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

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In our Microeconomic Principles courses, pairs of students designed an infographic to “teach” an assigned topic. Students liked it and said they learned the material better. Randomized experiment shows that it increased test scores. 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)
## Ice Cream vs Gelato

<table>
<thead>
<tr>
<th>ICE CREAM</th>
<th>VS</th>
<th>GELATO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCOPER</td>
<td></td>
<td>SERVING TOOL</td>
</tr>
<tr>
<td>~ 0°F (-18°C)</td>
<td></td>
<td>~ 15°F (-9°C)</td>
</tr>
<tr>
<td>HEAVY CREAM</td>
<td></td>
<td>DAIRY</td>
</tr>
<tr>
<td>~ 10-25%</td>
<td></td>
<td>MILK</td>
</tr>
<tr>
<td>~ 50% (CHURNED FAST)</td>
<td></td>
<td>FAT</td>
</tr>
<tr>
<td>AIR</td>
<td></td>
<td>~ 20% (CHURNED SLOW)</td>
</tr>
<tr>
<td>EGGS</td>
<td>✔</td>
<td>EGS</td>
</tr>
<tr>
<td>FLUFFY AND ICY</td>
<td>✔</td>
<td>TEXTURE</td>
</tr>
<tr>
<td>LESS INTENSE</td>
<td></td>
<td>DENSE, SILKY AND SMOOTH</td>
</tr>
<tr>
<td>FLAVOR</td>
<td></td>
<td>MORE INTENSE</td>
</tr>
</tbody>
</table>
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:

- Pie Chart: 22%
- Pictorial Chart: 24%
- Line Chart: 24%
- Bar Chart: 32%

**Font**

- Sans Serif: 85%
- Condensed Sans Serif: 15%

**Content**

**Countries Featured**

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>88%</td>
</tr>
<tr>
<td>China</td>
<td>22%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>12%</td>
</tr>
<tr>
<td>Australia</td>
<td>12%</td>
</tr>
<tr>
<td>Canada</td>
<td>10%</td>
</tr>
<tr>
<td>India</td>
<td>10%</td>
</tr>
<tr>
<td>France</td>
<td>10%</td>
</tr>
<tr>
<td>Mexico</td>
<td>8%</td>
</tr>
</tbody>
</table>

**Theme**
Relative popularity of different infographic themes:

- Technology
- Media
- Business
- Culture
- Health
- Politics
- Education
- Transportation
- Environment

**Key Info**
Percentage of infographics with key:

- Key: 33%

**Base Color**

- Red: 29%
- Green: 18%
- Yellow: 18%
- Blue: 13%
- Pink: 13%

**Navigational Iconography**

- Arrows: 13%
- Lines: 38%
- Both: 13%

**Sections**

Average number of sections per infographic: 2.12

**Credited Sources**

Average number of sources per infographic: 2.29

**Title**

“Richest and Poorest American Neigh”

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.
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 within 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?
- 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

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ELASTICITY

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

Elastic Goods

"Luxuries"

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

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 substitutability = lower elasticity

2. Luxury or Necessity
   - Luxuries have higher elasticity

3. Market Size
   - Larger market = lower elasticity

4. Time Passed
   - Greater time passed = lower elasticity

Calculating Elasticity

Price Elasticity of Demand

\[ E = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} \]

Midpoint Formula

\[ E = \frac{\frac{Q_2 - Q_1}{(Q_1 + Q_2)/2}}{\frac{P_2 - P_1}{(P_1 + P_2)/2}} \]

What Do These Numbers Mean?

<table>
<thead>
<tr>
<th>( E )</th>
<th>0</th>
<th>Perfectly Inelastic</th>
<th>Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>( E &lt; 1 )</td>
<td>Inelastic</td>
<td>Unitary Elastic</td>
<td></td>
</tr>
<tr>
<td>( E = 1 )</td>
<td>Unitary Elastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( E &gt; 1 )</td>
<td>Elastic</td>
<td>Perfectly Elastic</td>
<td></td>
</tr>
</tbody>
</table>

SOLVING USING PRIVATE EXTERNALITIES

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

EXTERNALITIES

uncompensated impact of one person’s actions on a bystander

POSITIVE EXTERNALITIES

beneficial to society

NEGATIVE EXTERNALITIES

harms the society
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 individual 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.

**SUPPLY**

1. Prices of Inputs (Ex. Minimum Wage Change)
   - $ Price Input ↑ $ Price Input ↓

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

3. Number of Suppliers
   - As the number of sellers ↑ Supply ↑

4. Technology
   - New inventions ↑

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 = ↑ now
   - Predictions of price ↓ in future = ↓ now

**REFERENCES:**
https://www.pendelous.com/topics/examples-of-demand-shifters.html
https://ecommercepotential.widely.com/supply-and-demand-shifters.html

**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 buyers and sellers don’t affect 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 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 demanded of a good responds to a change in the price of that good, compared to the percentage change in quantity demanded divided by the percentage change in price of the good.

\[ E_D = \frac{\% \Delta Q_D}{\% \Delta P} \]

**Income Elasticity of Demand**

A measure of how much the quantity demanded of a good responds to a change in income, compared to the percentage change in quantity demanded divided by the percentage change in income.

\[ E_I = \frac{\% \Delta Q_I}{\% \Delta Y} \]

**Cross Price Elasticity of Demand**

A measure of how the quantity demanded of one good responds to a change in the price of another good, compared to the percentage change in quantity demanded divided by the percentage change in price of the other good.

\[ E_{xy} = \frac{\% \Delta Q_x}{\% \Delta P_y} \]

**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, compared to the percentage change in quantity supplied divided by the percentage change in price of the good.

\[ E_S = \frac{\% \Delta Q_S}{\% \Delta P} \]

Categories of Price Elasticity of Demand and Supply

- **Elastic**:\( E \neq 0 \)
  - Elasticity is greater than 1
  - Elasticity is less than 1
  - Elasticity is equal to 1
  - Elasticity is perfectly elastic
  - Elasticity is perfectly inelastic

- **Inelastic**:\( E < 0 \)

The 4 Types of Goods

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 environment

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.
Examples of Student Work: Economics of Sport
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
<table>
<thead>
<tr>
<th>Suggestions</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide time to work on infographics together</td>
<td>Discuss strengths of infographics.</td>
</tr>
<tr>
<td>Work days in class esp. if one big project (e.g., field classes)</td>
<td>Can prep material ahead of time</td>
</tr>
<tr>
<td></td>
<td>Creates more active &amp; engaged learning in class</td>
</tr>
<tr>
<td>Have students create rubric</td>
<td>Can encourage collaboration</td>
</tr>
<tr>
<td></td>
<td>More inclusive</td>
</tr>
<tr>
<td></td>
<td>Ownership over projects</td>
</tr>
<tr>
<td>Students present infographics to class</td>
<td>Review day</td>
</tr>
<tr>
<td></td>
<td>Study guides for each other</td>
</tr>
<tr>
<td></td>
<td>Oral presentation skills</td>
</tr>
</tbody>
</table>
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