Teaching Visualization: Effective Communication in Visual Formats

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When [vision-competencies are] developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made, that he encounters in his environment.

A visually literate individual is both a critical consumer of visual media and a competent contributor to a body of shared knowledge and culture.

2011 ACRL Visual Literacy Competency Standards
A visually literate individual is able to...

- Determine the nature and extent of the visual materials needed
- Find and access needed images and visual media effectively and efficiently
- **Interpret and analyze the meanings of images and visual media**
- Evaluate images and their sources
- Use images and visual media effectively
- **Design and create meaningful images and visual media**
- Understand many of the ethical, legal, social, and economic issues surrounding the creation and use of images and visual media, and access and use visual materials ethically
Visual Literacy Array based on ACRL’s Visual Literacy Standards

PowerPoint Best Practices

Visual Exercise #1
According to the picture superiority effect, pictures are remembered better than words—especially for casual exposure to information for limited time.

Use pictures and words together so they reinforce the same information for optimal effect.

See this effect used widely in marketing communications, such as posters, billboards, brochures, annual reports, etc.

Visual imagery is a powerful mnemonic tool that helps learning and increases retention compared to, say, witnessing someone read words off a screen.

Garr Reynolds, Presentation Zen Design
Picture Superiority Effect:

Pictures remembered better than words in cases of:
- casual exposure
- limited amount of time

Reinforce by using pictures and words together

Used extensively in:
- posters
- billboards
- brochures
- annual reports

Visual imagery is a powerful mnemonic tool that helps learning and increases retention.
One idea per slide
Preserve “white space”
A slide’s message should be understood within three seconds.
Make time to translate ideas into images
Who is your audience?
PowerPoint Assignment Guidelines
- Your audience is Cal Maritime students outside your major. What is the problem in a nutshell? Why should they care? How might it affect them? What can they do about it?
- All slides should be primarily graphical.
- All photos and other images must be high resolution, licensed for re-use, and include a credit that names the creator of the image.
- No bullet points.
- Choose your graphics carefully. Their purpose is not decoration. Their purpose is communication.
<table>
<thead>
<tr>
<th></th>
<th>5 points</th>
<th>7-9 points</th>
<th>10 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slides 2-9</td>
<td>Graphic/image lacks credit (if applicable)</td>
<td>Slide difficult to read quickly due to interfering background, excessive text, size of text or graphics, color choices, pixelated images</td>
<td>Graphic communicates effectively by following best practices</td>
</tr>
<tr>
<td></td>
<td>Notes box empty or too cryptic</td>
<td></td>
<td>Shows awareness of audience by addressing the “why,” “how,” or “what” questions in assignment prompt</td>
</tr>
<tr>
<td></td>
<td>Animated elements appear out of order</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number or speed of animations distracts from content</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Slide 10:</td>
<td>More than 3 style errors</td>
<td>1-3 style errors</td>
<td>No errors in APA style</td>
</tr>
<tr>
<td>Bibliography</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Recommended Reading


Big Data + Excel

Visual Exercise #2
The Best Stats You've Ever Seen

http://splicd.com/hVimVzgtD6w/251/302
World Bank Open Data: free and open access to data about development in countries around the globe.

Data, differences, and digging deeper

New data shows meaningful progress in reducing maternal mortality

ICP 2014: 7 million prices, 199 economies, 8 regions, and 15 partners

The World at a Glance

Economy & Growth

GDP (current US$)

$72.68 trillion

2012

Health

Life expectancy at birth, total (years)

71

2012
COUNTRIES

International Energy Statistics

- Petroleum & Other Liquids
- Natural Gas
- Electricity
- Coal
- Renewables
- Total Energy
- Carbon Dioxide
- Other

Related International Information
- International Energy Statistics
- U.S. Nat Petroleum Imports By Country
- International Energy Outlook yearly energy projections through 2040
- Short Term Energy Outlook monthly energy projections through 2014
- Annual Energy Outlook yearly US energy projections through 2040

Sign Up for Email Updates
What factors are associated with poverty around the world? And how does the United States compare with other countries on these factors? Use data from the World Bank to explore these questions.
<table>
<thead>
<tr>
<th>Country Name</th>
<th>Indicator Name</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>School enrollment, primary (% gross)</td>
<td>104</td>
<td>105</td>
<td>106</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>102</td>
<td>100</td>
<td>102</td>
<td>103</td>
<td>103</td>
<td>103</td>
<td>-2%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>GDP per capita (current US$)</td>
<td>1611.1</td>
<td>1579.3</td>
<td>1729.2</td>
<td>2030.8</td>
<td>2641.8</td>
<td>3249.3</td>
<td>3733.3</td>
<td>4313.4</td>
<td>5498</td>
<td>6798.1</td>
<td>6403.1</td>
<td>6334.7</td>
<td>293%</td>
</tr>
</tbody>
</table>

**Bulgaria School enrollment, primary (% gross)**

- Enrollment as percentage of total primary-age population

**Bulgaria GDP per capita (current US$)**

- GDP per capita in current US$
<table>
<thead>
<tr>
<th>Country Name</th>
<th>2010 School enrollment, primary (% gross)</th>
<th>2010 GDP per capita (current US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>102</td>
<td>46615.51</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>103</td>
<td>6334.68</td>
</tr>
<tr>
<td>Barbados</td>
<td>120</td>
<td>15812.28</td>
</tr>
</tbody>
</table>
Table: Coal Consumption per capita (Btu)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>% growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>15088167.1</td>
<td>15730897.8</td>
<td>16218886.4</td>
<td>17101854.0</td>
<td>17873008.6</td>
<td>18873186.8</td>
<td>19588268.9</td>
<td>20245048.3</td>
<td>20612615.7</td>
<td>20742817.6</td>
<td>21289023.3</td>
<td>25%</td>
</tr>
<tr>
<td>China</td>
<td>21943974.7</td>
<td>22370001.5</td>
<td>23571996.3</td>
<td>24881092.0</td>
<td>26176617.5</td>
<td>36993715.5</td>
<td>40219476.4</td>
<td>42753436.5</td>
<td>45057351.5</td>
<td>50397744.1</td>
<td>52363287.1</td>
<td>139%</td>
</tr>
<tr>
<td>Thailand</td>
<td>5257795.63</td>
<td>5938397.35</td>
<td>6093837.6</td>
<td>6374360.5</td>
<td>6988469.8</td>
<td>7459908.0</td>
<td>8063389.0</td>
<td>8659605.8</td>
<td>9848836.1</td>
<td>9434044.1</td>
<td>10272512.9</td>
<td>95%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2300765.95</td>
<td>2600791.18</td>
<td>2628623.7</td>
<td>2648482.6</td>
<td>3433132.6</td>
<td>3883154.3</td>
<td>4498628.5</td>
<td>4744862.0</td>
<td>5045520.4</td>
<td>5897771.0</td>
<td>7023357.1</td>
<td>205%</td>
</tr>
<tr>
<td>Regional total</td>
<td>29502536.3</td>
<td>30919189.4</td>
<td>34294255.3</td>
<td>3813770.7</td>
<td>42108219.4</td>
<td>4813476.7</td>
<td>5278149.5</td>
<td>56467003.6</td>
<td>60852707.6</td>
<td>65729498.6</td>
<td>69650155.3</td>
<td>136%</td>
</tr>
<tr>
<td>Data and calculations are accurate</td>
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<tr>
<td>Sheets labeled &amp; organized correctly</td>
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<tr>
<td>Appropriate charts</td>
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<tr>
<td>Charts are accurate and labeled</td>
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<tr>
<td>Concluding analysis</td>
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</tbody>
</table>
Annotated Map

Visual Exercise #3
Mapping with Google

Discover new ways to navigate the world around you with Google Maps and Google Earth.

Improve your use of new and existing features of Google’s mapping tools.

Choose your own path. Complete a project using Google Maps, Google Earth, or both.

Start Now

Google Maps Lessons & Project

Explore features of the new Google Maps. Learn to create and share custom maps using Google Maps Engine Lite. Taught by Google Maps Product Managers Daniel Demetri and Beth Liebert.

Course Information

Mapping with Google is a self-paced, online course where you will watch videos (or read text lessons) and apply the skills you learn.

Course completion requires an internet-enabled desktop or laptop computer.
Learning Outcomes

1. *News Research:* Students will locate relevant news stories on a current issue in their major in order to select the most significant and reliable sources of information.

2. *Synthesis and Mapping:* Students will create an annotated map in order to synthesize and organize information spatially.
Incident Map Assignment

- **Identify a topic** you would like to illustrate with a map.

- Identify **four significant events** related to your topic. These events should have occurred in different places within one country or region of the world. For many topics, Lexis/Nexis or CountryWatch will help with this.

- **Create a map** using Google Maps and mark the location of your four events using **pushpins**. Annotate each pushpin with date and brief summary (2 sentences) of each event in the **description**.

- Create **APA citations** for your sources and add them to their relevant descriptions.
Japanese Tsunami Incident Map

38.297°N, 142.372°E

Russian leader Vladimir Putin maintained that Russia was still a major player in the Arctic and also called for the Northwest Passage to be an international strait. It was a rare situation because Russia, the E.U and the United States were all in complete agreement.

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are incidents significant and all related to topic?</td>
</tr>
<tr>
<td>Are incidents located accurately on map?</td>
</tr>
<tr>
<td>Are incidents described clearly and concisely?</td>
</tr>
<tr>
<td>Are sources reliable and cited correctly?</td>
</tr>
</tbody>
</table>
Infographics

Visual Exercise #4
Thank You to:

Caitlin Bagley
Gonzaga University

http://www.loexconference.org/2013/sessions.html
What is an Infographic?
Graphic visual representations of information, data or knowledge.

Value of Data Visualization
Create your own infographic to communicate a topic of your choice. Making your own will help you understand the issues of bias in data interpretation, so you'll be a more informed consumer of infographics that you see in the future.

Infographic Assignment
Infographic Assignment

1. Pick a topic
2. Find data about your topic
3. Turn your data into an infographic
4. Cite data sets in APA format
**SHARK ATTACKS**

**Why?**
This infographic is an example of the frequency trends of shark attacks. It raises the question of whether sharks have the best chance of finding prey and attacking humans. Why do humans have the highest chance of being attacked by sharks? The data suggests that sharks are not the most dangerous sea creatures. The infographic shows that the number of attacks has decreased in recent years, with a peak in 2000-2008. However, the number of fatalities remains relatively low.

**Apex Predators**
Sharks are very important to the health of our ecosystems. They are an ancient organism that does not have any predators to fear and reside at the top of the food chain.

**Graph Analysis**
Breakthroughs in the medical field have improved the chances of saving the lives of people who get attacked by these apex predators. The increase in populations has given sharks more chances of attacking.

**Data Citation**

**NAME:** BRENDA BUONSIGNOR

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**Do Sharks Like Eating People?**

Sharks usually feed on fish, seals, turtles, and other small marine life. However, researchers have found cases of shark attacks on humans, a leather wallet, and even a cheese plate.

**Shark Appetite**
- Sharks usually feed on fish, seals, turtles, and other small marine life.
- Researchers have found cases of shark attacks on humans, a leather wallet, and even a cheese plate.
The Future of Maritime

This data represents projected growth in the maritime industry and the outlook for jobs in the maritime industry. It also looks at the pay and benefits of working in the industry.

Job Outlook

14%-20% GROWTH

Pay and Benefits

TOP 10% EARN > $99,690

References


Piktochart

make information beautiful
Best Mountain Resort: California

Average Annual Snowfall

NOR CAL
Heavenly
North Star
Kirkwood

V.S.

SO CAL
Mammoth
Bear
Mtn High

The Run Down
In the rivalry between Northern California and Southern California resorts, the north holds the title.
In the snowfall category, both Nor Cal competitors, Heavenly and Kirkwood, took the top 1 and 2 spots with an average of just over 450 inches annually.
In the trail count, the north again prevails. Although a So Cal spot, Mammoth Mountain, holds the first place position, the overall average and consistency of the North Trumps them in the mounding charts.

Number of Trails

<table>
<thead>
<tr>
<th>Trail Quality</th>
<th>Nor Cal</th>
<th>So Cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>200</td>
<td>150</td>
</tr>
<tr>
<td>Intermediate</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Advanced</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Expert</td>
<td>50</td>
<td>0</td>
</tr>
</tbody>
</table>

REFERENCES
skimeanly.com
Mammothmountain.com

Data for average annual snowfall of the west coast mountain areas
Data on mountain trails, lift ticket prices, acreage, snowmaking, and lift capacity
Official site for Heavenly Lake Tahoe
Official site for Mammoth Mountain


View student infographics on Cal Maritime Library’s Facebook page: http://on.fb.me/1IPL67d
<table>
<thead>
<tr>
<th><strong>Communication &amp; Design (20 points)</strong></th>
<th>50%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information is insufficient to interpret the topic and main points.</td>
<td>Infographic displays information graphically, but does not have visual appeal.</td>
<td>Infographic is colorful and visually interesting.</td>
<td>Visual elements support communication of main points and overall understanding of the topic.</td>
</tr>
<tr>
<td>Visual elements interfere with main points.</td>
<td>Visual elements contribute to main points, but may be cluttered or confusing.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Data Accuracy (20 points)</strong></th>
<th>50%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data is incorrectly represented and/or not factual.</td>
<td>Data is mostly correctly represented but contains some errors.</td>
<td>Data represented is presented correctly and without error.</td>
<td></td>
</tr>
<tr>
<td>Source of data not reliable.</td>
<td>Most units are labeled accurately, with minor errors.</td>
<td>All units are labeled accurately.</td>
<td></td>
</tr>
<tr>
<td>Units are not labeled or are inaccurate.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Citation (10 points)</strong></th>
<th>50%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No citations or citation completely incorrect.</td>
<td>Data citation contains some errors.</td>
<td>All data is correctly cited in APA format.</td>
<td></td>
</tr>
</tbody>
</table>
Reflective Comics

Visual Exercise #5
Thank You to:

Matt Upson
Oklahoma State University

http://www.loexconference.org/2013/sessions.html
Choose a country that has ratified the Kyoto Protocol.
Collect reliable sources about that country’s efforts to meet the requirements of this treaty.
Document what you find in a graphic research narrative.
Dude using those same keywords, New Zealand, agriculture and Kyoto Protocol. I found a publication that outlines New Zealand's goals to reduce emissions.

Cite that s***t APA style.

AND THE BEST PART IS THAT OTHER PEOPLE CAN USE OUR RESOURCES TO DO MORE RESEARCH IF THEY WANT TO!

RIGHT ON!!

BEFORE THIS CLASS, DANIEL AND KAILEN WOULD ONLY USE GOOGLE TO RESEARCH, BUT AFTER TAKING LIB100, THEY ARE USING CREDIBLE SCHOLARLY SOURCES THROUGH ACADEMIC DATABASES. THEY NOW KNOW THE IMPORTANCE OF USING RESEARCH THAT IS CREDIBLE AND RELIABLE.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the comic address each of the reflection prompts?</td>
<td></td>
</tr>
<tr>
<td>Is there enough detail in words and/or images to be understandable? Are images related to story?</td>
<td></td>
</tr>
<tr>
<td>Is there enough organization in layout to be understandable?</td>
<td></td>
</tr>
<tr>
<td>Proofread for spelling and clean design?</td>
<td></td>
</tr>
<tr>
<td>Are sources reliable and relevant to topic?</td>
<td></td>
</tr>
</tbody>
</table>
Questions & Discussion

mhanson@csum.edu

http://www.slideshare.net/muumumuulibrarian