By: [Mike Pantoliano](#)   February 12th, 2012

Data Visualization Principles: Lessons from Tufte

Content

👍 46   💬 27

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When I began to practice SEO 8 years ago, I never would have guessed that I'd be writing a post about data visualization. Perhaps I might have foreseen myself writing about web analytics or information architecture, but data visualization seemed like something for the statistics fans. But today in web marketing, the emphasis on content has never been stronger, and it just so happens that one eminently shareable form of content is the data visualization. And I've come to love the crap out of data viz.

Another person that loves the crap out of data viz is Edward Tufte. 'ET', as he's sometimes referred, has been preaching the merits of quality data visualization since before the world wide web existed, let alone SEO. He has authored 4 books on the topic, is a professor of political science, statistics, and computer science at Yale University, and actually serves on Barack Obama's American Recovery and Reinvestment Act panel in order to provide transparency in the use of recovery funds. I was fortunate enough to catch him when he was in Seattle during his traveling seminar tour. I learned a lot that day, and have since learned quite a bit more through reading his and others' writing on the topic.
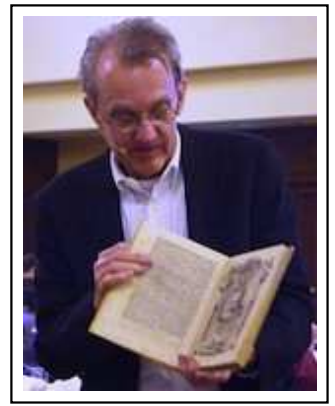
David McCandless's Information Is Beautiful Blog is a must-bookmark, and his TED talk below is a great data viz primer.

What's This Gotta Do With SEO?

Alright, enough with the intro. Let me quickly lay out what I hope this post will accomplish for the SEOmoz reader.

- Understanding of what makes great data viz great.
- Inspiration to think up and create (great) data viz for your company or your clients.

- (Maybe slightly self-serving, but…) Influence readers to cast a more discerning eye on data visualizations.

So far I've yet to say it, but there's an elephant in the room. Infographics. The buzz around the word has reached a fever pitch. Yes, infographics are a form of data visualization, but there are so many ways that infographics are being abused that the backlash seems to be rightfully mounting. Are all infographics bad? Of course not. Just the bad ones.

So, Wait. Am I Gonna Get Links or What?

As I stated earlier, and as you've probably seen, data visualization is a super-effective and shareable form of content creation. Now stay with me here: In this post I'm going to detail some of the principles of great data visualization as per Tufte's teachings, with examples that fit the bill. As of the writing of this sentence, I've yet to pull link metrics for any of the examples I've got planned. By the end of this post, I'm hoping to prove to you (and myself, really) that Tufte's principles aren't just highfalutin, hoity-toity, stats nerd stuff, but a checklist for highly effective data visualization link building.

These principles to which I'm referring are discussed in the first chapter of Tufte's Visual Display of Qualitative Information

1. Show The Data

Well, yeah. There have certainly been successful "infographics" that don't actually display any real data, but that's not really a piece of data visualization, is it? *The Trustworthiness of Beards* by Matt McInerney comes to mind. Regardless, it's funny as hell and was viewed by everyone and their mom.

No matter what the rest of this post says about data visualizations for attracting links, the bottom line is that if you've got a good idea that would be best be shared in graphic form, roll with it. Because this graphic was originally hosted on imgur.com, the link metrics behind it are a bit fragmented. The .jpg file itself has over 200 linking root domains in OSE, and according to the designer it was, "Viewed over 1,000,000 times and featured #1 on the reddit homepage, LaughingSquid, FHM, and the LATimes".

2. Provoke Thought about the Subject at Hand

Tufte's full thought on this:

> Induce the viewer to think about the substance rather than about methodology, graphic design, the tech of graphic production, or something else.

Tufte wrote this originally in 1983, and while the spirit still holds, I think it should be revised for today's times, especially framed in the context of link building: Our data visualization should provoke thought AND influence the reader to share.

Data visualizations built around economic and social matters are surefire ways to get your audience thinking and also have an inherent shareability (a product of the times and the human condition, I suppose). David McCandless's _The Billion Dollar Gram_ is a visualization that provides context to the incomprehensibly large monetary figures we hear in the media.
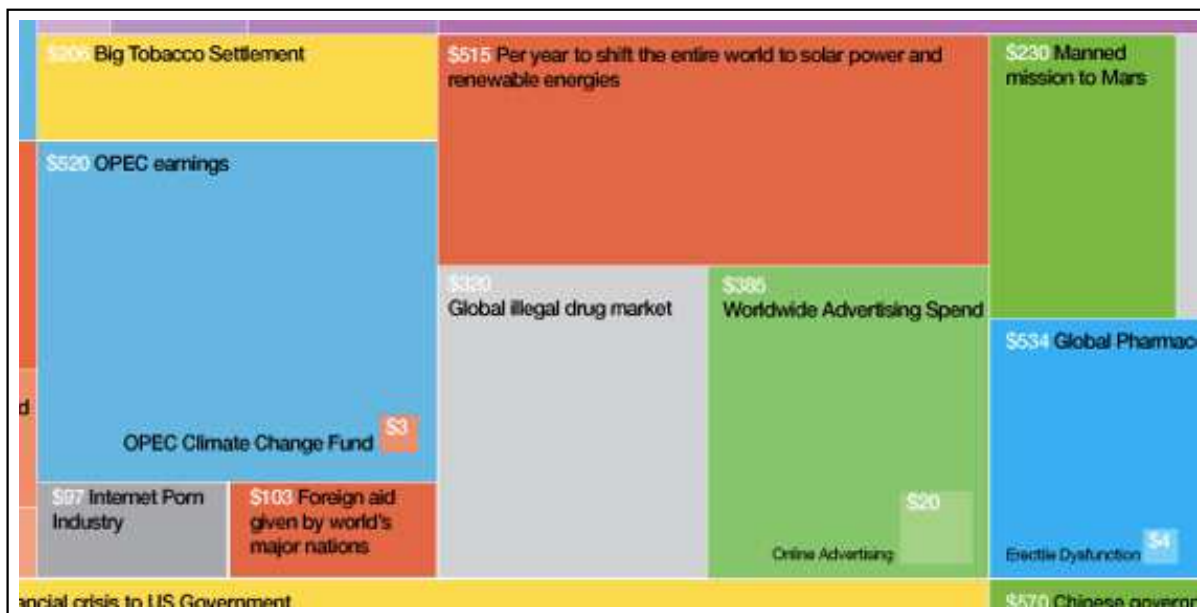
Despite not offering an embed code or dead-simple social sharing buttons, this visualization was a success: 2,801 tweets, 4,677 Facebook Shares and Likes, and 298 linking root domains.

Regarding the focus on substance rather than methodology, Tufte explains that the map makes a fantastic visualization medium because we've no reason to question methodology. A map is recognizable, allows us to put a lot of data in a small space, and displaying the data within allows us to easily understand and compare as needed. We'll see a map before this post is done.

3. Avoid Distorting the Data

It should go without saying that a great piece of data visualization should tell the story honestly. Pie graphs, and especially exploded 3D pie charts, are the favorite whipping boy of data viz geeks, often because of their distortion and lack of clarity ("chart-junk").
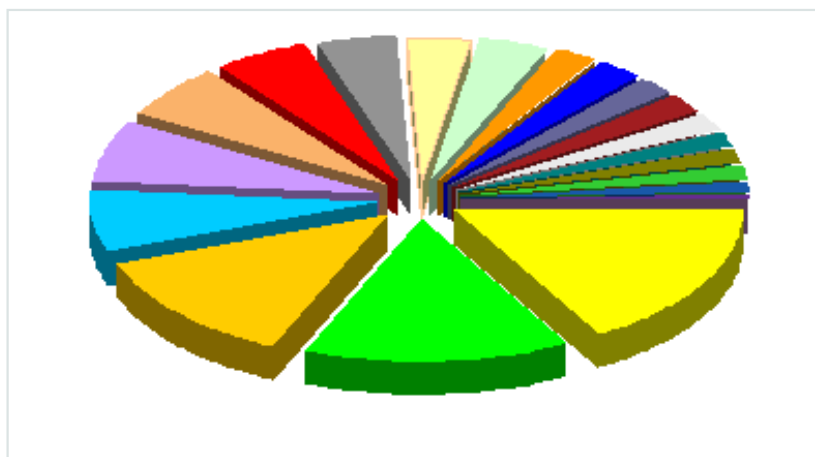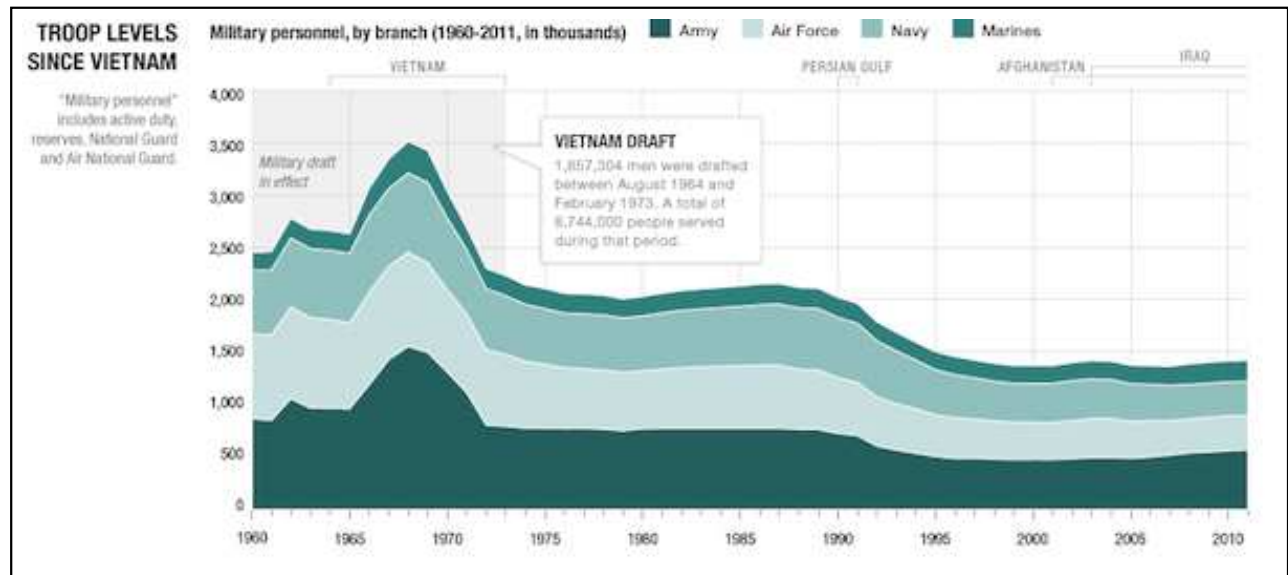

Bad 3D Exploding Pie Chart

I can't believe I'm putting this in a blog post, but 'with great power, comes great responsibility'. Yikes, quick shower, hold on.

But, it is true. If you've got great data, do it justice by presenting it honestly.

NPR did a visualization about the makeup of the US military that took a ton of interesting data, and represented it in a variety of formats.

Did it work? Well, it didn't exactly kill it according to OSE (12 linking root domains, handful of tweets, and 700+ Facebook shares/likes), but I don't suspect a news organization like NPR makes much of a link building outreach effort.

4. Present Many Numbers in a Small Space

Charles Joseph Minard was a French civil engineer that created what Tufte calls, "The greatest statistical graphic ever drawn": A map of the Napoleon's Grande Armée's advance and retreat into Russia.
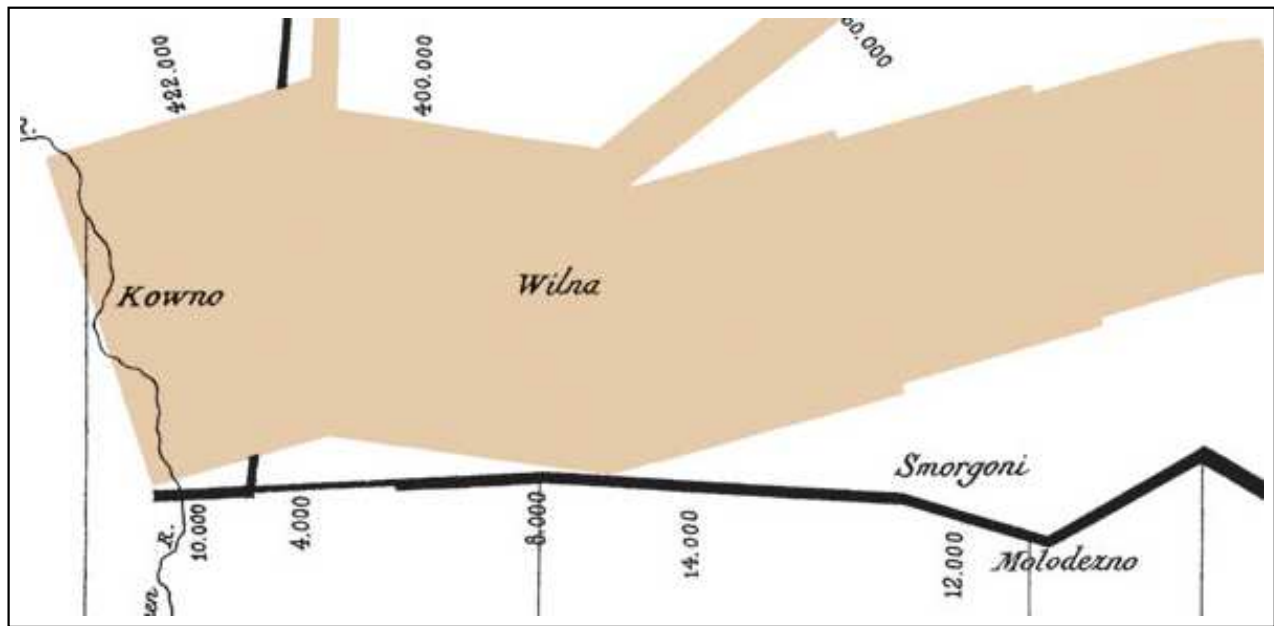
The graphic impressively manages to depict 6 different sets of data: latitude, longitude, direction of movement, time, temperature, and size of the army.

Obviously, because this is a graphic made in the 1800s, looking up link metrics would be a bit silly.

5. Make Large Datasets Coherent

Distilling down a big chunk of data is not easy, and the onus often falls on the designer. Tufte laments that the "lack of quantitative skills of professional artists" is what makes designing a great data visualization difficult. The best designed visualizations exist as a symbiosis between smart quantification and beautiful and elegant design.

David McCandless and Lee Byron made a graphic of Facebook post-break-up status messages by the time of year. Over 10,000 status updates in this pretty little graph:
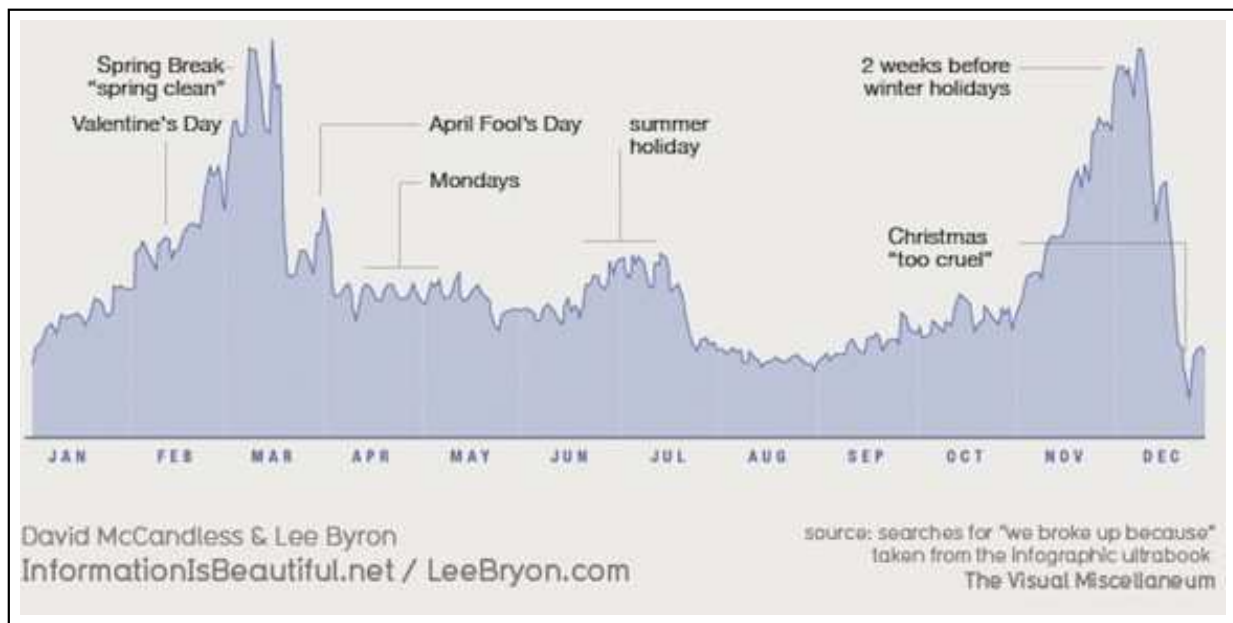
Some fun data, for sure, and people loved it. <u>Open Site Explorer shows</u> 92 linking root domains, 3,000+ Facebook shares/likes, and nearly 1,000 tweets.

6. Encourage Eyes to Compare Data

Though not necessary, interactivity makes comparing data in a visualization particularly fun and engaging. Sometimes the best use of a dataset is to present the viewer with the controls, letting them uncover things on their own.
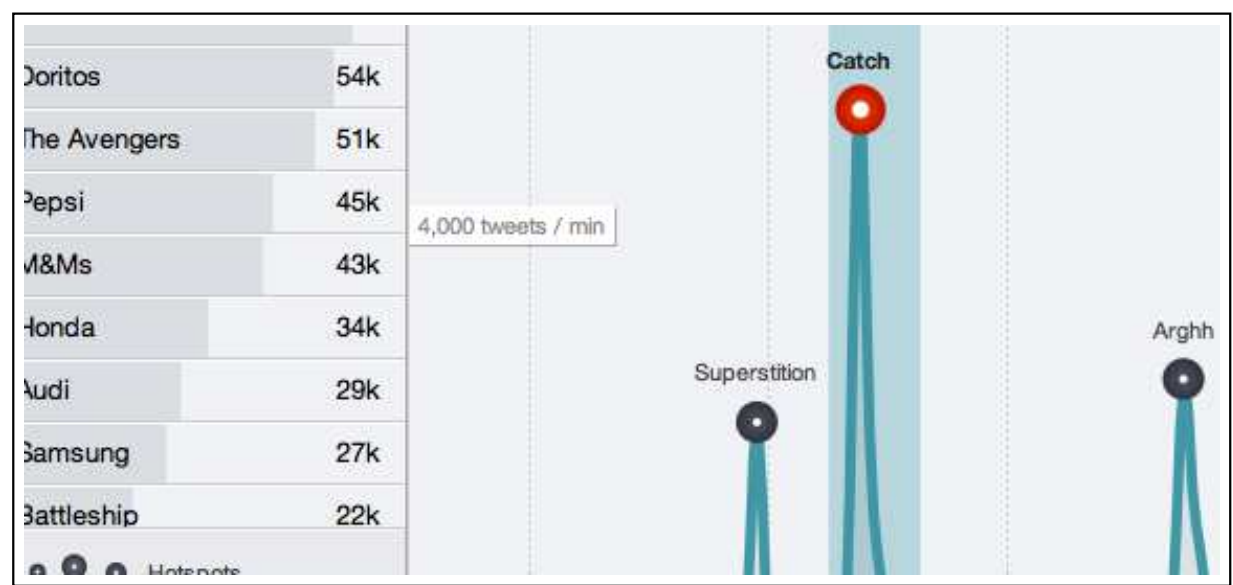

I had a lot of fun playing around with <u>Hotspots'</u> interactive display of Twitter buzz for this year's Superbowl ads. It's too new for link metrics, but I'm honestly surprised at the lack of social mentions: Only 29 shares/likes and 96 tweets?

7. Reveal Data at Several Levels of Detail

Many ambitious datasets call for a visualization that gracefully handles the large, 30,000 foot figures way down to the super granular, all while maintaining the proper spatial relations. This allows the viewer to explore the data; he or she understands the big figures quickly, but has the opportunity to pick out some of the more minute details.

This infographic by the Technology Review details the space launches by country. It's a two horse race between the US and the USSR/Russia, but it's pretty fun to see how other countries have done space launches as well.
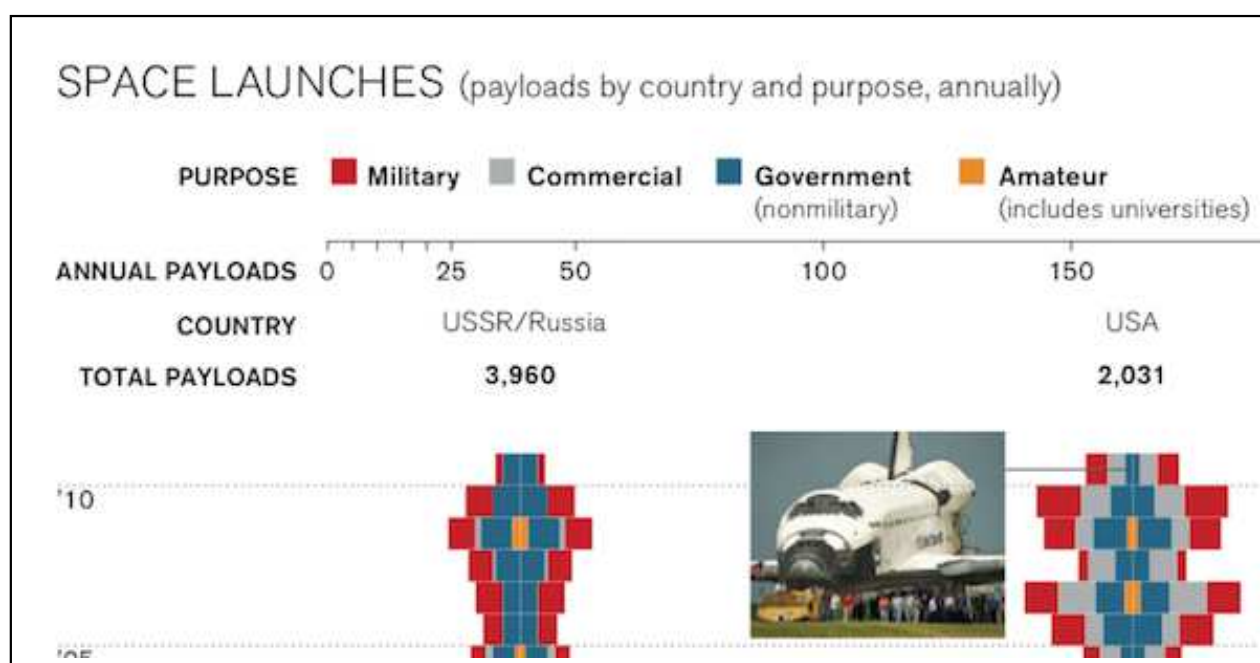

Its links were split between the PDF infographic and the post announcing the infographic. All told, it's still one of the least linked-to (roughly 30 LRD) and socially mentioned visualizations (~300 likes/shares, 29 tweets) in this post, but as with the NPR visualization, there likely wasn't much link building outreach done.

8. Serve a Reasonably Clear Purpose

What's the hook? After brainstorming ideas for clients at Distilled, this is how we narrow down our options. If you're not telling a story to an audience that will care, you're destined for a piece of linkbait that'll fall flat. I could expend the effort to visualize, say, the number of fast food restaurants in Bergenfield, New Jersey (my home town - I cried when Roy Rogers was closed) over time, but who would really care?

We put together an interactive visualization for Food Service Warehouse that compared the average calories consumed per day with the percent of income spent on food broken down by country.
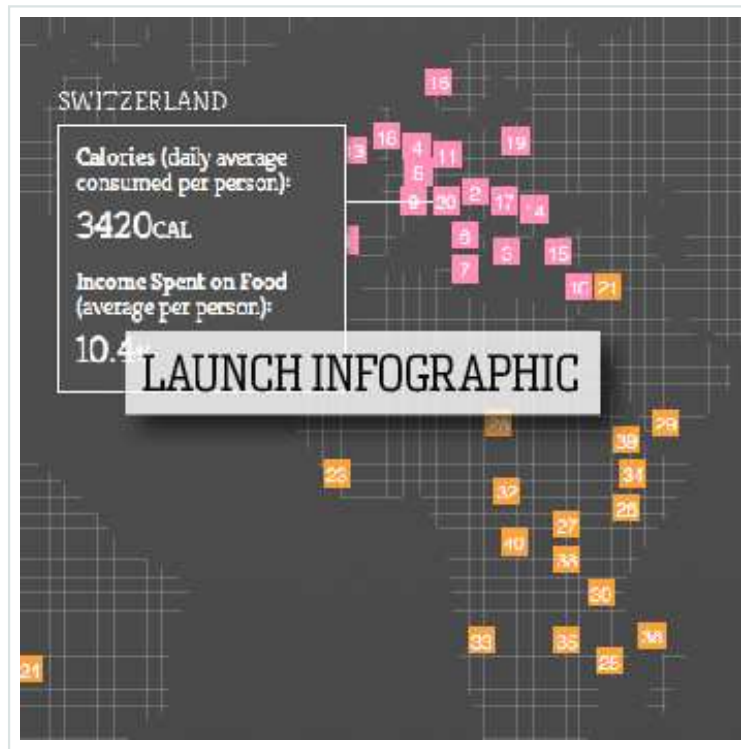

The result was a successful infographic (still a bit new for link metrics, but 26 LRD including newyorker.com, one.org and heifer.org, to go with 2,000+ likes/shares, and 1,200+ tweets) that highlighted the food consumption and economic disparity throughout the world.

9. Be Closely Integrated with Statistical and Verbal Descriptions of the Dataset

While your data visualization should be able to speak for itself, every release should include a link off to the raw data, and some explanation of the how and why. Your writeup provides you with an opportunity to explain why your findings are important, as well as highlight other interesting findings. Sometimes your visualization warrants further explanation, but doesn't fit within the graphic itself.

Thomson Travel's How Music Travels - The History of Western Dance Music was a one-page interactive graphic, with further explanation and sources in the announcement blog post.
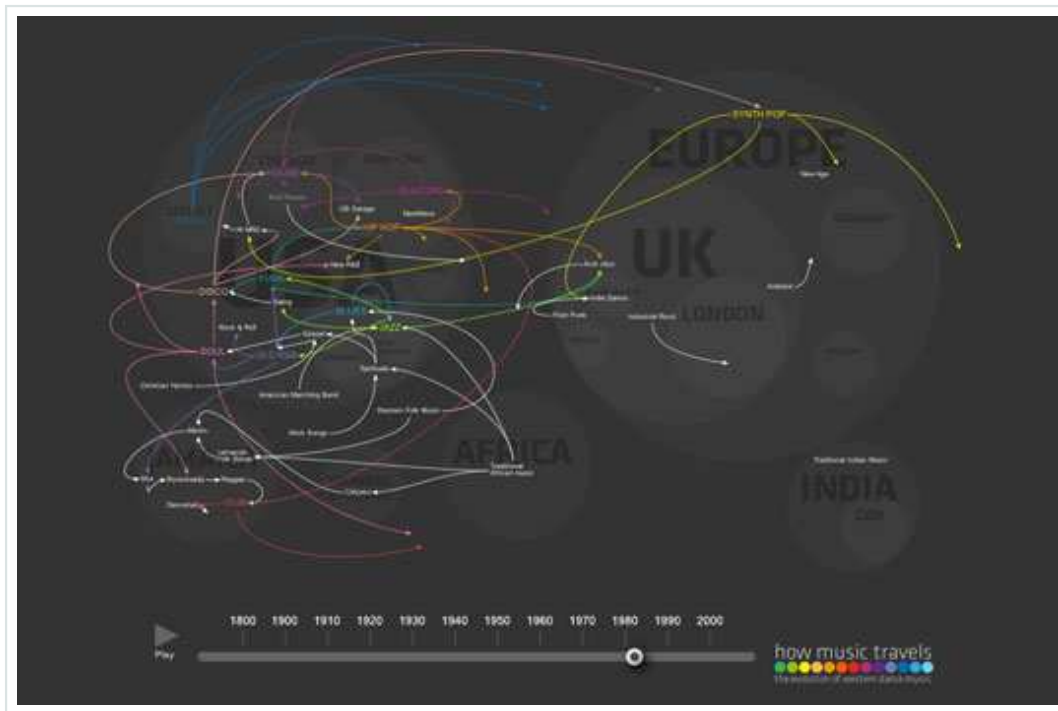
This data visualization was arguably the most successful of the ones in this post, with almost 250 LRD, 24,000+ shares/likes, and 5,000+ tweets.

In Conclusion

So if you follow each of these principles will you definitely succeed in getting links for your data visualization? Of course not.

It's important to remember that the data visualization is still just a medium for presenting (hopefully) interesting content, in the same way that the a blog might be home for a link bait blog post. Sure it helps to have a beautiful visualization or a crazy-awesome design for your blog, but it's still just a frame around what matters most.

Still, in the same way that your blog should follow some best practices for allowing maximum exposure like proper keyword research, social buttons, comments, etc., I'm hoping some of Edward Tufte's principles help improve the quality of your next great data visualization.

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Rand Fishkin
4 years ago

STAFF

This is a great post Mike, and a very timely topic. I see a lot of marketers investing in visual content and infographic strategies, but sadly ignoring the realities that if they're not high quality, the effort is largely wasted. Maybe my favorite of your rules above is "Serve a Reasonably Clear Purpose," simply because so few do this right.

👍 13   👎 0   💬 Reply

Ann Smarty
4 years ago

Very timely indeed. I see the overload of infographics nowadays but seldom they are done with much thought or research or purpose behind them

Pawan Dhiman
4 years ago

Great post Mike... very usefull and valuable for all.

Heather Robinson
4 years ago

Excellent reading for a Monday morning (uk)! I agree that infographics need a clearly defined purpose and thorough research.

You need to be able to say that this subject matter is of interest to people and people will want to share it. I think the reason why the moustache one works even without proper data, is humour and everyone can relate to that - it crosses many cultural/geographic boundaries (as long as it's not offensive).

The makeup of the US military possibly has limited appeal due to its subject matter despite providing quality, valuable data, which could be why it hasn't been as big a success as some of the others.

Gianluca Fiorelli
4 years ago

ASSOCIATE

Great post Mike (thanks for the video). Personally, I think that when it comes to data visualizations, people should know at least a little about how the human brain reacts to them; let's say, have some basic of psychology and neuro-marketing. In fact, everything visual, on the contrary of everything written, plays mostly with human basic emotions. Even though you are presenting cold data, the way you visualize them can enhance or dig the success itself of the visualization. For instance: the color patterns used, the visual style chosen, the typography, the sequence how the informations are presented, the archetypical

simbologies' strenght of the images used... That is why of 100 infpgrapohics just 2 or 3 really break the barrier of a gentle indifference, and that is why to produce great data visualization cannot be considered a fast, easy and cheap content marketing tactic.

👍 3   👎 0   💬 Reply

Asad Wahab
4 years ago

Yeah graphical stuff go viral soon, Do you know the Ann Smarty of myblogguest.com? She too started a separate section for guest infographics.

👍 3   👎 0   💬 Reply

Dan Peskin
4 years ago

Great post Mike. I loved that you reinforced one of my biggest issues with data visualization today, the fact that people need to avoid distorting the data. Avinash wrote a really great post about the big mistakes of poor data analysis and the display of that data here. It basically sums up my feelings on the issue well.

It's so important to learn to use the proper types of graphs/charts for the proper set of data and avoid trying to skew the look of your data by readjusting the intervals or measurements at which it's charted. And the fact is, if you have to go through all of that to get a positive looking chart, it means your hiding something or you just have bad data.

People need to come to that realization and move on until they gather good and informative data that speaks for itself when visualized.

👍 3   👎 0   💬 Reply

cgman
4 years ago

What is the difference between having an on-page visualization such as done by the author, vs having an embeddable graphic. Which do you think does better?

Jonathon Colman
4 years ago

Nicely done, Mike - this is great! It shows how our industry can refer back to a foundation of theory; we're essentially standing on the shoulders of giants when it comes to data visualization.

I read Tufte's Beautiful Evidence for a UW grad school class last quarter and we had a whole lecture dedicated to *just* the Napolean graphic! That book and his other works are a great reference for anyone working on infographics. You can see Tufte's hand in XKCD, in The Oatmeal, and several journalism outlets who do data visualization, including our own *The Seattle Times*. Hell, it's practically the entire reason why entire companies like Tableau Software exist!

Reading your post and turning to Tufte's books is an excellent primer for anyone who wants to get started in data visualization or make their infographics better and more useful.

Steve Webb, Ph.D.
4 years ago

Nice post, Mike. Similar to Jonathon's experience, I was also introduced to Tufte in an infoviz class back in grad school. Since this post was like a walk down memory lane, I tracked down a few of the infoviz blogs I used to follow back in the day (in case anyone wants to learn more about infoviz):

You already mentioned the "Information is Beautiful" blog.

Visual Complexity

Chart Porn (Great name... and SFW.)

Junk Charts (It looks like this one is now defunct, which is a shame because I used to enjoy the commentary on bad visualizations.)

While tracking down the old blogs, I also found these:

Cool Infographics

37 Data-ish Blogs You Should Know About

SteveWebb edited 4 years ago

👍 1   👎 0   💬 Reply

Dr. Peter J. Meyers
4 years ago

STAFF

Great review, Mike. I just read Tufte's "Visual Display of Qualitative Information" and McCandless "Visual Miscellaneum" (the American version got a worse title, for some reason) last year, and I've been hooked ever since. There's something amazingly powerful about being able to effectively simplify information and still communicate the intent. Very few people do it well, and most infographics botch it completely.

👍 2   👎 0   💬 Reply

Keenan Steel
4 years ago

Brilliant, Mike. I was just waiting for you to tear into someone for doing it all wrong, as I'm sure you could have, but I appreciate that you took the high road. I think we have more to learn from the things done correctly, anyway. The only brilliant and wildly successful IGs I would add to the list are from XKCD. They're not as pretty, but they do vizualize a ton of data that you would struggle to even find elsewhere.

I'm now thinking back to all of the times I've used 3d pie charts with regret and shame. Thanks for an awesome post, Mike :)

👍 1   👎 0   💬 Reply

BrettASnyder
4 years ago

Love the post Mike, you bring it as we've all come to expect! As many people have noted people will jump on the infographic bandwagon without evaluating the goals of the strategy and what they expect to gain as a result. Without this vision, you're already behind the 8 ball and it makes it so much harder to address the very things you mentioned in this post.

Thanks again for the great post!

sabila1230
4 years ago

great and use full sharing, appreciated

Matt Beswick
4 years ago

Fantastic post! The 'Information is Beautiful' book is a must buy... great for inspiration, flicking through when you have a few spare minutes (or are sat on the toilet)! I've recommended it to pretty much everyone I know - should've used an affiliate link ;)

Brian Greenberg
4 years ago

Great post. I watched the ted videos and they were enlightenting. Thank you.

Mark Capuano
4 years ago

Absolutely a great post and thanks for the link to the video too. I like the point that was made about how data visualization or a good infographic really can educate you on a lot of different information about a subject in one small space. It really gets to the point, captures the audience and educates the audience all at the same time.

Harald Tschuggnall
4 years ago

Hey Mike great post! Infographics have always been an interesting topic for me and you have shown some very useful points about them. I personally believe that an infographic should either have something very important or of value to be shared else it should be downright funny, else there is no reason to be checking it out.

There has to be a purpose for the creation of the infographic as you mentioned in point number 8 "Serve a Reasonably Clear Purpose".

Everybody nowadays has been using and putting up lots of data visualizations in their blogs but only a few are worth value.I don't understand why people forget that a good infographic is the one that has both content and design.

They really do forget what that "The best designed visualizations exist as a symbiosis between smart quantification and beautiful and elegant design".

Carter Cole
4 years ago

i love that ted talk... data is awesome... especially clean data

7ThDanWebNinja
4 years ago

Bit of global synchronicity going on here, I think that good data visualisation is essential in SEO now, I am currently working on ways to present reports in a simple and near immediately understandable format. When you deal with sites that have hundreds of thousands of pages targeting many different keywords how can you present this data in a meaningful way?

I think one of the best uses I have seen here recently was the tracking of TV campaigns against the analytics which simply tracked the keyword in the AD against search volume / site traffic and of course conversion. This does sound extremely simplistic but for the task at hand of demonstrating the ROI of driving site traffic via TV it takes around 5 seconds of looking at the graphic to work it out, regardless of your understanding of any aspect of the campaign.

I suppose my point is a very simple data visualisation can cut the need of hours of eplaining down to minutes which makes everyone happy.

7ThDanWebNinja edited 4 years ago

👍 1   👎 0   💬 Reply

Jean Marc Thomas
4 years ago

Great post and comparison!

You could have made an infographic out of it!

👍 1   👎 0   💬 Reply

JW Webmarketing
4 years ago

This is a very useful post. I think that marketers should never lose sight of good old principles such as researching who you are trying to reach and then choose the appropriate channels and the best suitable visual representations for that particular audience.

👍 1   👎 0   💬 Reply

Holly Wade
4 years ago

Thanks for the post, loved the video. When it comes to infographics, in addition to thinking of the phrase "the elephant in the room" I also think of "How do you eat an elephant ? One bite at a time." I feel like infographics are this huge difficult thing to handle. Thanks for giving some pointers that make it easier.

👍 1   👎 0   💬 Reply

MajCom
4 years ago

I've hit the digg frontpage over 50 times with infographics. You leave out one very important component to a winning infographic..er.. data viz.

Tell a story!

👍 1   👎 0   💬 Reply

Jacob Klein
4 years ago

Awesome post, Mike. Borrowing one of those books immediately!

👍 1   👎 0   💬 Reply

SEO Goldfish
4 years ago

Great post Mike, its amazing what power infographics hold if used correctly. Really cool post with all the good and bad examples, gj on this post.

👍 1   👎 0   💬 Reply

Koniele
4 years ago

you are master man!great post!

👍 1   👎 1   💬 Reply

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