First I have a question. When I say "design", what words come to mind?

Ok, so it seems like design is a lot of things, all kind of hard to define. Why is something so important so unclear?

**DESIGN IS INVISIBLE**

I think that a lot of it has to do with the fact that good design is invisible.

**CLEARVIEW**

To illustrate this point, let me tell you a story about how a font can saved millions of lives.

So typical road signs used to be written in a font called Highway Gothic, which was the dominant font up until the early 2000's. But it had problems. Whether people noticed it or not, it was hard to read in rainy weather, from a distance, and at night. When light hit the words, they basically appeared to blend together in a glowing, blurry mess, something known as halation. This may be annoying to an average person, but if you're driving at 70 miles an hour and say, are elederly and have bad vision, it can be deadly.

So highway engineers struggled to find a solution. They thought maybe making the letters 20% bigger would solve it, but that would only require bigger signs and require millions of dollars.

So they turned to two designers: An environmental graphic designer and a type designers. These designers developed Clearview, a new typeface that was designed to take up the same space as Highway Gothic but be much easier to read. They made a lot of changes, but most importantly tweaked the tiny shapes inside the letters called counter spaces (like the inside of the O or P). And it worked! After a bunch of tests in bad weather and dark conditions, Clearview was fond to improve drivers’ reading accuracy, reaction time, and recognition distance. Soon, highways across the country began to adopt Clearview.

But why haven't you heard this amazing success story of Clearview? Well, because nobody really noticed the change. Although it proved to be so much better, much more legible, have all these benefits that keep us safe on the road, it remains largely invisible. We don't notice it, because it does it's job.

This goes for all of typography. It's job is to let you focus on the message, rather than the presentation of that message. It shouldn't doesn’t call attention to itself or get in the way. It shows off content.

**NOTICE IT WHEN IT BREAKS**

**DOORS**: When we do notice design, it's typically when it breaks down, when it fails us. Who here has trouble opening doors on occasion? This typically isn't because we're dumb, its because the door is not designed well. We have pull handles on doors meant to be pushed, or vice versa.

**STOVETOPS:** What about stovetops? Who can tell me how to turn on the bottom left burner for the stovetop on the left? What about the right one? The one on the left is impossible to make out, because of something called mapping. The righthand side has the knobs in a similar position to the actual burners, so its easy for our brains to map out which knob corresponds to the real burner.

**SHOWER FAUCET:** Another example. Anyone ever had trouble figuring out how to turn on an unfamiliar shower faucet? It can be pretty difficult, even apearing, like this one, with a 3 paragraph instruction manual. Just to operate the shower!! This is clearly a design problem.

**INSTRUCTION MANUAL:** Don Norman likes to say "IF a device as simple as a door"... failure. Instruction manuals are typically signs not that the object itself is complicated, but that we need a better design solution. When I spend 10 min trying to get my shower started, when I can't find the home button on a website, when I puzzle and puzzle but still can't make out this crazy map, that's when I notice design. But when the design is good, it is so intuitive that I just focus on the task at hand, and the design is invisible.

**NOT THAT INVISIBLE:**

But... there is a limit to how invisible you make your design. And I think we run into this trap when we try so hard to make beautiful things, that we risk making unfunctional things. These doors might be clean and instruction free and beautiful.... but how do you open them? Invisible doesn't mean glass doors that are so aesthetically pleasing you can't use them.

**BEAUTY**

Or take a look at these data visualizations. They are gorgeous, but they display gibberish data. They mean absolutely nothing! So it's important to distinguish between forms that are beautiful, and those that actually accomplish the goals of design. And design is not only how things look. It's how they work.

**CRIAGSLIST**: If design were all about looks, Craigslist wouldn't be a thing. Design is at its core much more about making the user's life easier, about helping with actual tasks as well as thinking tasks.

Whether that's making it easier to read a book because the typography is set correctly and is readable, or making sure a poster grabs your attention and gives you the info you seek, whether that's the data visualization that displays data in an understandable way, whether it's placing elements in a story at precisely the right spot so that they help the user, or giving people hints about how to navigate a website, or preventing them from making mistakes.

We could talk about this all day, I think there are plenty of examples of designs that call attention to themselves. But the main point is that those are conscious decisions, and should never happen because of a lack of care or a haphazard arbitrary placing of elements. You need a good reason to have the design call attention to itself. And especially n the context of journalism, its important not to get too carried away with aesthetics at the expense of functionality. The gorgeous chart that is impossible to read will not help your users. In art, this is different, right? Data art is great, and we can learn many things from artists who use and present data in interesting ways. But we should never confuse their purpose, which is often to make a beautiful thing, with our purpose, which is to make a useful thing.

So, how do we actually make these things? Well, several principles can go pretty far. These 4 principles will go a long way to make design work, and they apply throughout the journalism world. Basically anytime you're combining words & pictures and visual forms, these principles apply.

**DESIGN PRINCIPLES**

**PROXIMITY** - Group Related Items Together

Proximity is like organizing a drawer. Things that are similar, like socks, get put together. Shirts go someplace else. If related things are grouped together, they are easier to find, and no one is forced to hunt around for information (or socks).

Putting things together visually that belong together conceptually not only reduces clutter, but helps establish a visual hierarchy as you group and subgroup different elements into discrete visual units. Fight the inclination to evenly spread out all your content and fill every pixel of the screen. Well-organized empty space can direct people’s attention in the same way a headline can. Don’t fear white space.

Here’s a list of topics on NPR’s website. Hard to tell where to find Videos, for example, or whether these items are all related or somewhat different. In the redesign on the right, they are groups. Merely by putting items together, our brains can tell they belong together.

Proximity means keeping text close to the data it is describing, legends close to the map they’re explaining, etc. The “annotation layer,” a phrase coined by by Amanda Cox for guiding a user’s attention and providing clues to what’s important, also works because relevant text is positioned next to the elements being described. (Here’s a wonderful example of an annotation layer adding context and explanation.)

In this reconstruction of the Boston Marathon bombing, descriptions and labels are placed as close as possible to the relevant parts of the image (sometimes directly overlaid) instead of, say, listed all at the bottom.

**ALIGNMENT** – Find a Line and Stick with it

In graphic design you often hear about alignment in terms designing on a grid, or making text flush left or right. These are examples of a higher principle: Everything should be positioned for a reason, and should align with related elements. Strong lines can help organize elements, so proper alignment gives a sense of structure and unity. When in doubt, find a line and stick with it.

Alignment is the driving force behind the table, one of the most common ways to present data. So prevalent we probably pass them over most of the time, tables are great examples of how alignment can aid the presentation of a lot of data. Here's a table from the NY Times on various super pacs and how they are spending money on various candidates.

Alignment can also be used to represent more abstract concepts than just organizing a bunch of boxes. In this example alignment is used to organize time (a line's placement on the horizontal axis indicates where it lies in time).

Now the main thing about alignment is to not place things arbitrarily. Now, a lot of people's first inclination when they are throwing things only a page is to center things. It's easy, its symmetrical, it seems like the best choice. But I want to tell you to avoid this impulse at all costs!

So what’s the problem with centering something? We have one clue from our alignment principle: find a line and stick with it. When you center something, there is a line, but it’s more subtle. It runs through the middle and is definitely not as strong as a left or even right aligned piece of text.

Now, this isn't to say you can't ever center something, but if you do, make it obvious. Make that center line as noticeable as possible.

**CONTRAST** – Don’t Be a Wimp

If two elements are not exactly the same, make them VERY DIFFERENT.

Contrast is perhaps the most appealing part of a design, it attracts the eye, it can provoke emotion, it directs attention. The key is to not be shy about it – don't have anyone think that it could be a mistake. Use design choices like color, size, and typography boldly to get people to notice what you want them to. The eye is drawn to movement on a still page, bright colors on a page of muted colors and bold elements on a page of neutral ones. Contrast attracts the eye, provokes emotion and directs attention.

If a user has to work to figure out whether a switch from 12-point type to 13-point type was actually on purpose (“is it really different? why is it different? what does it mean?!”), then she is working too hard and has missed your point. Make it obvious.

For this graphic on drones, we wanted to point out contradictions between statements from officials on the CIA drone program. Among the long list of statements, we used a contrasting color to indicate the outliers, highlighting the contradictory statements in red. Strong color differences are processed very rapidly by the brain’s visual system. They immediately pop out from the background, which in this case was the effect we intended.

Contrast can reveal the variability that exists in the data, add visual interest and make a point. It can also tell a story. This NY Times interactive on the aftermath of a deadly tornado lets you look simultaneously at a street in Moore, Okla. before and after the storm. Here the contrast comes from the photos themselves. Our brains are attuned to notice the differences, so highlighting them is a matter of capturing and closely coupling the panoramas.

I'm sure many of you have seen examples of those before/after slider, which lets you look at the past and present of one place at the same time. The principle at work in all those examples is contrast.

White space can also be a form of contrast.

When baseball writers refused to nominate any players to the Baseball Hall of Fame, the NYTimes sports section published a huge blank page with the headline, "And the Inductees Are..."

Nothing. White space. The contrast of the huge white page makes a stark point.

**REPETITION**: Pick an element and use it over and over.

Repeating visual elements like shapes, typefaces and colors establishes a sense of purposefulness and internal consistency. You can use these elements to unify a design across multiple pages or products, so that users know they belong together. For example, the TIME magazine has this iconic logo and color red, that it uses to establish a cohesive look and feel and remind you that all you're reading the same publication each time. You can also use repetition to associate elements in a user's mind with a particular function, such as the ability to input text or sort a table. For example, a blinking cursor is repeated all over the web to mean “if you type the text will appear here.”

In the same way, repetition can be useful to establish a visual cue for the function of an element across projects. At ProPublica we have an internal set of standard design elements, such as a particular color blue that we use for all the search boxes or input fields, which we call “do something blue.” We repeat this color throughout our site so that people who’ve used our apps more than once begin to associate the color with the ability to search, filter or participate.

Repetition also helps the user instantly see what is similar, and reveals what is different. By seeing the same form repeated, the user can easily recognize slight variations. This is the idea behind small multiples, which are sequences of small graphics that display differences in data and can be easily compared. Small multiples have the added benefit of not relying on the viewer’s memory to see the comparisons, because every element is presented to you at the same time. In this NY Times graphic, you can actually see changes in drought patterns because your eye becomes accustomed to the small U.S. maps and perceives only the changes between them.

Same idea in this chart of "The Great Migration," when more than 6 million African Americans relocated from the rural South to urban centers across the country between 1910 and 1970. By showing the same map form and having every image change as you scroll, we are able to see and compare these movements more easily.

Repetition can also provide context, and you can use repetition to serve as a background to the element you are really interested in. In this example of unemployment rates for different types of people, the lines are repeated over and over and only the one that applies to you is lit up. The rest serve as context, as sort of background singers to showcase the main event.

Common Forms: Repetition doesn't just exist inside your app – people have seen charts and graphs before, and there are some forms that are more familiar than others. People tend to read lines as representing trends – while bars are usually seen as representing distinct quantities. Use that to your advantage, by tailoring your presentation to common psychological intuitions.

**SUMMARY**: 4 principles.

Proximity: Group related things together.

Alignment: Find a line and stick with it.

Contrast: Don't be a wimp, if its not the same make it VERY different.

Repetition: Pick an element and use it over and over.

**AN EXAMPLE IN THE WILD:**

So, in summary, let's look at an example of what a difference those 4 principles can make. Here's a typical credit card disclosure statement, something that's appeared on American credit card forms since 2000. The type is too small, the headings are not prominent enough and many critical facts are buried in the fine print below the actual chart. This is a problem! Even Obama said a few years ago that “You shouldn’t need a magnifying glass or a law degree to read the fine print that sometimes doesn’t even appear to be written in English.”

No, we can probably think of some reasons why credit card companies would want to make the fine print obscure and hard to understand. But as journalists, we have the opposite goal. We want to reveal the information, not hide it.

**REDESIGNED VERSION**

So there is lots to work with here. How would we go about re-doing this form, knowing what we know now about our design principles? Well, luckily, a non-profit group called Designs for Democracy did a new design for us. This is their version.

So, first things first. This is not the most stunning visual design in the world. Its not beautiful and slick and glossy, but it gets the job done. What's different about it is that its designed with the USER in mind. It is useful. It is straightforward and easy to understand because conscious decisions were made to make it that way. They even used a form that we all should be pretty familiar with: the Nutrition Fact labels you see on every packaged food item in grocery stores.

**BEFORE & AFTER**

Proximity: text is grouped together so your eye can see which types of information go together.

Alignment: Everything is left-aligned, making it much easier to follow. It's also presented in a format we all are used to reading: a table.

Contrast: We see sections that are not just a few sized different, but Huge white text against a black background.

Repetition: Thick black horizontal lines break up the form into sections, and also indicate that these are distinct sections, with similar

There's another thing I like about this example, and it's not a design principle per se. But notice that these designers from Design for Democracy did not just change around the LOOK of the credit card statement. They actually translated a lot of this complicated legalese into simple language describes charges and payments and stuff like that. They also DELETED a lot of stuff, eliminating everything that was not necessary, so that the really important info was not buried in fine print.

Often as journalists, and definitely as visual journalists, you will be in a position to be actually writing the stories or the intro text or the annotations that go along with or make up your graphic. It's your role as a designer and a journalist to take this seriously and not leave the words to the end. You are often in the best position to write clear and easy to understand labels, because you are not bogged down within a sea of jargon. This is part of your job, and cannot be disconnected from design. Again, design is not just about how things look, its about how they work, and words, even if they are tiny labels or annotations, are super important in making a visual piece of journalism work.

So speaking of small labels... We're going to turn to one more element of design that I think everyone should take away from his talk. And that is, that design is all about the details.

**DETAILS:**

And this brings me to my last main argument about design. It's all about the details.

These interactions might seem trivial at first. Who cares about a hover state on a button, or a confirmation box, or a minor color change? But when it comes to designing details, Charles Eames said it best: “The details are not the details. They MAKE the design.” So let’s look at what wee things can do to help make our interactions better.

**Give Hints**

Small, strategically placed hints can help direct someone’s attention to what they are supposed to do, to what will happen once they do it, and whether or not they actually did it successfully. One way to give hints it to take advantage of Affordances.

#### Affordances: In the physical realm “affordances” refer to the attributes of an object that make it do what it does. A wheel affords rolling, a light switch affords flipping, etc.

In the online world, we depend on perceived affordances, like buttons that look like buttons and links that look like links. Much of this is convention–there is nothing about blue underlined text that necessarily means a link, but these conventions have become established over time, and we use them to give people a clue as to what they can do.

Here’s an example of a pretty obvious hint. In the following graphic from Bloomberg Businessweek, I see a blinking purple circle and think – ok! I can click here.

Here are some more subtle hints from two stories from the NY times. They each have a series of dots along the bottom of the page and as you scroll, they highlight one by one. The left to right sequence also hints at the direction that I need to swipe to move through the interactive.

Speaking of swiping, next are a couple of hints that I need to swipe to access whatever comes next, from a NY Times article and my iPhone. As you can probably tell, this is early days for mobile swiping instructions –designers haven’t quite made up their mind whether “slide” is actually the better word or which side the arrow should go one, but ok, they work.

But we can do stuff even without arrows. When I go to share an image on my iPhone, I get a bunch of app icons that show me my options. I can see four of them in full, but I also know that there are more to the right. How? I can tell instantly because I see a portion of the next app icon peeking out from the right side. The need for a “See More” label has been eliminated by design.

#### Bring Data Forward

Tiny details can also help us present data up front instead of forcing a user to go seek it out. In some cases, bringing the data forward actually eliminates the need to interact at all. For example, Chrome shows an icon of a speaker if there is music playing in one of your tabs, so you don’t have to frantically click through and try to find out where that music is coming from. On an iPhone, the calendar app shows you the date without you having to open it up to find out. The clock app shows you the time.

Chrome shows you all the instances of a term you’ve searched for on the page, in the little tick marks on the right side, bringing that information forward to you.

This website, rather than just telling me the office hours, includes what time it is at the office, right now. This is a relatively simple achievement (computers are pretty good at telling time) but it saves me the trouble of calculating time zone differences. In many cases, it’s possible to take advantage of basic information, like the time, to help give people the information they really need.

In this example from the Washington Post, I don’t need to hover over every location on the map to see the annotations, they are already visible to me. This is the benefit of annotations too, they are right up front and not hidden.

Or this example, a NY Times graphic on where people moved to from individual states (in this case Oklahoma). The labels could have been written up at the top with a color legend that tells you which color corresponds to each label, but instead they are right where they need to be. They make that task easier for you, by placing the information exactly where you need it.

**Prevent errors.**

As an intro to this, let me tell you about my favorite machine in the world: the coffee grinder. With a coffee grinder, it is literally impossible to hurt yourself because it only works when it’s closed (unlike, say, a blender).

And preventing screw ups is really good! Store shelves are filled with products in which this is not the case. One very painful example is the instant soup cup, which can easily tip over and lead to scalding burns (not to mention hungry emergency room patients).

In one of my favorite collection of wee things (and this is an actual picture in an [actual scientific paper](http://www.ncbi.nlm.nih.gov/pubmed/16819351)) we see the exact angle at which an instant soup container will topple over. The taller and narrower, the smaller the angle (and the more likely the accident). So why are so many soup containers tall and narrow? Soup cup desginers could prevent this error by making them very flat and wide, but for whatever reason, they have chosen not to.

In another example, Gmail knows that I used the word “attached” so prevents me from sending my email without the attachment (or at least gives me a heads up beforehand).

In this case, I am prevented from accidentally being born in the future.

Or in this case, you can use technology to help me out. Instead of having to hover over every individual line in this line chart from the Washington Post, they implemented a feature where the line closest to my mouse is highlighted, even if I’m a little bit off.

Here’s what not to do: In the options below, which one will cancel my payment?

**Surprise me**.

Details can help me make my life easier. In some cases they are just helpful, acknowledging that memory is limited and forms are boring. Ever start filling out an online form and immediately forget what you were supposed to type? In the example below, the intruction label is still visible, it just moves out of my way.

Surprising details can also take the form of little notes to your users that are funny or have some personality. If you’re uploading something to Dropbox that will take a long time, it tells you to go grab a Snickers. And if your text gets too long, Google Voice just stops counting the characters and says “Really?”.

Or pressing this spinner over and over again to get a new prediction about who’ll win the Senate.

All of these little details make a huge difference to the overall design. So don’t forget them!

So, to review:

**Be Invisible:** Design in the purpose of journalism shouldn’t call attention to itself, it should just allow your user to do the task at hand. Don’t let your designs get in the way of the function, otherwise you’ll end up with the online equivalent of a door that won’t open or an crazy complicated shower faucet.

**Apply the principles.** Go through each one and ask yourself, have I grouped items, have I added enough contrast, have I created clean strong lines that drive the organization of the piece? It might be route at first, but as you become more familiar with these principles you’ll see them everywhere.

**And finally, the details matter.** They might seem like tiny things that are trivial, but often they are the difference between a successful design and a failure. Help people by giving them hints on how to act, preventing them from making mistakes, and make their lives easier by bringing information forward and including, sometimes, surprises or delightful treats. Little things and attention to detail are the difference between a ok design and an incredible, powerful, memorable and functional one.