# EXPERIENCING ECONOMICS: USING EXPERIMENTS IN TEACHING ECONOMICS

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11TH DEE CONFERENCE
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"**Tell me**, and I forget.
**Show me**, and I may remember.
**Involve me**, and I understand"

*From the Xunzi by Xun Kuang*
*Confucian philosopher*
*(314 - 235 B.C.)*

"**Students need a happy teacher who's
gonna make them excited**"

*From a Prof. Feyman tweet*

# WHY EXPERIMENTS?

We have found that conducting economic experiments is an effective way of getting students to use economics to think about the world around them. Students have no problem grasping the rules for the experiments and love getting involved in economic situations, and then figuring out what happened. Better still, is that they do not always play as rationally as they might, providing the opportunity to learn from their own and others' mistakes.

*Experiencing Economics*

# WARM-UP EXPERIMENT

## Open a browser

## (preferable Firefox or Chrome)



Smartphone



Tablet



Computer

# LOGIN

## Three alternatives to login



https://classex.uni-passau.de/

https://classex.uni-passau.de/bin/index.php?automatic=IXg0bDNWCshSqYeILGEhDg

# Everybody here?



You are logged in. The game has not started yet. Please wait.

# EXPERIENCING ECONOMICS

THE CORE PROJECT

**EXPERIENCING ECONOMICS**

Instructors | Students

coreecon

This ebook is developed by the CORE project. More information and additional resources for learning and teaching can be found at www.core-econ.org.

Version 0.1.0 - Produced by the CORE Book Works

https://www.core-econ.org/experiencing-economics/

# CLASSEX

**CLASSEX**: AN ONLINE TOOL TO RUN INTERACTIVE EXPERIMENTS

https://classex.uni-passau.de

Freeware: free for the instructor, free for the students

Flexible: use ready-made, share, modify, or create experiments

Real-time feedback: prof-stud. and stud-stud.

# ECON CLASS EXPERIMENTS

ECON CLASS EXPERIMENTS

EXPERIENTIAL LEARNING
A NOTE TO STUDENTS
INSTRUCTIONS & FAQ
EXPERIMENTS
ABOUT CLASSEX
ABOUT US
FEEDBACK
○ CONTRIBUTE

ECON CLASS EXPERIMENTS
Experiments with Economics Principles

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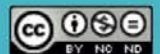# THE CORE PROJECT
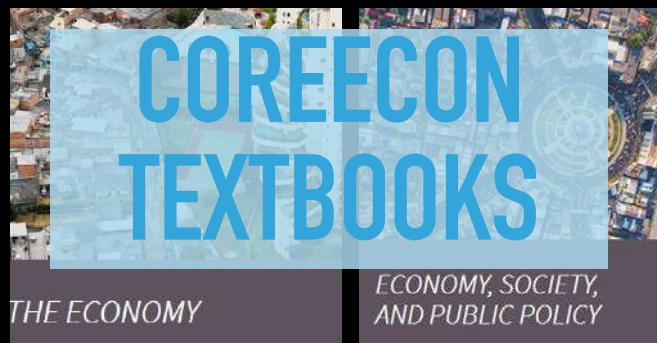
# EXPERIENCING ECONOMICS

Instructors    Students

https://www.core-econ.org/experiencing-economics/

# EXPERIENCING ECONOMICS: A FREE ONLINE BOOK OF THE CORE-PROJECT

*Experiencing Economics* is designed to provide you with pre-programmed **self-contained** experiments that can be run immediately, plus a complete set of materials to help you maximize the benefits of using experiments in your teaching.

- Introductory course
- Topic course
- Experimental method course
- …

# EXPERIENCING ECONOMICS: A PUBLIC GOOD GAME

## INSTRUCTOR

### 1 Public goods game

1.1 Introduction

1.2 Requirements

1.3 Description of the experiment

1.4 Step-by-step guide

1.5 Student instructions

1.6 Predictions

1.7 Discussion

1.8 Homework questions

1.9 Further reading

1.10 Instructor experience

Timing: 10-15' + instructions
Resources: browser
Number of participants: >8

Detailed instructions
Advanced settings (optional)
*Cheat sheet*

Predictions &
What might go differently

A guide for the after-the-experiment discussion

Actual experience from instructors who have used the experiment

## STUDENT



**Student instructions**

This experiment consists of 10 rounds. You will be in a group of four students and will remain in the same group for all 10 rounds. You will not know who the other three members of your group are. In each round, you will receive 20 tokens and you must decide how many tokens to contribute in a project; you can contribute any number between 0 and 20 tokens. You will keep any remaining tokens for yourself. Your screen will look like Figure A.

**Figure A** The classEx contribution screen

After all the members of your group have contributed, you will receive feedback on the total contribution to your project and on the tokens you gained in that round (your 'income'), as well as the number of tokens you have accumulated so far (Figure B).

dedicated webpage and PDF

# A PUBLIC GOOD GAME

Based on Benedikt Herrman, Christian Thöni, Simon Gächter. 2008. "Antisocial Punishment Across Societies" Science Vol. 319 (5868):1362-1367

Covered in Section 4.7 in *The Economy* and Sections 2.9 in *Economy, Society, and Public Policy*

## Instructions

- You play in groups of **4 players for 10 rounds**. The composition of the group is the same in all 10 rounds.
- At the beginning of each round, **each player receives an endowment of 20** tokens and can decide **how many tokens to contribute to the common project.**
- Each token contributed to the project will be **multiplied by 1.6 and distributed equally among all 4 members of the group**. Therefore, each player receives 0.4 tokens for each token contributed to the project by any member.

PAYOFFS = YOUR TOTAL TOKENS AT THE END OF THE GAME

# SCREENSHOTS



**Your endowment = 20 tokens**

**Your contribution in this round to the project:**

submit



Feedback round 1
Your contribution to the project in this round = 15 tokens.
Sum of contributions in your group = 20 tokens.
Income from retained tokens = 5 tokens
Income from the project = (20 x 0.4) = 8 tokens.
**Your total income in this round** (5 tokens + 8 tokens) **= 13.**

Your income over all periods = 13 tokens.

The other participants in your group contributed:
Role 1 : 0 tokens
Role 2 : 5 tokens
Role 3 : 0 tokens
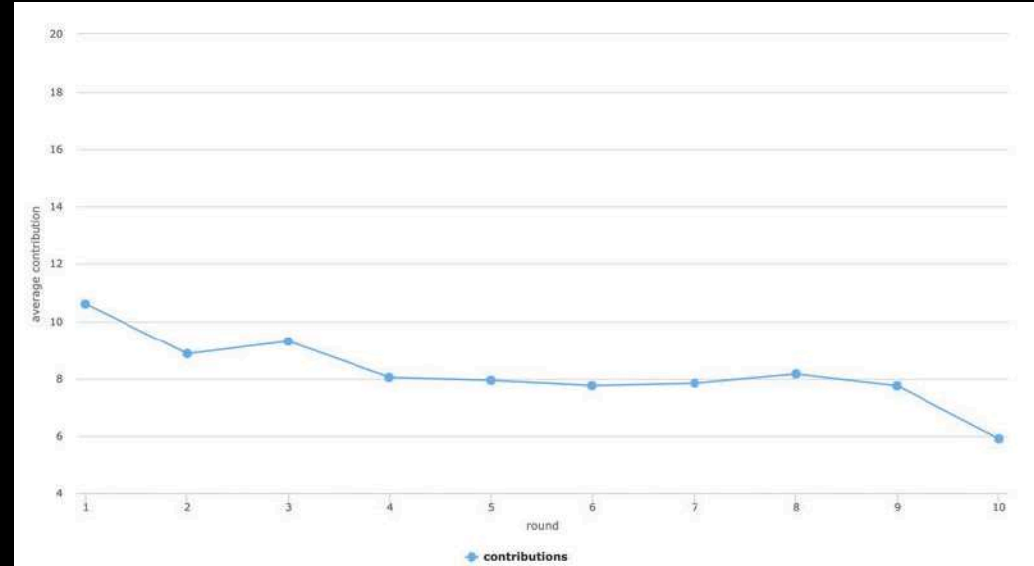


**Figure 1.10.** Average contributions without punishments. Session ran online at Pompeu Fabra University on 6 October 2020 with a group of 99 first-year students.
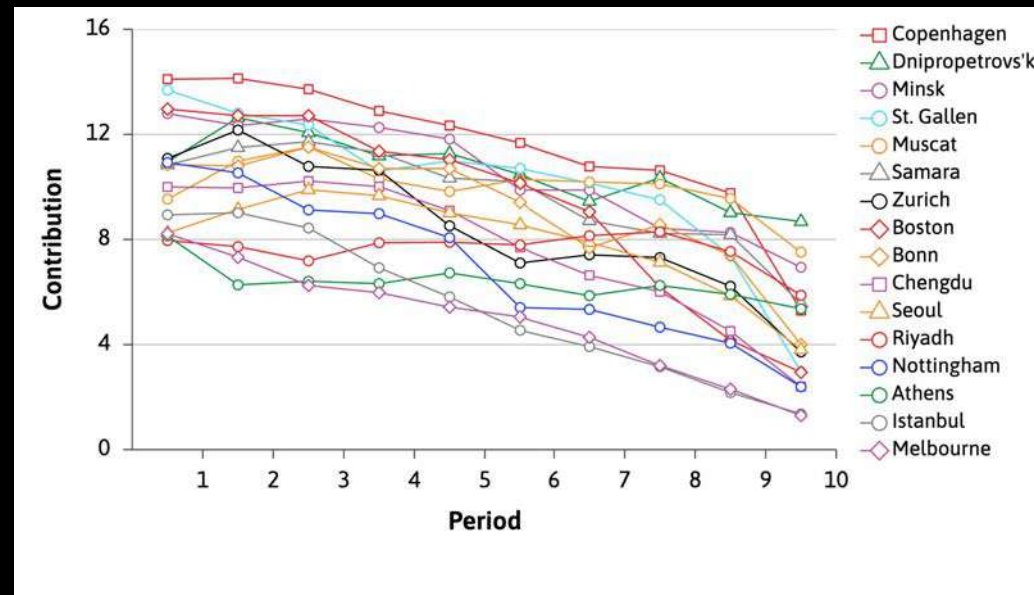


**Figure 4.9a** Worldwide public goods experiments: Contributions over 10 periods.

# A PUBLIC GOOD GAME WITH PENALTIES

Covered in Section 4.7 in *The Economy* and Sections 2.9 in *Economy, Society, and Public Policy*

## Instructions for Stage 2: penalties

From now on, we add a second stage to each round.

**Stage 1**: It remains the same and you have to choose how many of your 20 tokens to contribute to the common project of your group.

**Stage 2:** You have the possibility to punish other group members after you see their contributions. **For each token you pay on punishment, the punished member's payoff is reduced by 3 tokens.** You can pay a maximum of 10 tokens on punishment per member of your group. Each member of your group can also pay a maximum 10 tokens each for punishing you or other members of your group. If you don't want to punish other group members, please enter 0.

Background calculations are made in the following way:
- You gain tokens from your endowment and the common project.
- Afterwards, **you loose tokens if other players punish you.** Punishment can never be larger than the amount of tokens you gained in this round.
- Finally, **the tokens you paid on punishment will be subtracted from your tokens**. Theoretically it is therefore possible to leave a round with negative income.

# STUDENT'S SCREENSHOTS WITH PENALTIES

**Ex** class

**Your endowment = 20 tokens**

**Your contribution in this round to the project:**

submit

---

**Ex** class

<u>Feedback round 1 (before deductions)</u>
Your contribution to the project in this round = 12 tokens.
Sum of contributions in your group = 20 tokens.
Income from retained tokens = 8 tokens
Income from the project = (20 x 0.4) = 8 tokens.
**Your total income in this round** (8 tokens + 8 tokens) **= 16.**

Your income over all periods = 0 tokens.

The other participants in your group contributed:
Role 1 : 0 tokens
Role 2 : 0 tokens
Role 3 : 8 tokens

**How many tokens do you want to pay to punish role 1?**

**How many tokens do you want to pay to punish role 2?**

**How many tokens do you want to pay to punish role 3?**

submit

# OUTCOMES
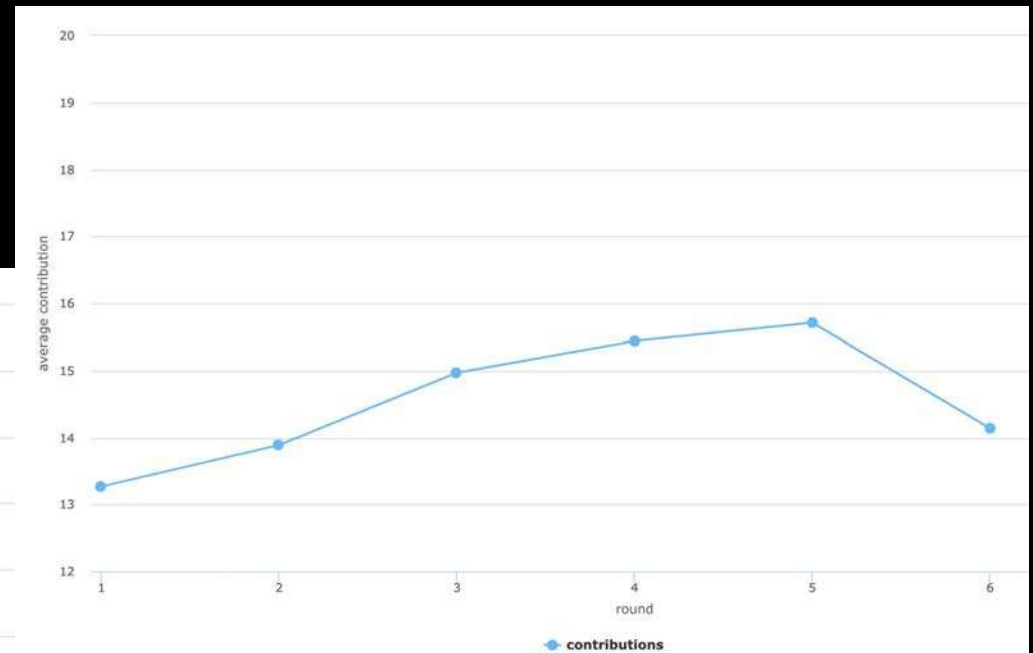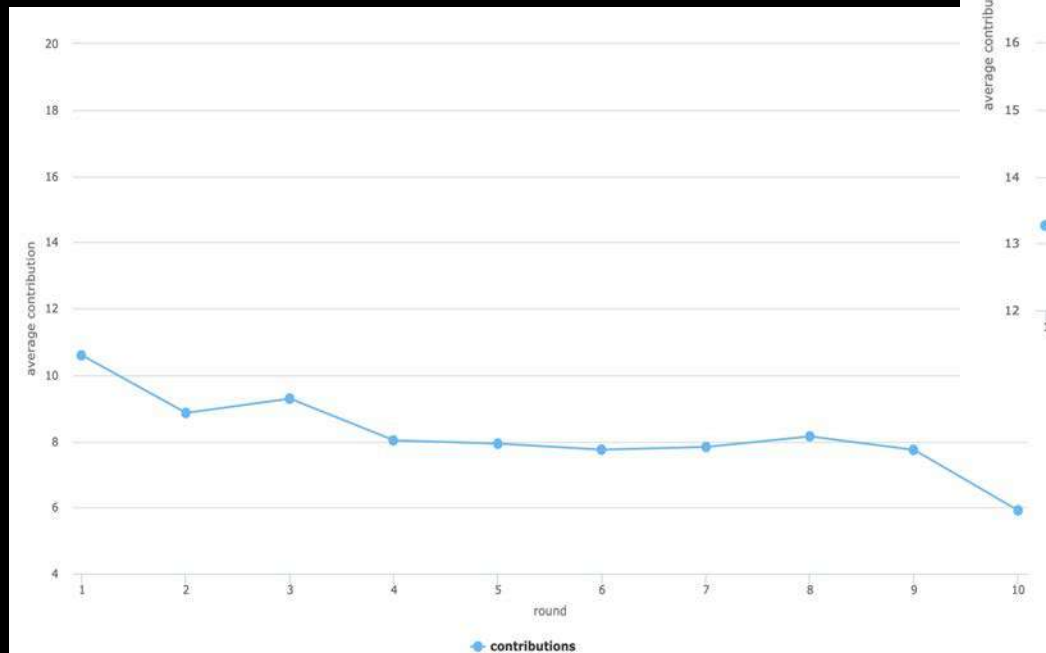


Figure 1.10 Average contributions without punishments (left graph) and with punishments (right graph). Game played online at Pompeu Fabra University on 6 October 2020 with a group of 99 first-year students.

ECON CLASS EXPERIMENTS
Experiments with Economics Principles

# ECON CLASS EXPERIMENTS

A set of market experiments complemented with detailed instructor's and student's instructions, warmup-exercises and problem sets. All experiments are implemented in the free online tool classEx to be run in the classroom with the use of mobile devices. They are based on the book by Ted Bergstrom and John Miller and can be directly run with no need for printing out material or installing software.

## Well designed experiments

We provide a set of experiments which have been played more than a thousand times all around the globe. Experiments are based on the seminal book by Ted Bergstrom and John Miller. Experiments are well calibrated and provide robust results.

## Integrated teaching concept

All experiments come with fully detailed student's and instructor's manual. Warm-up exercise help testing that students understand the rules of the market. The data form the experiment is collected in a spreadsheet and can be used in the problem sets.
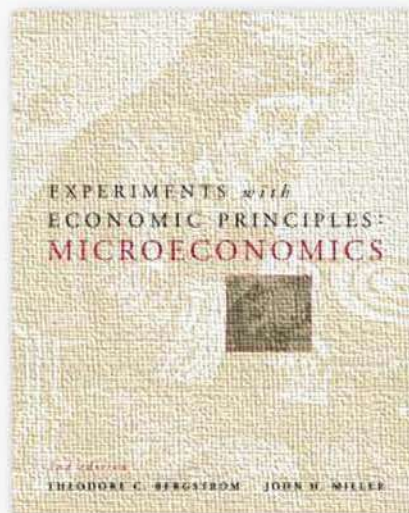
## classEx and mobile devices

All experiments are fully implemented with classEx, a free online tool to run experiments in the classroom with mobile devices. All you need is free classEx login credentials. Students log in directly with their mobile devices to the webpage and are ready to participate.

## Fast and ready-to-use

No need for printing out and distributing personal information sheets. No need to collect data or participation by hand. All this is done by classEx. Results are immediately displayed and data automatically collected in a spreadsheet format. This saves time and generate dynamism in the classroom.

EXPERIMENTS *with* ECONOMIC PRINCIPLES: **MICROECONOMICS**

THEODORE C. BERGSTROM    JOHN M. MILLER

+

class Ex

https://econclassexperiments.com/

# ECON CLASS EXPERIMENTS

## List of experiments

Click on the title of the experiment to access student's and instructor's material.
In classEx, experiments and warm-up exercises are located in the *econ-class experiments* folder.

### The Apple Market: A simple trading-pit experiment

This is a simple trading-pit experiment and is commonly used as the first encounter of students with an experiment in the classroom. It introduces the concepts of supply and the demand, as well as buyer surplus and seller profits.

### The Fish Market: More is not always better

This experiment explores the effects of a shift in the supply curve on price and quantity. It also introduces the notion of sunk costs.

### A Tax in the Apple Market: Who pays the tax?

This experiment introduces a per unit tax in the Apple Market, but with a richer distribution of types. It runs three sessions of the same market: without taxes, with an excise tax paid by sellers, and with an excise tax paid by buyers. It also helps on studying tax incidence and excess burden.

### The Coal Market: Pollution, Pigouvian taxes and permits

In this experiment, students experience the effects of a negative externality, and observe how an appropriately chosen tax or a fix supply of marketable pollution permits may recover efficiency.

## Experiments in the pipeline
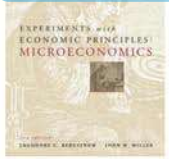
The following experiments are already implemented in classEx. They can be found in the *microeconomics* folder. Their implementation in classEx follows the design described in the original book by Ted Bergstrom and John Miller, but we are still in the process of updating the instructions.

- The **Plane Tickets Market**: Monopolies and cartels [name in classEx: Monopoly Session 1 & Monopoly Session 2-4]

- The **Restaurant Market**: Short and long run economics [name in classEx: Entry and Exit]

- The **Smartphone Market**: Network externalities [name in classEx: Network Externalities Session 1]

- The **Labor Market**: Minimum wage and unemployment [name in classEx: Minimum Wage]

# OTHER READY-MADE EXPERIMENTS IN CLASSEX

## MICROECONOMICS

microeconomics

...re based on Bergstrom & Miller (2000): Experiments with Economic Principles. We adapted the experiments for classEx. You can find the adapted material as PDF download at econclassexperiments.com. The adapted experiments can be found in the folder in econ class experiments in classEx.

| | | | |
|---|---|---|---|
| The Apple Market | play view | Based on Experiments with Economic Principles by Bergstrom, Giamattei, Llavador and Miller. https://econclassexperiments.com | |
| The Fish Market | play view | Based on Experiments with Economic Principles by Bergstrom, Giamattei, Llavador and Miller. https://econclassexperiments.com | |
| Apple Market with a Tax | play view | Based on Experiments with Economic Principles by Bergstrom, Giamattei, Llavador and Miller. https://econclassexperiments.com | |
| Minimum Wage | play view | Implemented at Universitat Pompe... Contact: Prof. Humberto Llavador Based on Bergstrom & Miller (2000... Economic Principles. Experiment 5. | |
| Monopoly Session 1 | play view | Implemented at Universitat Pompe... Contact: Prof. Humberto Llavador | |

## STANDARD GAMES

standard games

| | | | |
|---|---|---|---|
| Prisoners dilemma (framed) | play view | In groups of two, pla... "confess". If both den... Confessing on the co... individual payoff. ... | |
| Prisoners dilemma (neutral) | play view | Uses the system of th... (framed)" but withou... | |
| Stag-Hunt Game | play view | A coordination game... solutions differ from... groups of two. If bot... hare, the stag hunter | |
| Beauty Contest | play view | All participants are a... between 0 and 100. T... whose number is closest to p times the average of all numbers submitted, where ... more | |

## MACROECONOMICS

macroeconomics

| | | | |
|---|---|---|---|
| Keynesian Multiplier | play view | Subjects decide across 5 rounds on their consumption without yet knowing their income, as this depends on the consumption of all subjects plus fixed investment. Reaching a target of 0.8 of their incom ... more | |
| Coordination game: Investment | play view | If both players invest, they reach the highest payoff. But if one player invests while the other does not, the investor's payoff is reduced to zero. The experiment comes with two different framings ... more | |
| Face Beauty Contest | play view | Keynesian style face beauty contest where participants have to pick the two prettiest faces from a set of 8 faces. The participant who chooses the most selected pair wins. Two faces are in black and w ... more | |
| The consumption function: income | play view | Consumption behaviour for different levels of income is elicited and can be used to show the effect of consumption varying with a different income close to a Keynesian consumption function. Johann ... more | |
| The consumption function: savings | play view | Savings behaviour is elicited for different interest rates and ... |

## ENVIRONMENTAL ECONOMICS

| | | | |
|---|---|---|---|
| Fishing pond | play view | The tragedy of the commons mechanism is applied to the natural resource fish. Participants share a fish pond and individually have an incentive to overfish the pond. | |
| Fish pond (with punishment) | play view | The tragedy of the commons mechanism is applied to the natural resource fish. Participants share a fish pond and individually have an incentive to overfish the pond. Participants can try out if punish ... more | |
| pollution experiment | play view | Participants can decide how much they produce and if they take additional costs for producing at zero pollution. The game could be played in three ways: reducing pollution can be voluntary, partly obl ... more | |
| For Want of a Chair | play view | "Cap and trade" is one of the most innovative policy options developed by environmental economists. By placing a cap on a social bad and allowing firms to buy and sell the right to generate it, po ... more | |

# PRACTICAL QUESTIONS

- **Do I need to be an experimental economist to use experiments in my teaching?**

    **NO!**
    Experiments as a teaching tool ≠ Research experiments.
    The objective of the experiments is to *replicate* a known result.

    However, there is much to learn from experiments that fail
    to deliver the expected result by searching the cause of its
    different result:
    incentives, attention, market power …

- **Online or in-the-classroom?**

- **How many students in a group?**

- **Incentives – Frustration/Fairness – Picaresque**

    - Small weight for outcomes is enough to generate incentives

    - Reputation works as an incentive

- **What if something goes "wrong"?**

# Last comments

- Experiments engage students and facilitate the understanding of abstract concepts (experiential learning)

- But running experiments is not enough

  - Discussions before, during and after the experiment must force students to think and must be designed to help them in their thinking.

  - Even better if experiments go with tasks that make students reflect and discover on their own the main findings.

- Experiments introduce a dynamic that keeps the professor engaged and makes teaching a fun experience.

# WHY EXPERIMENTS?

It is important to design your course so that it
will be interesting to teach.

Using experiments not only engage students
but also help us to discover or to recover the
joy of teaching

# Thank you

**humberto.llavador@upf.edu**