A Picture is Worth 1,000 Words: Infographic Assignments in Economics Courses

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Basic Overview

Objective

In our Microeconomic Principles courses, pairs of students designed an infographic to “teach” an assigned topic

Did it work?

Students liked it and said they learned the material better

Randomized experiment shows that it increased test scores

Bottom Line

This is a fun & worthwhile assignment, some changes necessary to make it more effective in the future

What is an infographic?

Conveys information through pictures, graphs, tables

Few words

To make a quality infographic:

- Tell a story
- Must know enough to identify “most important”
- Determine how to convey information in meaningful way (images, words)
- Make connections
- Consider layout, color, flow

Why Infographics?

Rising Popularity

- Increasingly used in all fields: medical, fitness, business, education

Learning Outcomes

- Career-readiness skills

Inclusive

- UDL framework
- Different way of communicating
- Language

Learning Theory

- People learn & process verbal & visual information in different cognitive systems
  - Graphics enable learning through dual-coding, visual learning, conjoint retention
- View “whole unit” (fewer cognitive transactions)
- Concept maps & graphical organizers improve student learning & retention
- Students must make connections between concepts & visuals (meta-representation)

(Nilson 2009; Vekiri 2002); (Ausubel 1960; Hortnon et al 1993; Manoli & Papadopoulou 2012; Willerman & Mac Harg 1991)

Example


ICE CREAM
VS
GELATO
SERVING TOOL
SCOOPER
FLAT SPATULA
~ 0°F (-18°C)
TEMPERATURE
~ 15°F (-9°C)
HEAVY CREAM
DAIRY
MILK
10-25%
FAT
2-9%
~50% (CHURNED FAST)
AIR
~ 20% (CHURNED SLOW)
EGGS
FLUFFY AND ICY
TEXTURE
DENSE, SILKY AND SMOOTH
LESS INTENSE
FLAVOR
MORE INTENSE

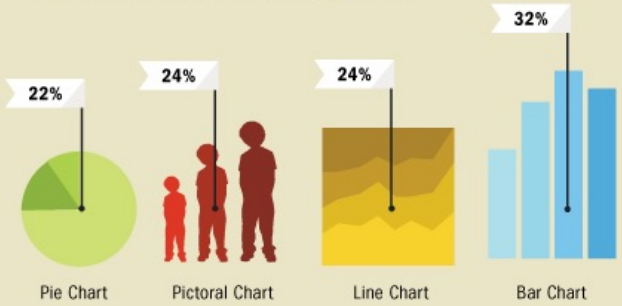
INFOGRAPHIC OF INFOGRAPHICS

Data visualization is a popular new way of sharing research. Here is a look at some of the visual devices, informational elements, and general trends found in the modern day infographic.

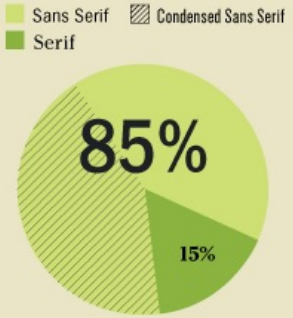
DESIGN

CHART STYLE

Percentage of infographics with the following charts:

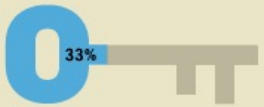


FONT



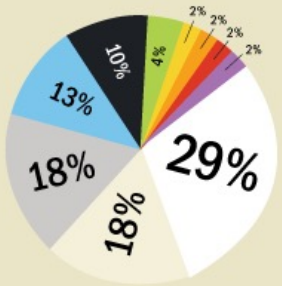
KEY INFO

Percentage of infographics with key:



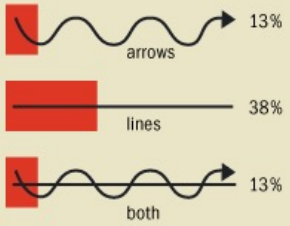
Average number of symbols per key: **5.1**

BASE COLOR



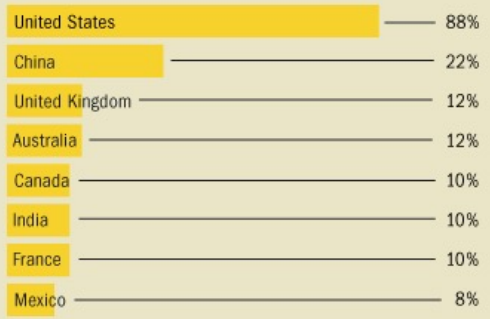
NAVIGATIONAL ICONOGRAPHY

Frequency of arrows & connecting lines in infographics:



CONTENT

COUNTRIES FEATURED



THEME

Relative popularity of different infographic themes:

SECTIONS

CREDITED SOURCES

Average number of sources per infographic: **2.29**

TITLE

Average number of words per infographic title: **4.36**

"RICHEST AND POOREST AMERICAN NEIGH

CONCEPT & DESIGN Ivan Cash **SOURCE** 49 infographics collected at random from www.good.is/infographics

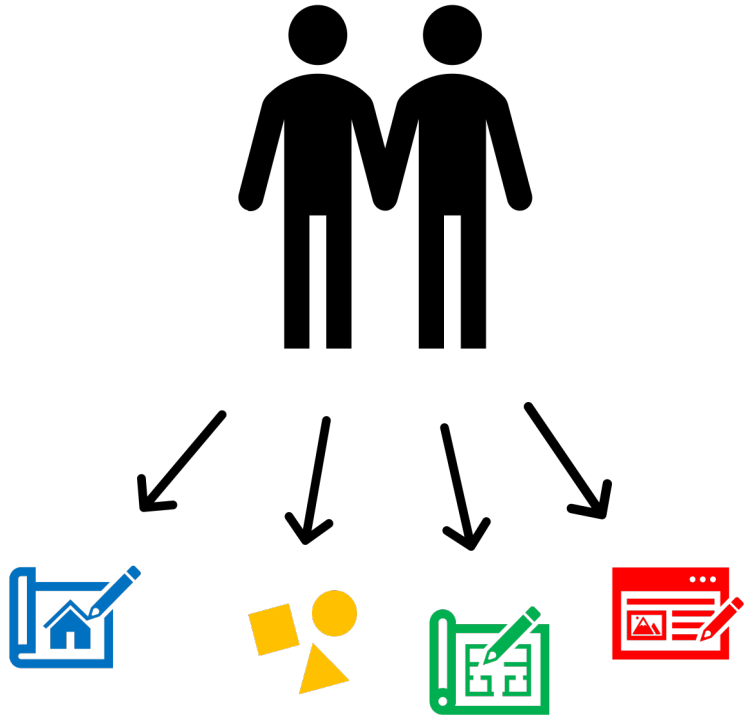
https://www.wired.com/2012/07/you-suck-at-infographics/

The assignment

Student pairs were assigned 4 topics

- Create infographic
- Write reflection paper
  - What & Why

2 topics per exam



Infographic Instructions

Remember that an infographic's job is to provide a clear and concise overview of a topic, in a manner that grabs attention and is memorable. Your infographic should "tell a story" about your topic. Does it describe a process? Does it compare and contrast? Does it define? All components should be directly relevant to your topic and key focus. Be careful not to include too many graphics, which can be distracting, nor to include too many words, which will lose the intention of an infographic.

Paper Instructions

In your paper, you will reflect on your infographic and the choices you made. You will explain what you focused on and why you chose that focus withi your topic. You will then detail why your group decided to include the components you did, and what you left out and why. You will reflect on what you personally learned during this process. Finally, imagine if you had to do the project on your own. Explain what you would have done differently and why.

Preparing students

Step-by-step guide & guiding questions

Clear rubric

Tutorial video

Daily infographic/review infographics

Rolling due dates

Was the assignment effective?

Randomized classroom experiment

- Students scored higher on questions for which they were assigned an infographic than on questions for which they were not
- Greater effect for higher ability students

Student survey

- Students enjoyed creating infographics
- Believed infographics helped them perform better on exams
- Believed they understood material better

Preparing Students: Step-by-Step Guidelines

Identify important concepts & questions within topic

- Consider definitions, equations, graphs
- Does your topic lend itself to comparisons (compare/contrast)?
- Is there a process or method to describe?
- Are there applications that are important?

Identify a focus within your overall topic

Write down all main concepts within that focus

- Consider relationships
- How to visualize
- Main to include/what to exclude

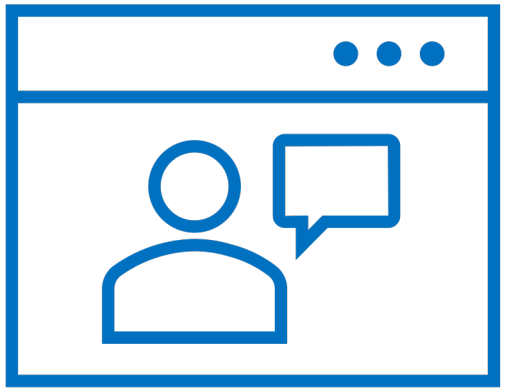
Determine best method of communicating

Order/flow of information?

- Comparison? Definitions? Step-by-step? Timeline?
- Columns/blocks?
- Colors/themes

Preparing Students – Video Tutorial

- ~20 min
- Modeled step-by-step process to create an infographic, as if we were a student pair
- Provided video instruction on the use of Canva
- Created an infographic in real time



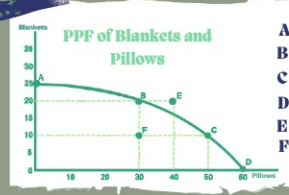
Examples of Student Work

PRODUCTION POSSIBILITY FRONTIER (PPF)

A graph that shows the combinations of output a population can possibly produce, given available factors of production & technology.

Factors of Production

Inputs that are required for producing all goods and services.



- A – feasible and efficient
- B – feasible and efficient
- C – feasible and efficient
- D – feasible and efficient
- E – not feasible
- F – feasible and inefficient

What do these words mean?

Feasible - Points that exist on or within the curve. They are reachable using current resources FOP and technology.

Not feasible - Points that exist above the curve. They are unreachable due to scarcity of technology and resources.

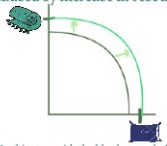
Efficient - Points that exist on the curve. They are getting the most they can out of their resources.

Inefficient - Points that exist under the curve. They are reachable, but are not getting the most out of their resources.

Example of PPF Movements

Outward shift

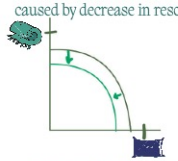
Increased output at all points caused by increase in resources.



In this case with the blankets and pillows, an Increase In the supply of cloth or Increase In labor workers may cause this shift

Inward shift

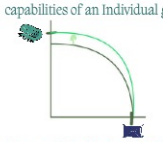
Decreased output at all points caused by decrease in resources.



In this case with the blankets and pillows and pillows, an decrease In the supply of cloth or decrease In labor workers may cause this shift

Pivot I

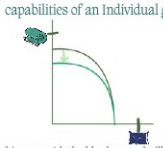
Caused by changes In the production capabilities of an Individual good



In this case with the blankets and pillows, an Increase In technology allows more blankets to be produced but does not affect the production of pillows

Pivot II

Caused by changes In the production capabilities of an Individual good



In this case with the blankets and pillows, an decrease In technology causes less blankets to be produced but does not affect the production of pillows

ELASTICITY

The measurement of percentage of change of one economic variable in response to a change in another.

Elastic Goods

Elastic Goods "Luxuries"

When goods are elastic, a change in price results in higher responsiveness to quantity demanded.

Inelastic Goods

Inelastic Goods "Necessities"

When goods are inelastic, a change in price results in lower responsiveness to quantity demanded.

Things That Determine Price Elasticity

1- Substitutes
More substitutes= elasticity

2- Luxury or Necessity?
Luxuries= Elastic
Necessities= Inelastic

3- Market Size
Larger markets =More elasticity

4- Time Passed
Greater Time Period =More Elasticity

Calculating Elasticity

Price Elasticity of Demand

$$E = \frac{\%\Delta Qd}{\%\Delta P}$$

Midpoint Formula

$$E = \frac{\frac{(Q2-Q1)}{\frac{Q2+Q1}{2}}}{\frac{(P2-P1)}{\frac{(P2-P1)}{2}}}$$

What Do These Numbers Mean?

Number	Elasticity	Graph
$E_d = 0$	Perfectly Inelastic	
$E_d < 1$	Inelastic	
$E_d = 1$	Unitary Elastic	
$E_d > 1$	Elastic	
$E = \infty$	Perfectly Elastic	

EXTERNALITIES

uncompensated Impact of one person's actions on a bystander

POSITIVE EXTERNALITIES

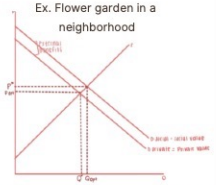
beneficial to society

NEGATIVE EXTERNALITIES

harms to society

Positive Externality Graphical Analysis

Ex. Flower garden in a neighborhood



-Flower bed creates benefits to society due to sights & smells
-Externalities not realized by private parties
-Social value curve reflects these benefits
-Privately, market will produce at Q*
-Social value curve shows optimal quantity at Qpt
-Market underproduces in case of positive externality

Negative Externality Graphical Analysis

Ex. Giant highway next to a neighborhood

-Highway creates noise pollution, which can cause negative effects on society
- Social cost = private cost to the firm of producing + external costs of those effected
social cost exceeds private cost paid by producers
- optimal production is where social value curve intersects demand curve

INTERNALIZING THE EXTERNALITY

Altering incentives so that people take into account the external effects of their actions.

To internalize a POSITIVE externality, the government could use a SUBSIDY

To internalize a NEGATIVE externality, the government could use a TAX

SOLUTIONS USING PRIVATE EXTERNALITIES

- Moral codes
- Charities
- Parties Involved with externalities can reach an agreement

DEMAND SHIFTERS

DEMAND SHIFTERS CHANGE THE QUANTITY DEMANDED AT EVERY PRICE POINT AND CAUSE THE DEMAND CURVE TO MOVE RIGHT OR LEFT.

Examples of Demand Shifters:

INCOME

For most products there is a positive relationship between consumer income and the amount of product they are willing and able to buy.

CONSUMER TASTES

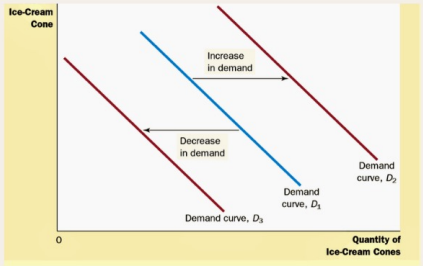
- Markets are shaped by indivudal tastes and preferences.
- There are specific factors that direct these tastes and preferences.

EXPECTATIONS

If the buyers expects that the price of a certain product will change in the future, it will most likely affect when they purchase the product.

NUMBER OF BUYERS

The arrival of new buyers in an established market results in an increase in demand for a particular product.



REFERENCES:

https://www.profolus.com/topics/examples-of-demand-shifters/

https://econprojectsd.weebly.com/supply-and-demand-shifters.html

Factors that shift Supply and Demand Curves

SUPPLY

1.) Prices of Inputs
(Ex. Minimum Wage Change)

↓Price Input = ↑S
↑Price Input= ↓S

2.) Expectations
- Predictions of price ↑ in future = ↓S now
- Predictions of price ↓ in future = ↑S now

3.) Number of Suppliers

As the number of sellers ↑ Supply ↑

4.) Technology

New inventions ↑S

5.) Other
- (ex. Natural Disasters, Wars, Pandemic)

DEMAND

1.) Prices of Other Goods
- **Substitutes** (ex.Coke/Pepsi
- **Compliments** (ex. Buns/Hot Dogs)

2.) Income
- **Normal Goods** (ex. dinner out) ↑D as Income ↑
- **Inferior Goods** (ex. Ramen Noodles) ↓D as Income ↑

3.) Number of Buyers

As the number of buyers ↑ Demand ↑

4.) Tastes

Goods that are trendy ↑D

5.) Expectations
- Predictions of price ↑ in future = ↑D now
- Predictions of price ↓ in future = ↓D now

Perfect Competition

01 HOW MANY BUYERS AND SELLERS?

Many

02 TYPES OF GOOD AND SERVICES OFFERED

Homogeneous- goods that are viewed as identical in the eyes of customers

03 BUYERS AND SELLERS ARE PRICE TAKERS

Actions of byers and sellers don't effect the market price

04 ARE THERE ANY BARRIERS TO ENTER?

There is free entry with no barriers

05 WHERE SHOULD YOU PRODUCE?

Where Marginal Revenue = Marginal Costs

06 WHEN SHOULD YOU SHUT DOWN?
- When Total Revenue < Total Variable Costs
- When Price < Average Variable Costs

THE TRAGEDY OF THE COMMONS

An Example Story

01 ORIGINALLY LOTS OF FISH - ALL THE FISHERMEN ARE HAPPY

02 ONE FISHERMAN DECIDES HE WANTS MORE FISH THAN EVERYONE ELSE

03 ALL THE FISHERMEN MUST INCREASE THEIR FISHING OR ELSE THERE WON'T BE ANY FISH LEFT

04 OVERFISHING OCCURS!

OF THE WORLD'S FISH STOCKS ARE OVERFISHED.

Source: https://www.fishforward.eu/en/topics/facts-figures/

THE BASICS OF *Elasticity*

Elasticity is a measure of the responsiveness of one variable to another

TYPES OF ELASTICITY

PRICE ELASTICITY OF DEMAND

A measure of how much the **quantity demand** of a good responds to a **change in the price of that good,** computed as the percentage change in quantity demanded divided by the percentage change in price

$$\xi_D = \frac{\%\Delta Q^D}{\%\Delta P}$$

INCOME ELASTICITY OF DEMAND

A measure of how much the **quantity demanded** of a good responds to a **change in consumer income**, computed as the percent change in quantity demanded divided by the percent change in income

$$\xi_y = \frac{\%\Delta Q^D}{\%\Delta Y}$$

CROSS PRICE ELASTICITY OF DEMAND

A measure of how much the **quantity demanded** of a good responds to **changes in the price of another good**, computed as the percent change in quantity demanded for good divided by the perfect change in the price of good

$$\xi_{xy} = \frac{\%\Delta Q^D x}{\%\Delta P y}$$

PRICE ELASTICITY OF SUPPLY

A measure of how much the **quantity supplied** of a good responds to a **change in the price of that good**, computed as the percent change in quantity supplied divided by the percent change in the price

$$\xi_s = \frac{\%\Delta Q^s}{\%\Delta P}$$

CATEGORIES OF PRICE ELASTICITY OF DEMAND AND SUPPLY

ELASTIC	INELASTIC	UNIT ELASTIC	PERFECTLY INELASTIC	PERFECTLY ELASTIC
change in quality is greater than the price	change in price is greater than quantity	change in price is equal to quantity	no change in quanity	perfectly elastic
$\lvert\xi_D\rvert > 1$	$\lvert\xi_D\rvert < 1$	$\lvert\xi_D\rvert = 1$	$\lvert\xi_D\rvert = 0$	$\lvert\xi_D\rvert = \infty$

THE 4 TYPES OF GOODS

Excludability

The property of a good whereby a person can be prevented from using it, includes having to buy it

Rivalry in Consumption

The property of a good whereby one person's use diminishes other people's use

1 Private Goods

Excludable and Rival goods

Examples: Groceries, cars

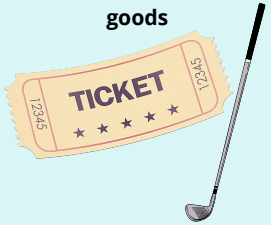
2 Common Resources

Non-Excludable and Rival Goods

Examples: Fishing in public waters, a library book

3 Club Goods

Excludable and Non-Rival goods



Examples: Country Club and Cinemas

4 Public Goods

Non-Excludable and Non-Rival Goods

Examples: National Defense and the enviroment

Examples of Student Work: Economics of Sport

MLB RULE CHANGES

Economic Impact and Analysis

Pitch Clock (2023)

- Increase speed of game
- Increase viewership
- Teams lose revenue from food and drinks

CHECKING FOR STICKY SUBSTANCES (2022)

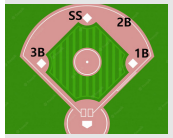
- Designed to maintain integrity
- Increase viewership due to the integrity
- Craft Union - restricting pitchers that cheat

BIGGER BASE SIZE (2023)

- Reduce injuries to players
- Industrial Union - Protect Players
- Increase action in SB

REGULAR SEASON SCHEDULE FORMAT (2023)

- Each team plays one another
- Increases revenue and viewership
- Small teams benefit as big teams come to play

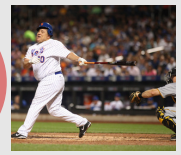


NO INFIELD SHIFT (2023)

- Creates more action in the game
- More runs scored
- Leads to more viewership and helps to save the sport

NL DESIGNATED HITTER (2022)

- DH was added to the NL
- Industrial Union - Protects the safety of pitchers
- Craft Union - Allows pitchers to specialize more



PLAYOFF FORMAT (2021)

- Two new wildcard teams were added
- Increased the number of teams from 10 to 12
- This creates more games and viewership, which leads to higher revenue

LEAGUES

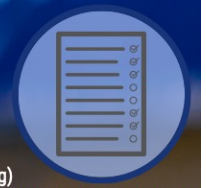
"Voluntary" Associations

SCHEDULES

- Balanced (home/away)
- Season length
- Championship design

RULES OF PLAY

- Teams must agree
- Rule changes
  - Alter returns to offense/defense skills
  - Change winning patterns
- Help become more popular
- Outlaw undesirable behaviors (PEDS/betting)



LEAGUE SIZE

30

- Too big : decrease competition
- Too small: risk competing league
- New members
  - Source of revenue (fees)
  - Drain revenue (sharing)
- Competitive Balance a problem?

MARKET SIZE & SHARING

- Protect territories - determine where teams locate
- Limit entry
- Revenue sharing agreements

COMPETITIVE BALANCE

- Degree of parity within a league
- Within-season & between season balance
- Driven by revenue imbalances
- "Solutions": draft, revenue sharing, salary caps

All to max profit, provide financial stability

Pitfalls & Lessons Learned

Pitfall: Too many infographics

- Students overwhelmed
- Rushed through & delayed work

Solution: 4 infographics allowed us to run an effective classroom experiment

- 2 infographics (one per exam) would be more manageable for students and (likely) more effective

Pitfall: Information dump & lack of focus/story

- “Data dump” of entire module

Solution: Provide more guidance in selection of a “focus” within each topic

- Prompt to ”answer a question” or “tell a story”

Pitfalls & Lessons Learned

Pitfall: Students failed to work collaboratively with the structure we used

- Given pairs had 2 infographics before each exam, pairs divided infographics to reduce cost

Solution:

- Reduce from 4 to 2 (1 per exam) increases likelihood work together
- Increase group size to 3 students makes it harder to divide the labor & increase the likelihood that they work together
- Build in accountability measure into rubric to ensure group work

Pitfall: Reflection papers not effective

- Didn’t actually reflect or explain well

Solution:

- Presentation
- Better crafted questions

Suggestions

Provide time to work on infographics together	Perhaps create one as a class as a whole Discuss strengths of infographics.
Work days in class esp. if one big project (e.g., field classes)	Can prep material ahead of time Creates more active & engaged learning in class
Have students create rubric	Can encourage collaboration More inclusive Ownership over projects
Students present infographics to class	Review day Study guides for each other Oral presentation skills

Bottom line

- Effective (improves learning)
- Students enjoy it
- Career readiness skills
  - Oral, written, visual communication
  - Data visualization skills
- Inclusive & active learning
- Adaptable for many different courses
  - Explain a basic concept
  - Conduct research, collect data, present

Questions & Discussion