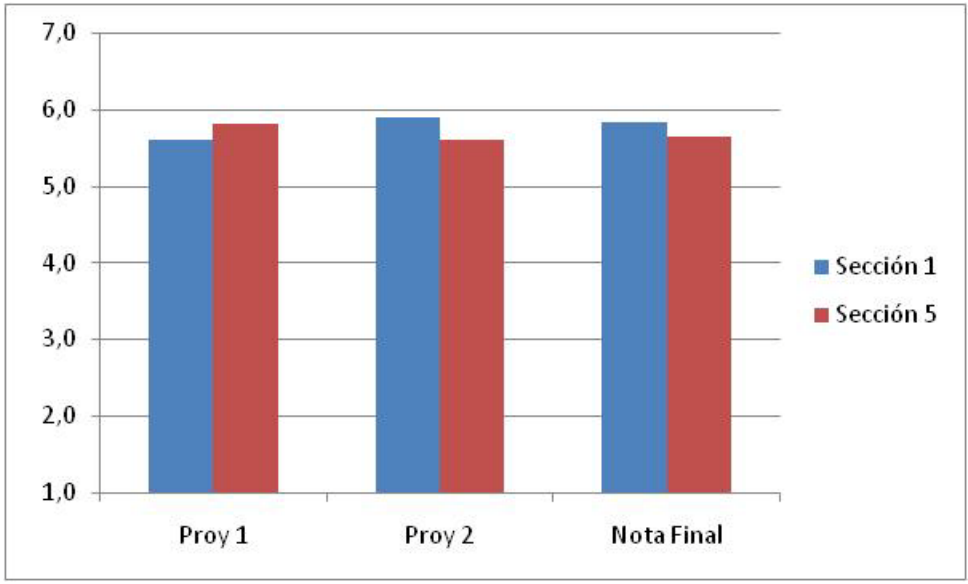
- Mechones 2009



Comparación de Valores para Distintas Categorías

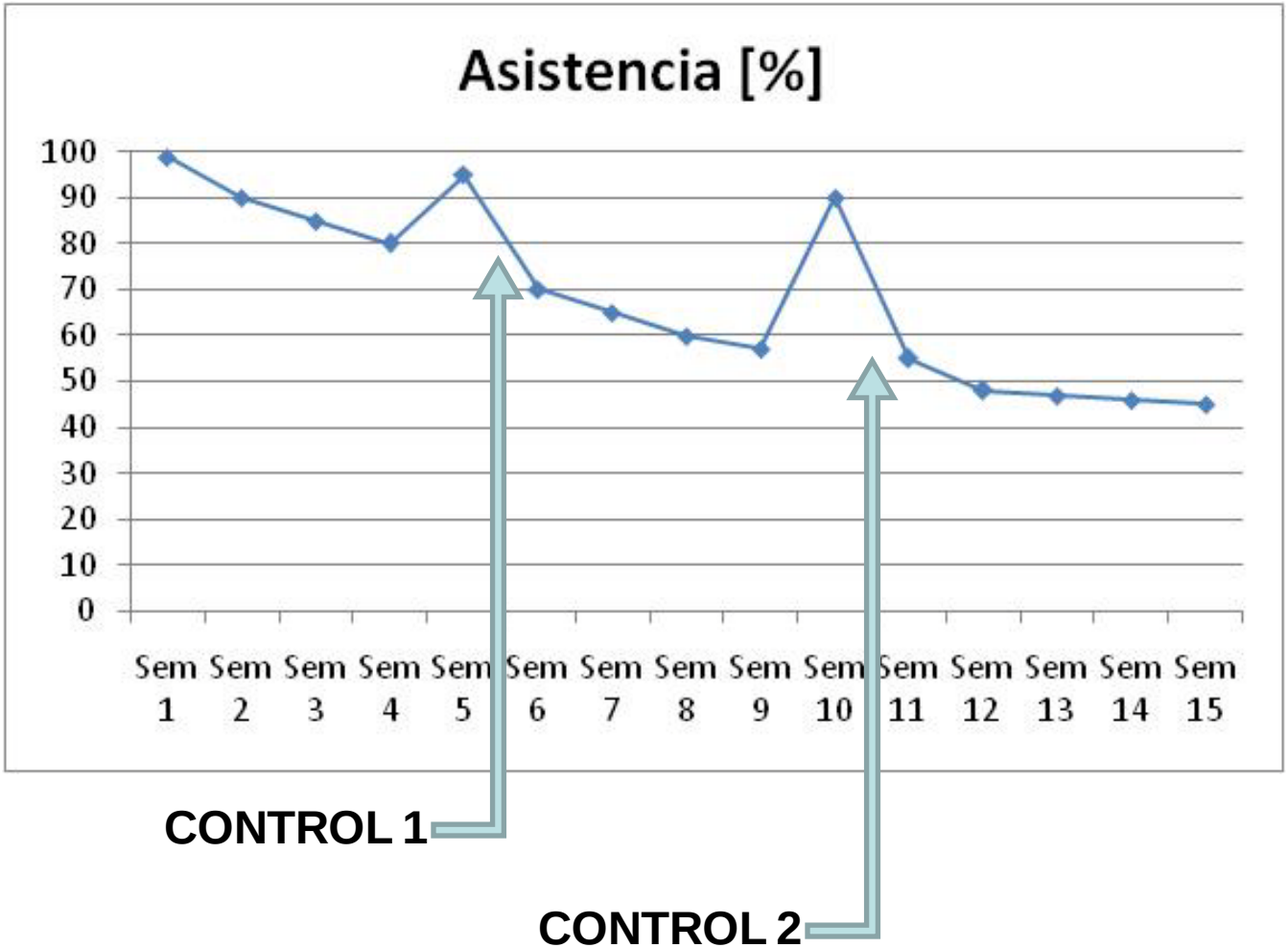
Ojo con escala !!





Series de Tiempo (Tendencias)

	Asistencia
Sem 1	99
Sem 2	90
Sem 3	85
Sem 4	80
Sem 5	95
Sem 6	70
Sem 7	65
Sem 8	60
Sem 9	57
Sem 10	90
Sem 11	55
Sem 12	48
Sem 13	47
Sem 14	46
Sem 15	45



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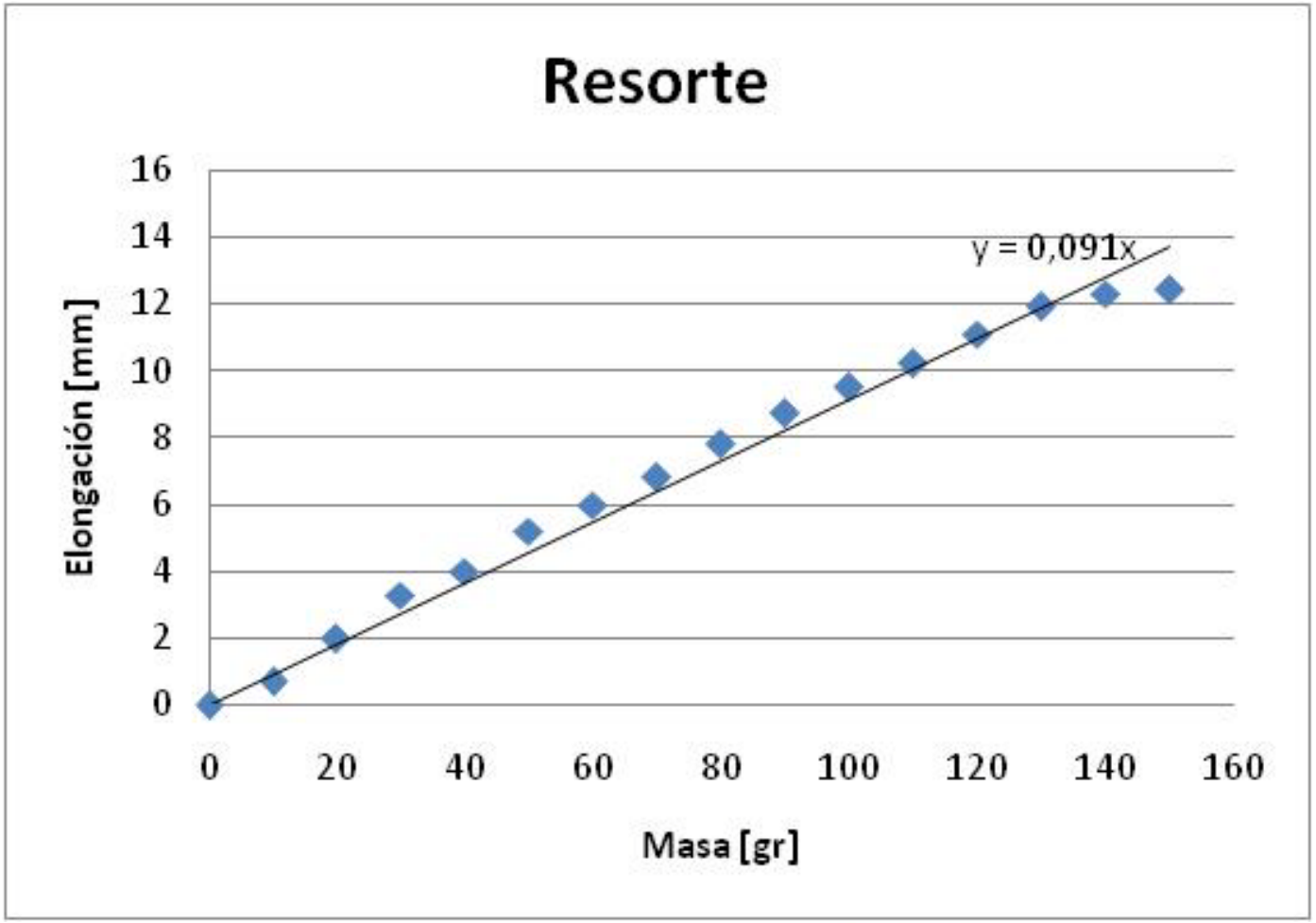
Comparar Datos Experimentales y Teóricos



Presentación de Información

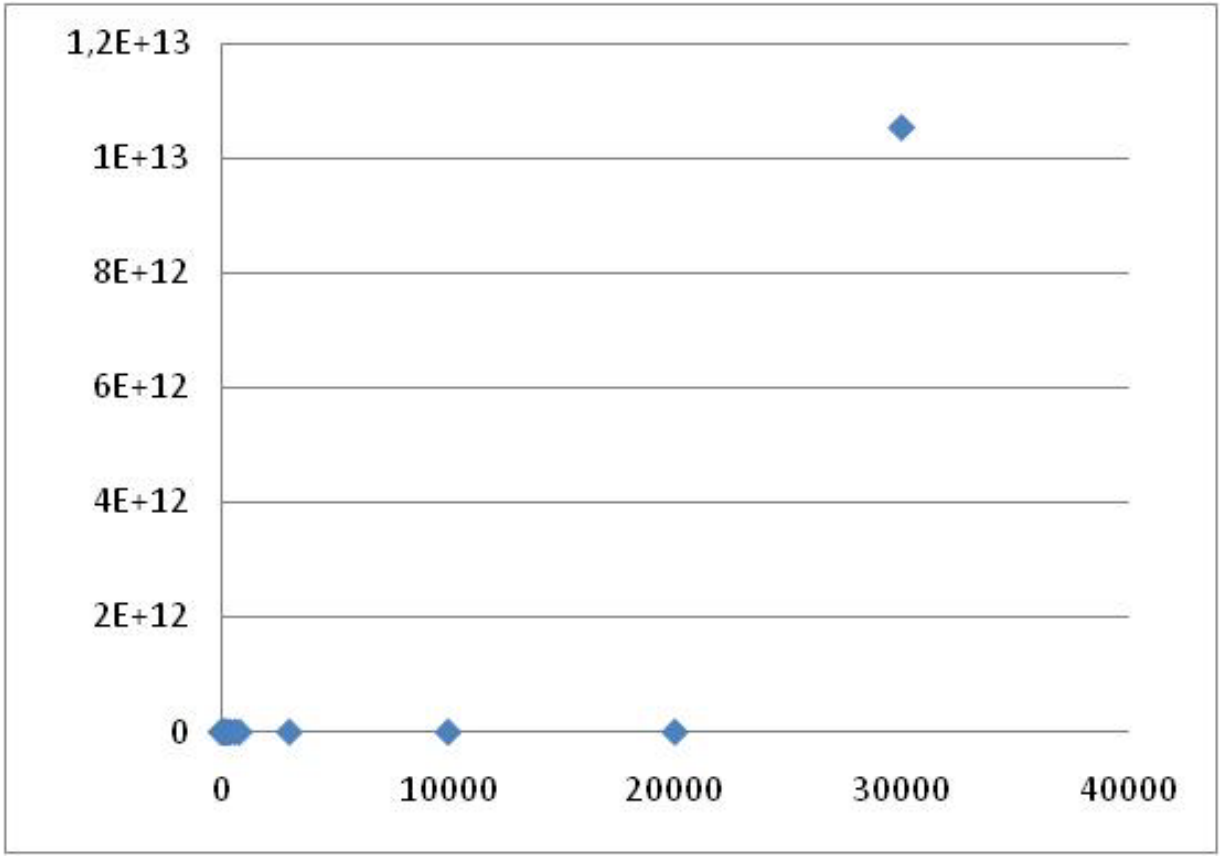
- Usar escalas adecuadas (logarítmica, semi-logarítmica, etc.)
- Más ejemplos ver capítulo 9 libro.

Escala Semi-log

Datos:

x	y
1	1,001
50	1,05124483
100	1,1051157
150	1,16174717
200	1,22128071
300	1,34965648
400	1,49152656
600	1,82157261
800	2,22465148
3000	20,0554512
10000	21916,6813
20000	480340921
30000	1,0527E+13

Graficando:



Pareciera que hay datos “anómalos” al final

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Escala Semi-log

Datos:

x	y
1	1,001
50	1,05124483
100	1,1051157
150	1,16174717
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300	1,34965648
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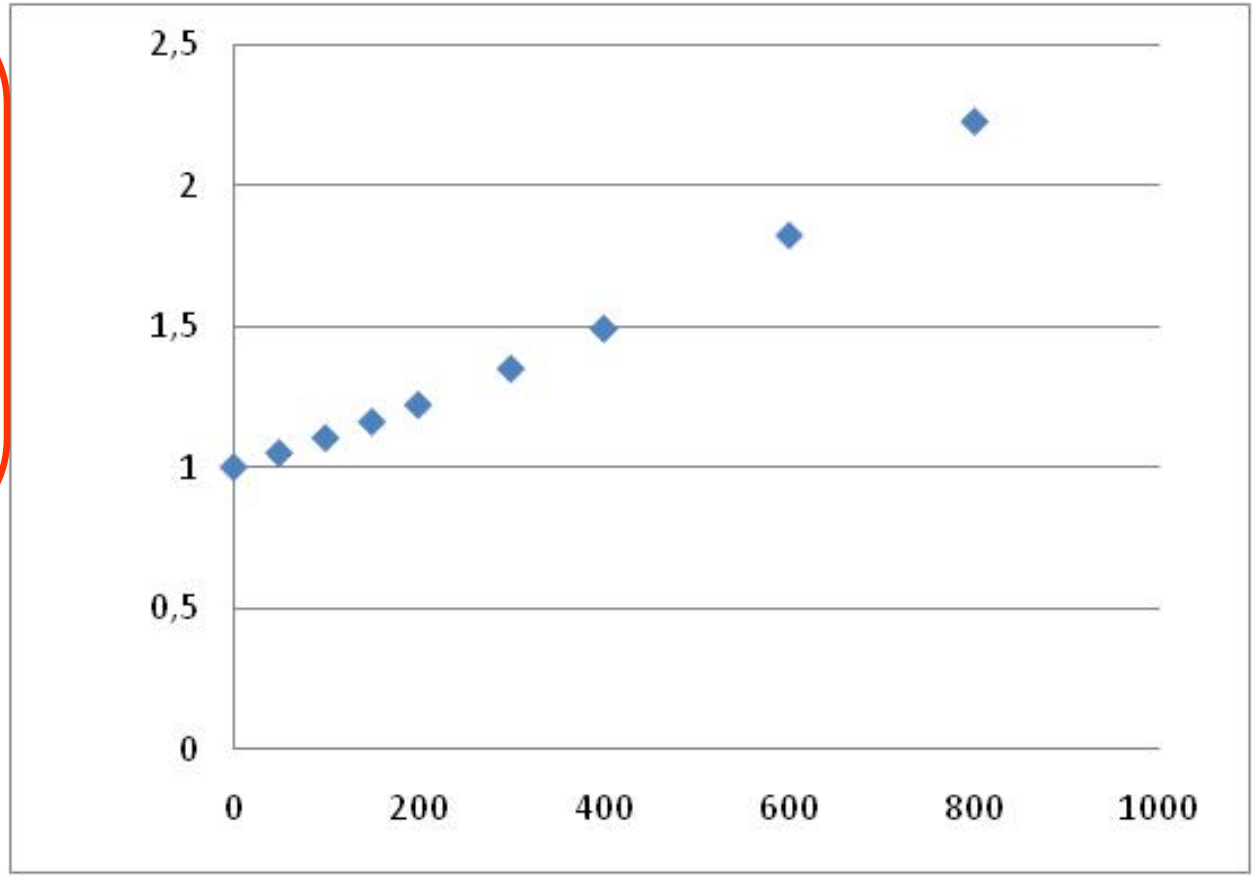
600	1,82157261
800	2,22465148
3000	20,0554512
10000	21916,6813
20000	480340921
30000	1,0527E+13

Sacamos algunos datos y graficamos otra vez:



"Parece" recta

Escala Semi-log

Datos:

x	y
1	1,001
50	1,05124483
100	1,1051157
150	1,16174717
200	1,22128071
300	1,34965648
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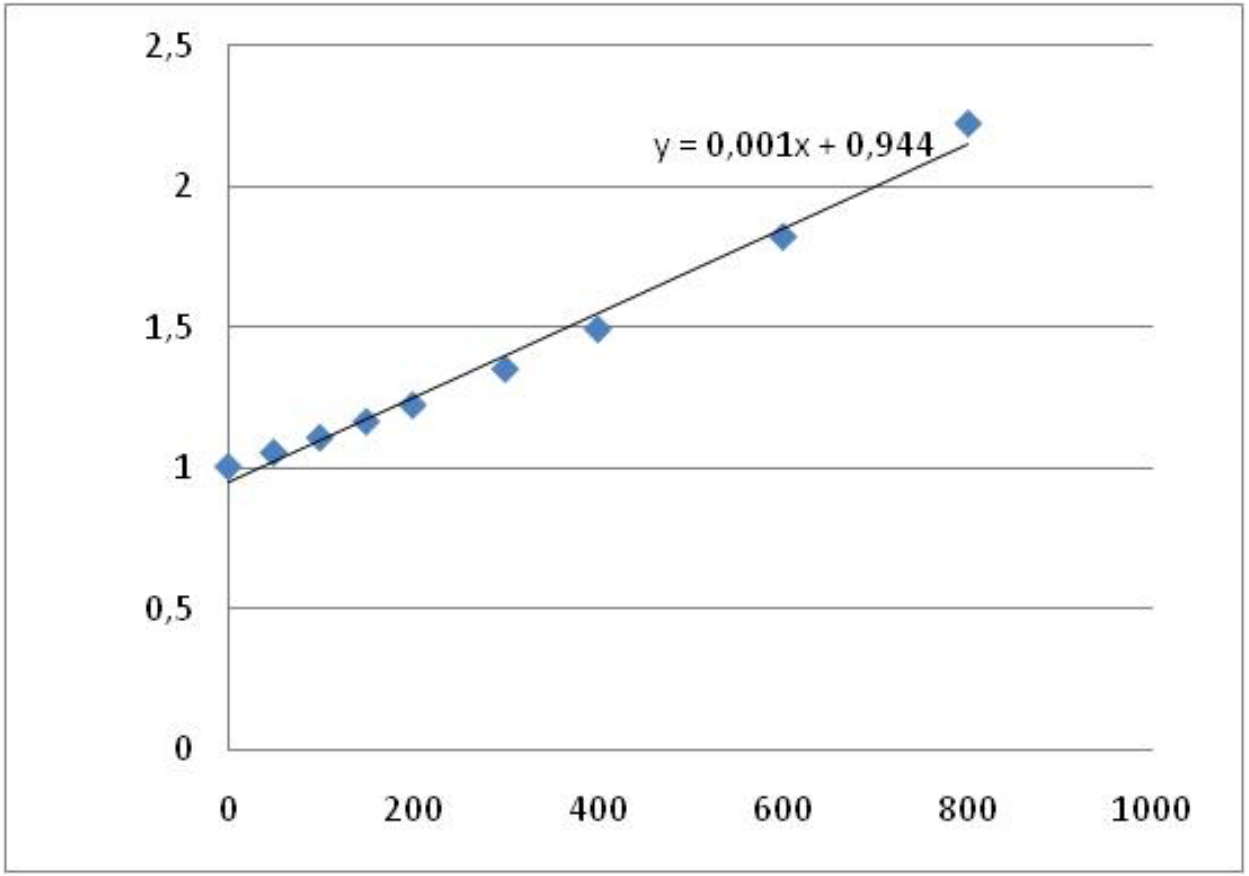
Agregamos curva de tendencia



"Hasta" tiene buena correlación

Escala Semi-log

Datos:

x	y
1	1,001
50	1,05124483
100	1,1051157
150	1,16174717
200	1,22128071
300	1,34965648
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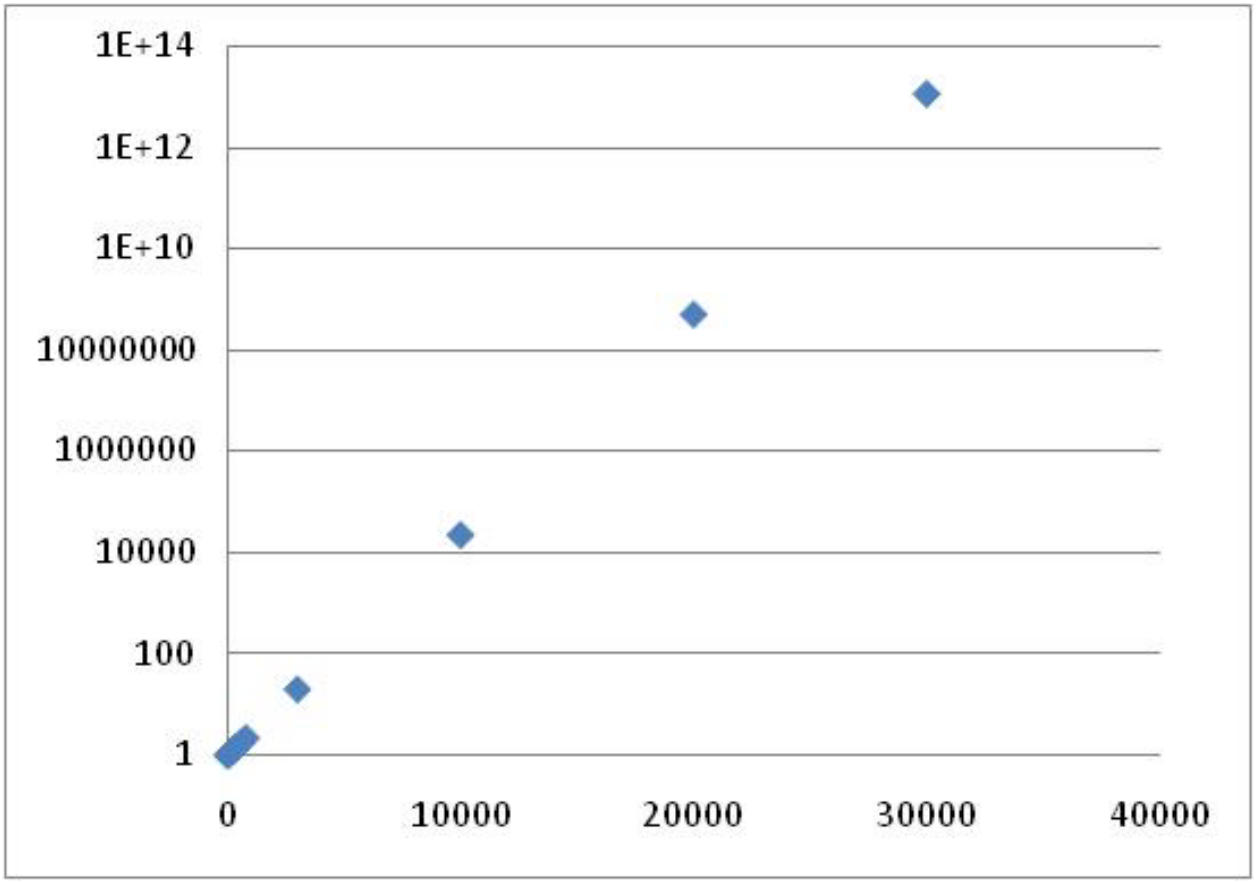
3000	20,0554512
10000	21916,6813
20000	480340921
30000	1,0527E+13

Pero si graficamos en escala semi-logarítmica (en eje y)



Parece recta

Escala Semi-log

Datos:

x	y
1	1,001
50	1,05124483
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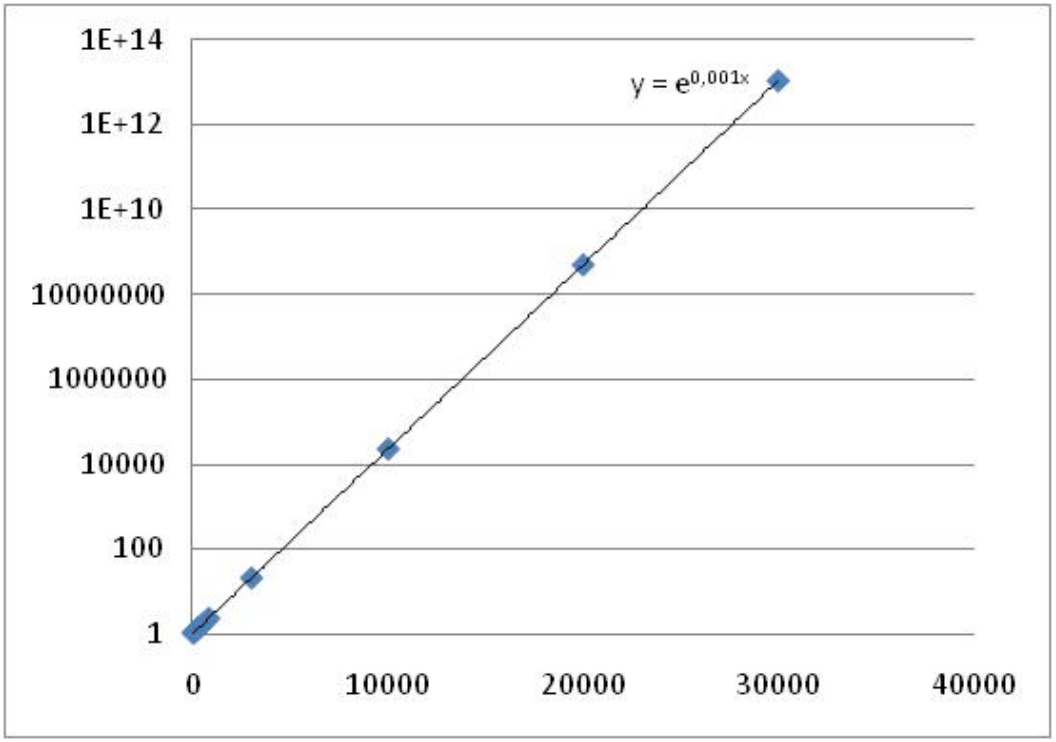
3000	20,0554512
10000	21916,6813
20000	480340921
30000	1,0527E+13

Agregando línea de tendencia exponencial, obtenemos la ecuación con la que se originaron los datos:

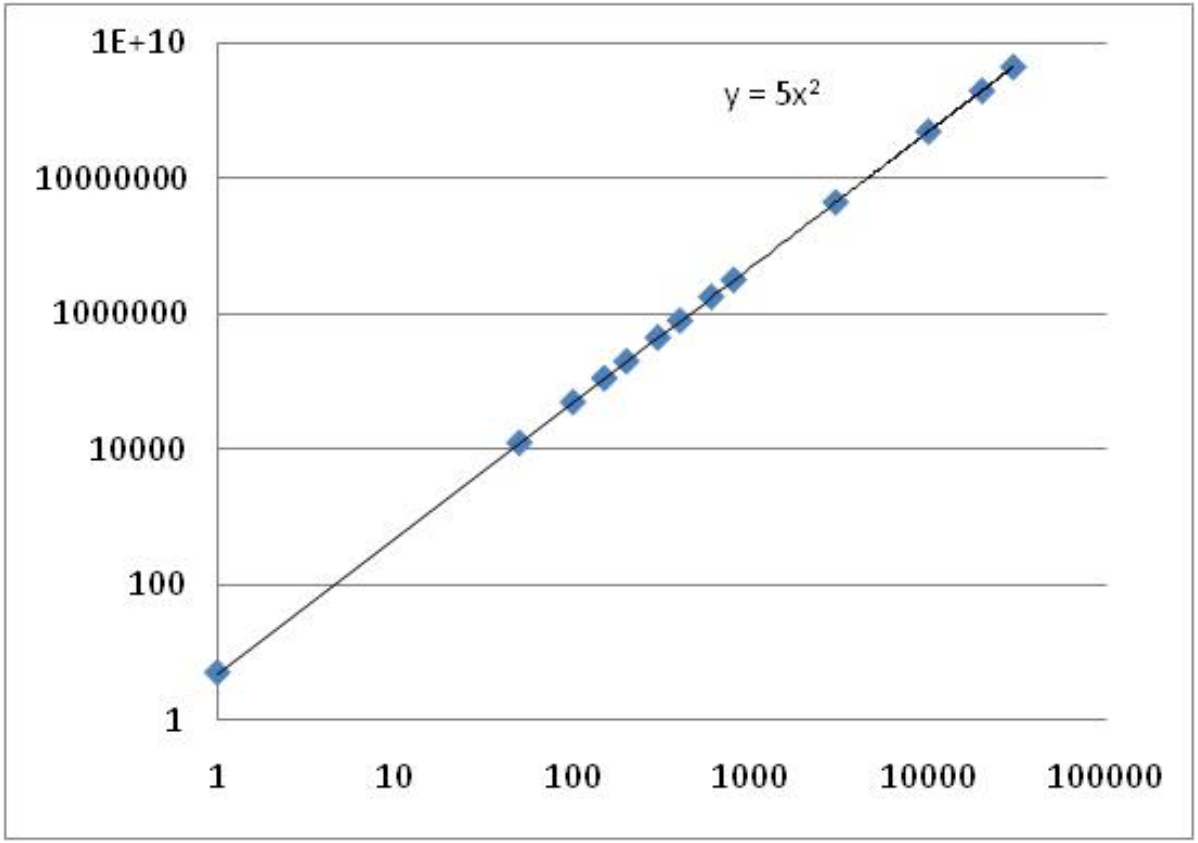


Funciona en general para datos con la forma $y=a \cdot b^x$

La escala log-log es aplicar esto a ambos ejes y funciona con datos de la forma $y=a \cdot x^b$

Escala log-log

La escala log-log es análogo a lo anterior pero aplicando escala logarítmica a ambos ejes y funciona con datos de la forma $y=a \cdot x^b$



¿Qué tiene que ser capaz de hacer un Ingeniero?

Concebir

Diseñar

Implementar

Operar

http://www.cdio.org

Ingeniería
UNIVERSIDAD DE CHILE

Concebir

- Definir requerimientos y metas del sistema
- Definir funciones, conceptos y arquitectura del sistema
- Desarrollar modelos del sistema que permitan su evaluación
- Desarrollar la planificación del proyecto

Diseñar

- Llegar a solución “acabada” y “factible” del problema
- Definir en detalle esta solución
- Evaluar alternativas
- Visualizar y resolver problemas de implementación.

Implementar

- Diseñar el proceso de implementación
- Concebir el proceso de fabricación de Equipos
- Concebir el proceso de Implementación de Software
- Diseñar la implementación e integración de los procesos
- Probar, Verificar, Validar y Certificar
- Gestión de la implementación

Operar

- Diseñar y optimizar operaciones
- Entrenamiento y capacitación de las operaciones
- Soporte durante el ciclo de vida del sistema
- Reconocer la evolución y mejoramiento del sistema
- Manejo de fin de vida útil y desechos
- Gestión de operaciones

Volvamos a Diseño

- Llegar a solución “acabada” y “factible” del problema
- Definir en detalle esta solución

Muchos grupos no tiene resuelto 100% el problema

- Evaluar alternativas

¿Se hizo?

- Visualizar y resolver problemas de implementación.

Ahora aparecerán

Volvamos a Diseño

Otros no siguen recomendaciones respecto a puntos débiles, ensamble de piezas, etc. (tendrán problemas al armar)
Algunos diseños asumen material ”Ideal”, no consideran resistencia y deformación

Afiches (Posters)

- Muy usados en congresos seminarios y curso Taller de Proyecto (próximo semestre)
- Entregar información sin que el observador deba esforzarse
- Debe capturar el interés y atención
- Debe ser fácil de leer y entender

Afiches (Posters)

- Títulos
- Diagramas
- Tablas
- Diagramas de flujo
- Ejemplos táctiles (materiales, partes, etc.)
- Caricaturas
- Fotografías
- Gráficos
- Ilustraciones
- Esquemas

Afiches (Posters)

- Tamaño recomendado:

60x90 cms (24”x36”)

- Letra al menos 18 pts, contraste con fondo
- Dar sentido a flujo de información
- Aplicar síntesis
- Incluir: miembros del grupo, fecha.

Afiches (Posters)

- Poner atención en presentación (limpieza, orden)
- Deben hablar por si mismos

Posters Sessions

UCS

UNIVERSIDADE DE CAXIAS DO SUL

CCET - CENTRO DE CIÊNCIAS EXATAS E TECNOLOGIAS

DEPARTAMENTO DE FÍSICA E QUÍMICA

A FOOD ENGINEERING INTERDISCIPLINARY, INTERACTIVE AND VERY ACTIVE COURSE: TECHNOLOGY OF CEREALS AND BAKING - A COURSE WHERE STUDENTS COOK COLLABORATIVELY WITH THE SENSES

Odoaldo Ivo Rochefort, Helena Libardi and Valquíria Villas-Boas

oirochen@ucs.br, hlibardi@ucs.br, vvillasboas@yahoo.com

Abstract: An elective course called "Technology of Cereals and Baking" (TCB) from the Food Engineering program of the Universidade de Caxias do Sul (UCS), has an interdisciplinary, innovative and experimental approach totally based on the active learning methodology with a strong inclination toward hands-on activities and team work. The methodologies used in the TCB course allow the development of competences and abilities for solving new problems, for communicating ideas, for making decisions, for having initiative, creativity and intellectual autonomy, in a context of respect for the rules of democratic society.

Introduction:

In this work presents an elective course called "Technology of Cereals and Baking" (TCB) from the Food Engineering program at the Universidade de Caxias do Sul where an alternative to the traditional paradigm is developed inserting in the holistic vision, by which the academic study is carried out analyzing the whole context, in contrast with the fragmentary approach of much present pedagogical work developed at the majority of universities.

The TCB course has an interactive and experimental approach totally based on the active learning methodology with a strong inclination toward hands-on activities and team work.

The first part of the activities is designed in a way that the students are going to make mistakes in terms of measuring the quantities, manipulating equipment and raw material, etc... In the second part, students work with recipes on an industrial scale. Some recipes have the objective of recovering the history of the region where UCS is located. At the end of the semester the students participate of a contest where they need to use all the skills and competencies developed during the semester to develop a recipe that they are not familiar with.

The results are great and the conclusion is that success in this kind of hands-on teaching-learning approach is mainly due to group work and collaborative effort that also help developing students' social skills and critical thinking.

"Technology of Cereals And Baking" Course (TCB)

The general objective of this course is to present to the future food engineers the theoretical and practical underpinnings of the processes of grinding cereals, roots and tubers for starches and flours, as well as the main technological processes and equipment used for the manufacture of products like breads, cakes, biscuits, pastry and pasta from a cross-interdisciplinary point of view.

Cooking collaboratively with the senses at TCB

Within the spirit of the TCB course and of an interdisciplinary proposal, activities related to the senses were adapted and are conducted throughout the entire course helping develop abilities and competences of the food engineering students.

Figure 1 – Activities involving the senses of taste and smell

Learning about the raw material used at TCB

Before initiating any procedure for the manufacture of baking products, it is necessary to know more about their characteristics. The quality of the raw material is basic for the success of the final products.

Therefore, the students carry out different tests with the objective of verifying if the raw materials that will be used are adequate for the production.

Figure 2 – Students working at a very active TCB activity

A Challenging Task – Learning about the baking processes

In the very beginning of the course, there is also a challenge to the students that consists in a program of weekly production for a bakery: 500 French rolls weighing 50g each, 200 hot dog rolls weighing 100g each, 100 hamburger rolls weighing 100g each, 30 sweet rolls weighing 300g each, and 100 sweet rolls called "dreams" weighing 80g each.

Figure 3 – Some of the breads and pastry prepared by the students.

Specific Operational Activities

Some specific operational activities are also proposed, such as: (i) the preparation of different types of breads, sweet breads, "dreams" (a Brazilian specialty), "cucas" (another Brazilian specialty of German origin) and croissants; (ii) the preparation of different types of pastry dough and (iii) the preparation of different types of pasta. Some recipes have the objective of recovering the history of the region where UCS is located.

Figure 4 – (a) The preparation of French rolls. (b) Students verifying the consequences of the procedures.

FINAL REMARKS

Throughout the development of the TCB course we have attempted to construct a bridge between the university and the workplace of the food engineer, through the joint diagnosis of problems and the elaboration and evaluation of an educational proposal that must be adapted and have its validity tested in different educational contexts.

One proposal is to stimulate the use of the initiative, creativity, involvement, team responsibility. The students participate a significant amount of new knowledge that is acquired mainly due to the [illegible] activities.

The methodologies used in the TCB course allow the development of competences and abilities for solving new problems, for communicating ideas, for making decisions, for having initiative, creativity and intellectual autonomy, in a context of respect for the rules of democratic society.

The results obtained in this course are very satisfying and the conclusion is that success in this kind of hands-on teaching-learning approach is mainly due to group work and collaborative effort that also help developing students' social skills and critical thinking.

Supported by:

FINEP UCS

PBL AND SERIOUS GAMES

Julian ALVAREZ - alvarez@irit.fr - Vortex Team and LARA Team

Mots clés : Active learning, PBL, Serious Game, Similarity, Video game

OBJECTIVE

The aim is to show similarities between the active learning approach PBL and Serious Games.
Our approach is a pedagogic experience led during one month in the shape of a PBL which subject was to create a Serious Game.
The goal of this work is to study the object Serious Game in order to merge it with PBL by combining their added values

WHAT IS A SERIOUS GAME?

The vocation of a Serious Game is to invite the user to interact with a data-processing application whose intention is to combine at the same time teaching, training, communication, or information aspects, with ludic mechanisms based on video game. The purpose of such an association is thus to give attractive shapes or plots (Game) to didactic contents (Serious).

SERIOUS GAME PROJECT :

- *Six groups of 5 students according to their affinities.*
- *1 month to realise Specification, Paste-up of multimedia, Questionnaires, Journal and Presentation*
- *The students have shown a fine involvement in realizing the project*

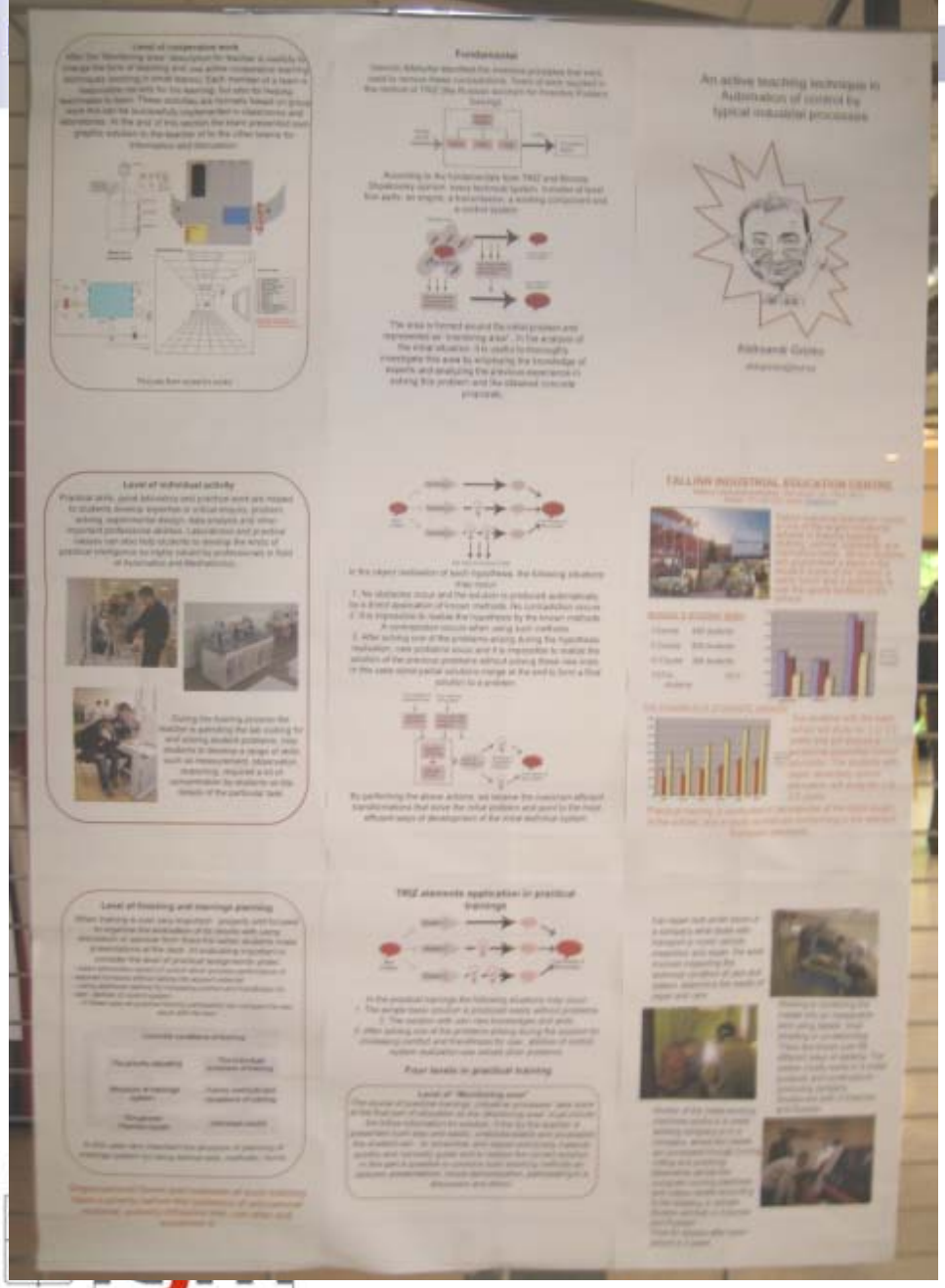
RESULTS

We have found 6 similarities, not exhaustive, between the PBL and the Serious Games. These common points concern as well their pedagogical approach as their questions.
All this will allow us to conclude that it is possible to study the crossed recursivity of these two approaches in order to understand them better and eventually optimize their relationship.

LIST OF SIMILARITIES BETWEEN THE PBL AND THE SERIOUS GAMES:

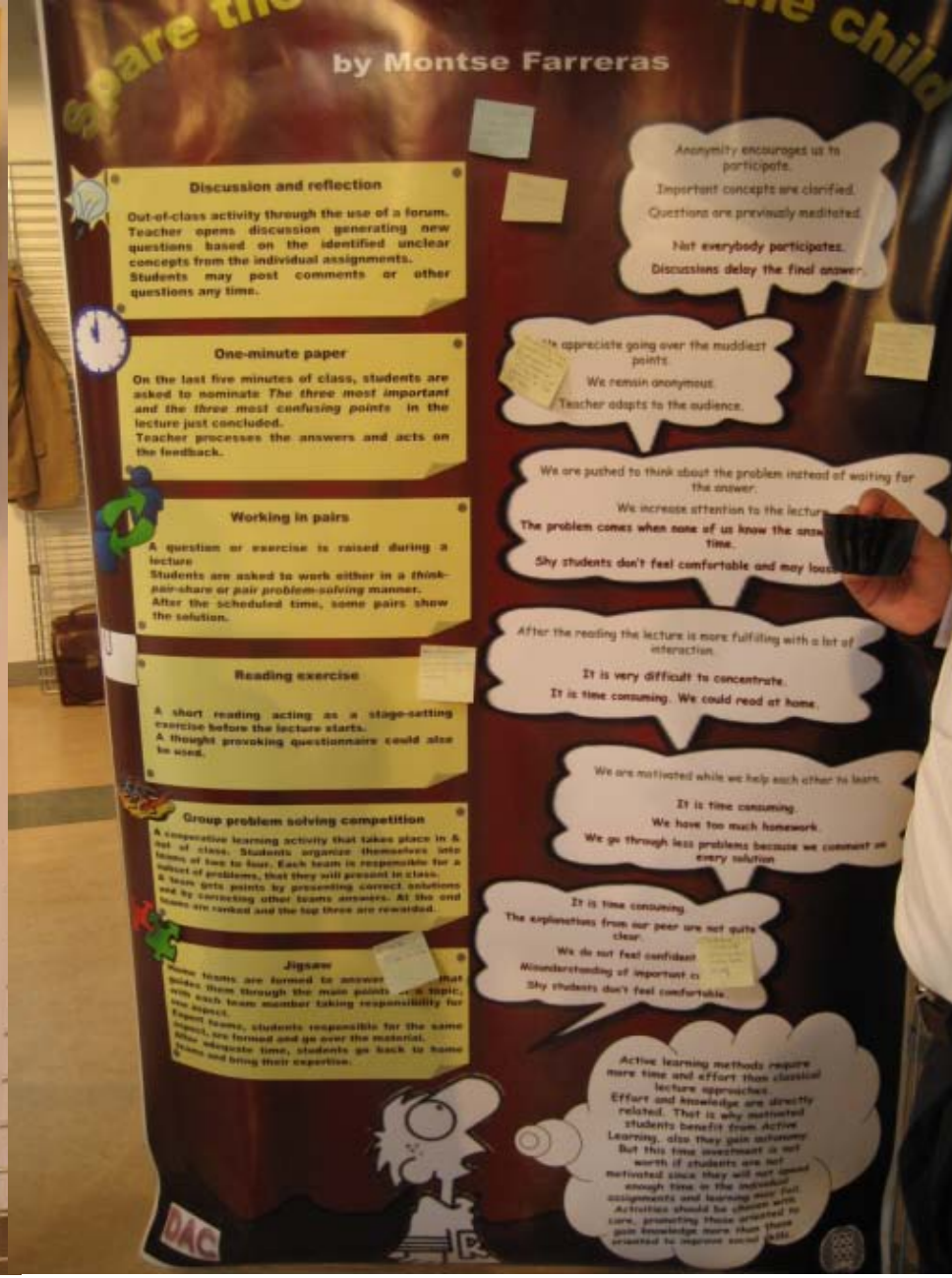
- *The iterative approach*
- *The presence of the ludic aspect*
- *The presence of a mediator*
- *Have to prove to a great number of persons their added values*
- *Have to find adapted systems of valuations*
- *Have to give an answer to a generation with an eagerness of interactivity*

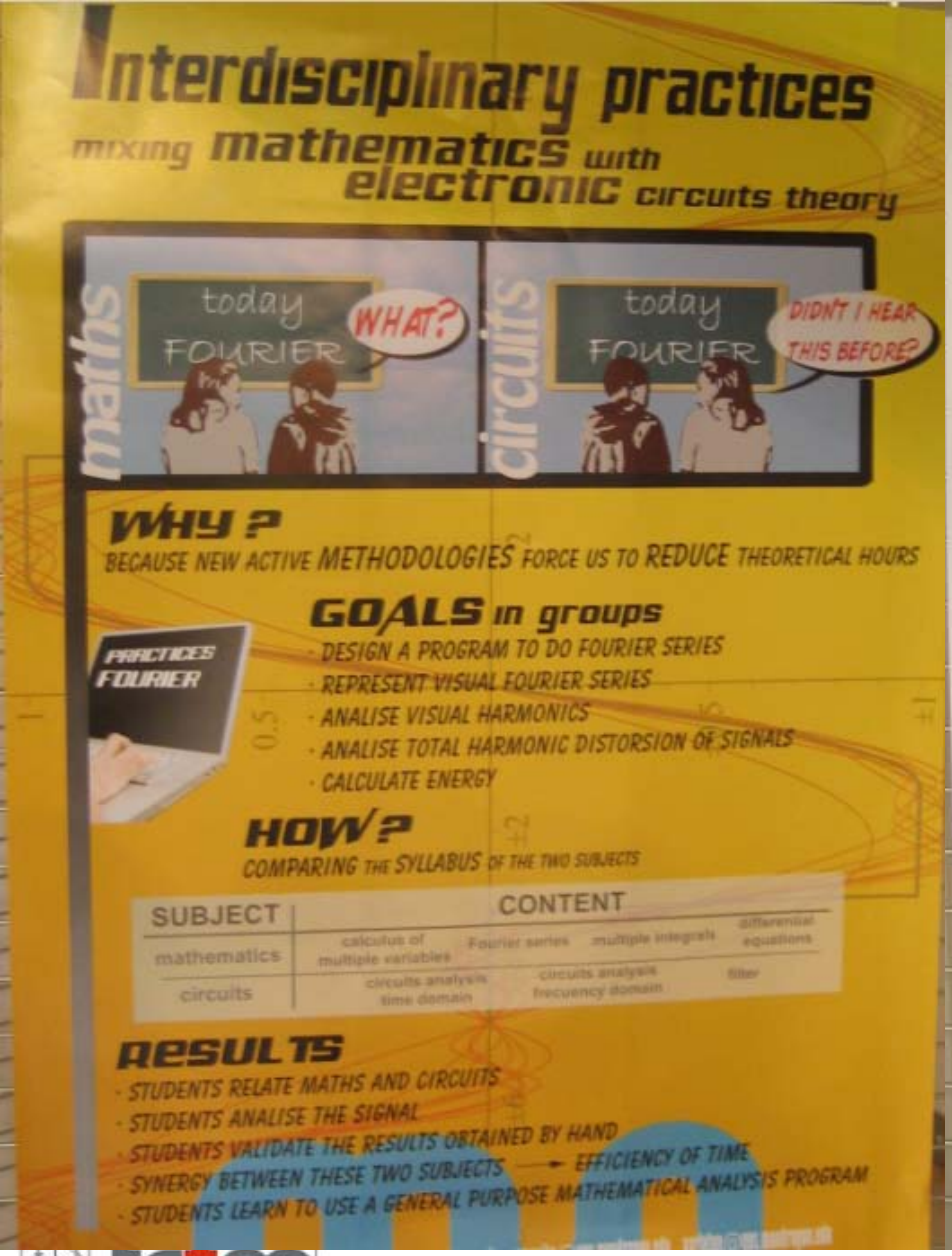
This is not exhaustive




ENGINEERS AND THEIR ROLE IN PUBLIC POLICY
on active learning experience for enhancing the understanding of the state
Universidad de los Andes


BEST
Time 4
Active Learning in Education!
Project Based Learning
PROJECT BASED LEARNING
Thematic Networks
Events on Education
Applications to Events on Education


by Montse Farreras
Discussion and reflection
Out-of-class activity through the use of a forum.
Teacher opens discussion generating new questions based on the identified unclear concepts from the individual assignments.
Students may post comments or other questions any time.
Anonymity encourages us to participate.
Important concepts are clarified.
Questions are previously meditated.
Not everybody participates.
Discussions delay the final answer.
One-minute paper
On the last five minutes of class, students are asked to nominate The three most important and the three most confusing points in the lecture just concluded.
Teacher processes the answers and acts on the feedback.
We remain anonymous.
Teacher adapts to the audience.
Working in pairs
A question or exercise is raised during a lecture
Students are asked to work either in a think-pair-share or pair problem-solving manner.
After the scheduled time, some pairs show the solution.
We are pushed to think about the problem instead of waiting for the answer.
We increase attention to the lecture.
The problem comes when none of us know the answer.
Shy students don't feel comfortable and may lose
Reading exercise
A short reading acting as a stage-setting exercise before the lecture starts.
A thought provoking questionnaire could also be used.
After the reading the lecture is more fulfilling with a lot of interaction.
It is very difficult to concentrate.
It is time consuming. We could read at home.
Group problem solving competition
A cooperative learning activity that takes place in & out of class. Students organize themselves into teams of two to four. Each team is responsible for a subset of problems, that they will present in class. A team gets points by presenting correct solutions and by correcting other teams answers. At the end teams are ranked and the top three are rewarded.
We are motivated while we help each other to learn.
It is time consuming.
We have too much homework.
We go through less problems because we comment on every solution.
Jigsaw
It is time consuming.
The explanations from our peer are not quite clear.
We do not feel confident.
Misunderstanding of important co
Shy students don't feel comfortable.
Active learning methods require more time and effort than classical lecture approaches.
Effort and knowledge are directly related. That is why motivated students benefit from Active Learning, also they gain autonomy.
But this time investment is not worth if students are not motivated since they will not spend enough time in the individual assignments and learning over full.
Activities should be chosen with care, promoting those oriented to gain knowledge more than those oriented to improve social skills.

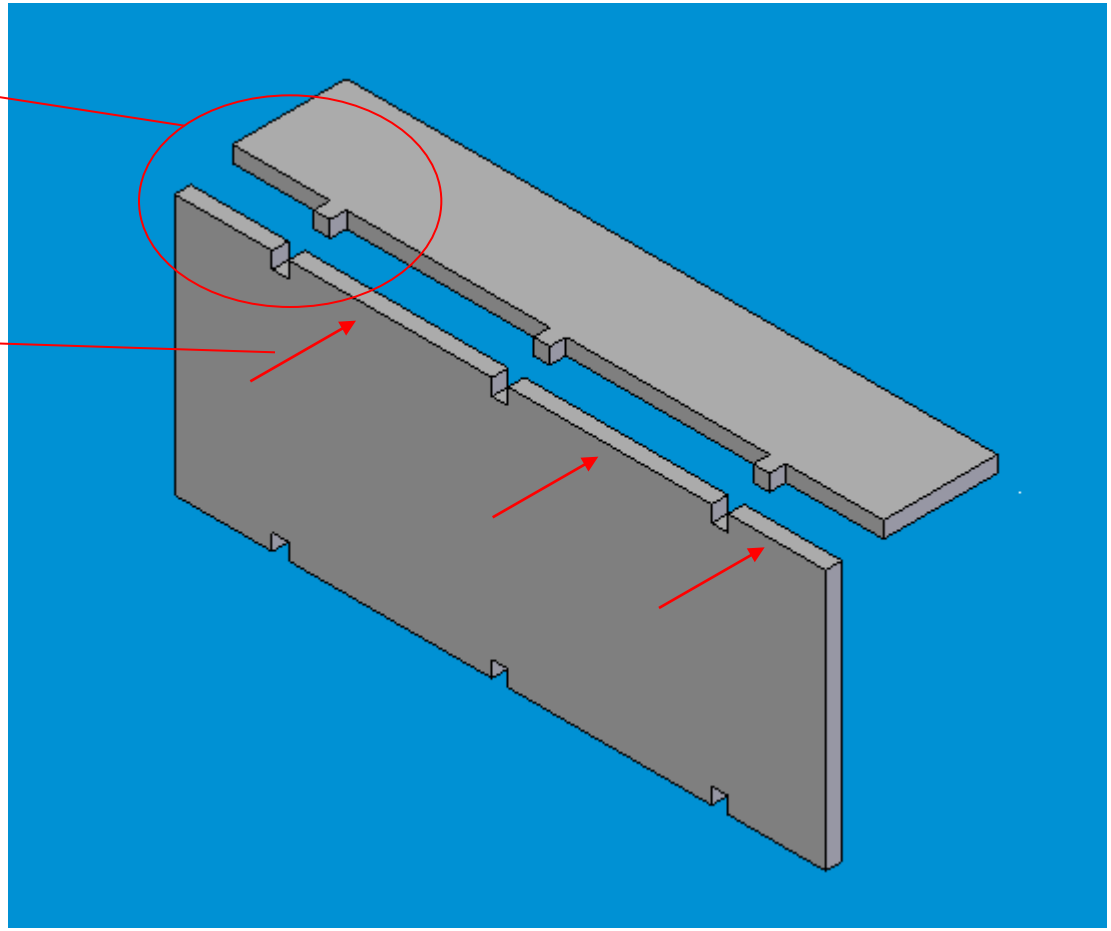

Interdisciplinary practices
mixing mathematics with electronic circuits theory
maths
today FOURIER
WHAT?
circuits
today FOURIER
DIDN'T I HEAR THIS BEFORE?
WHY ?
BECAUSE NEW ACTIVE METHODOLOGIES FORCE US TO REDUCE THEORETICAL HOURS
GOALS in groups
PRACTICES FOURIER
· DESIGN A PROGRAM TO DO FOURIER SERIES
· REPRESENT VISUAL FOURIER SERIES
· ANALISE VISUAL HARMONICS
· ANALISE TOTAL HARMONIC DISTORSION OF SIGNALS
· CALCULATE ENERGY
HOW?
COMPARING THE SYLLABUS OF THE TWO SUBJECTS
SUBJECT
CONTENT
mathematics
calculus of multiple variables
Fourier series
multiple integrals
differential equations
circuits
circuits analysis time domain
circuits analysis frecuency domain
filter
RESULTS
· STUDENTS RELATE MATHS AND CIRCUITS
· STUDENTS ANALISE THE SIGNAL
· STUDENTS VALIDATE THE RESULTS OBTAINED BY HAND
· SYNERGY BETWEEN THESE TWO SUBJECTS → EFFICIENCY OF TIME
· STUDENTS LEARN TO USE A GENERAL PURPOSE MATHEMATICAL ANALYSIS PROGRAM


REDESIGNING DRAWING COURSES FOR ENGINEERS
Carlos F. Rodriguez, Oscar F. Delgado, Hugo A. Quintero
Department of Mechanical Engineering
Universidad de Los Andes, Bogotá, Colombia
How can I say it ?
This is a metallic object with a long cylindrical body (between 20 mm and 150 mm).
Its diameter is between 1 mm and 5 mm.
On one end of the body there is a flat round disk as a head, while on the opposite end there is a pointed tip.
Conception
Technical Specification
Object
Functional Objects Design
Spare Parts Manufacturing
Assembly
Design for Assembly
DEWALT
MANUAL DE ENSAMBLAJE

Recomendaciones

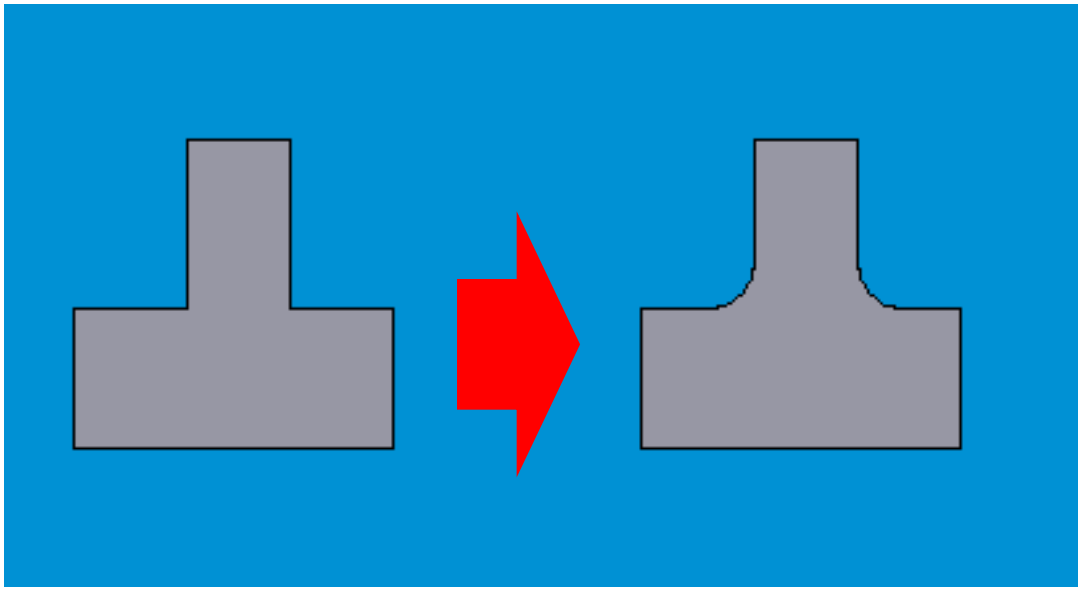
Ensambles

Guías



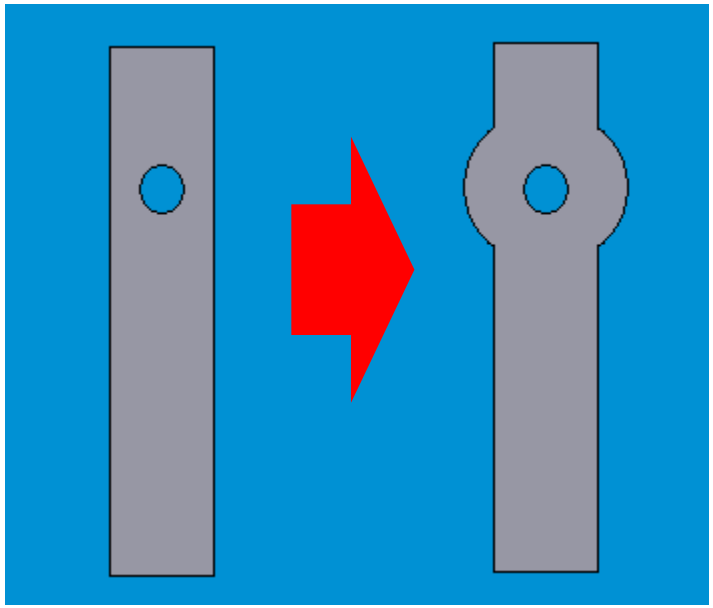
Recomendaciones

- Para piezas móviles usar alambre de acero de 1.5 mm con perforaciones de 1.6 mm.
- Reducir concentración de esfuerzos. “Redondear” esquinas internas



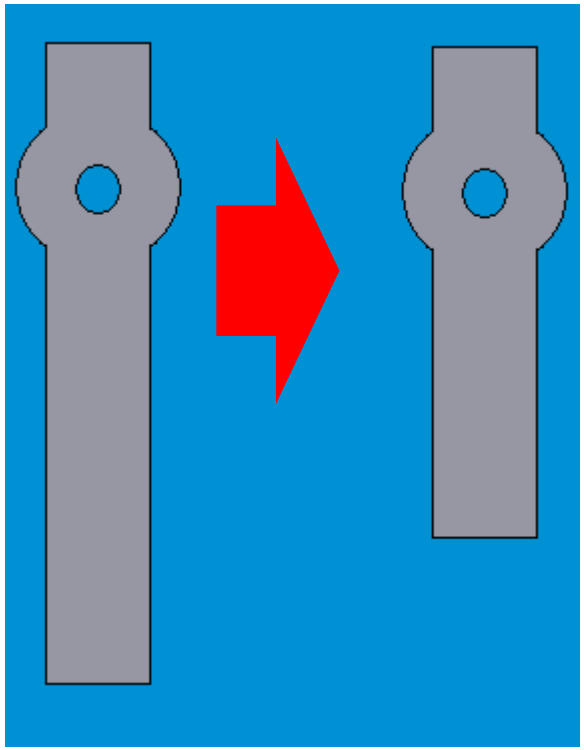
Recomendaciones

- Buscar y reforzar “puntos débiles”



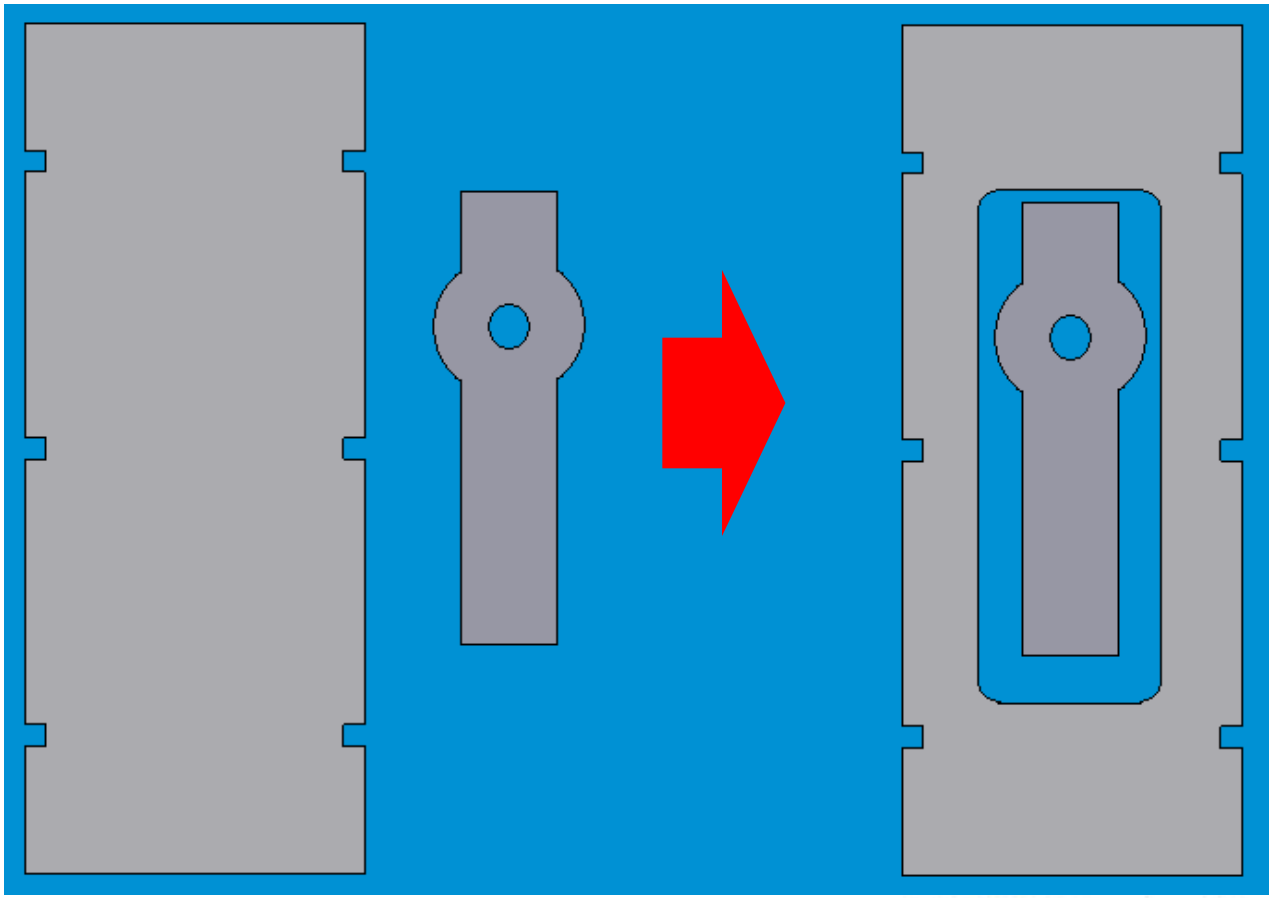
Recomendaciones

- Hacer piezas ajustables, que pueden dimensionarse posteriormente.



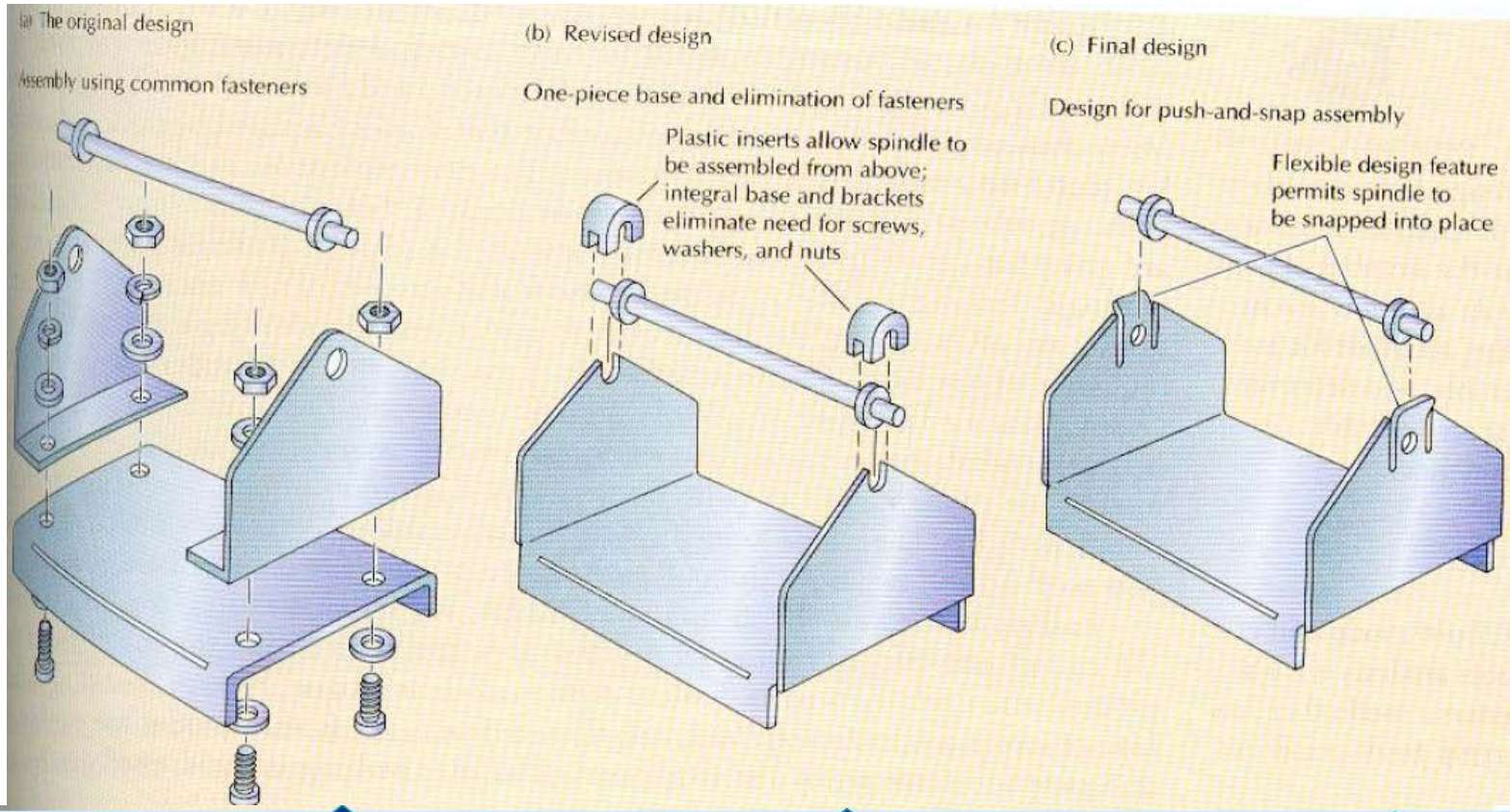
Recomendaciones

- Optimizar material (cuando sea factible).



Recomendaciones

- Simplificar diseño:



24 piezas
84 seg de ensamble

4 piezas
12 seg de ensamble

2 piezas
2 seg de ensamble

Proyecto 2: Planificación

Semana	Actividad
10	Confección de Planos
11	Construcción 1
12	Construcción 2, Prueba preliminar
13	Construcción 3, Prueba final
14	Presentaciones finales

Entrega Planos

- Miércoles 21 de octubre, 12.00 (mediodía)

Actividades siguientes Obligatorias!

11	Ética III	Construcción 1
12	Ética IV	Construcción 2, Prueba preliminar
13	Construcción 3, Prueba final	
14	Presentaciones finales	
15	Análisis Proyecto 2	