Module 3: Finding Your Data Story

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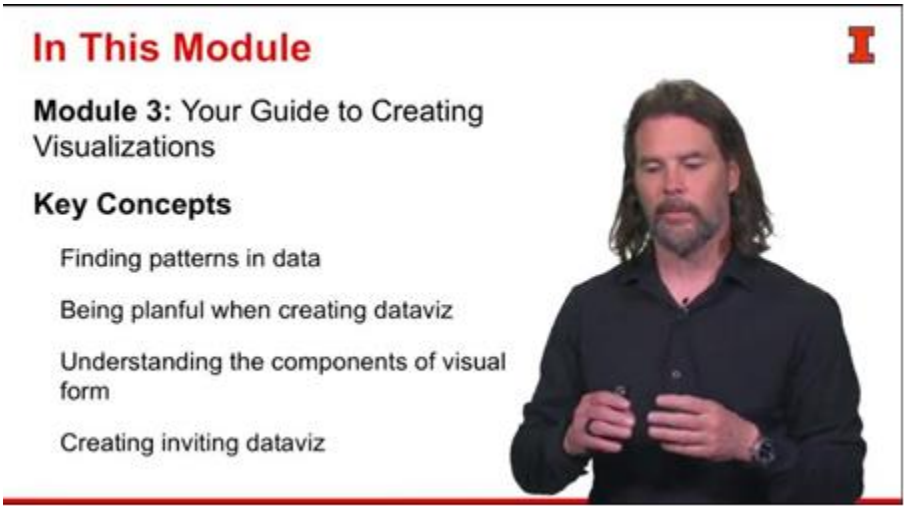
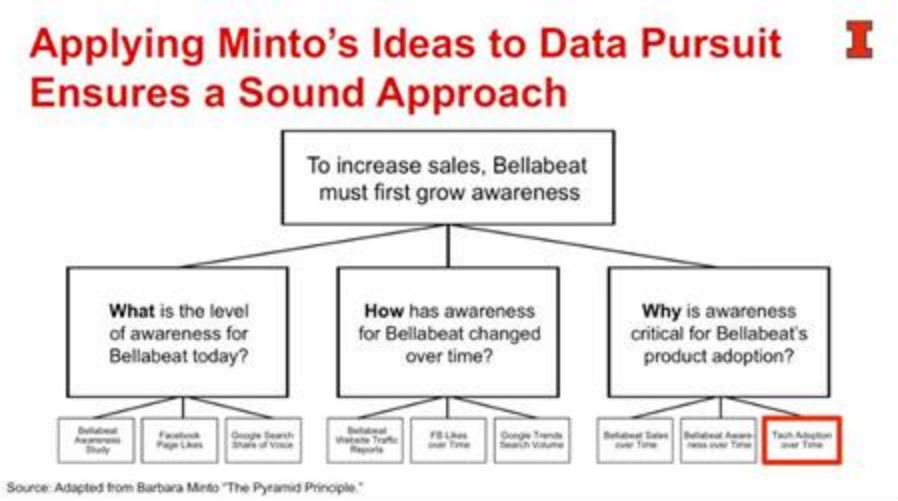
Lesson 3-0.1: Overview



Module Three, you're guide to creating visualizations. So, now we have moved through many elements of the framework we're using to define good data visualization. In this module, we're going to really focus in on the visual form. To do so, we'll talk about a few key concepts, we'll talk about finding patterns in data, we'll talk about being planful and the way that you approach the creation of your data visualization, we'll talk about having the understanding of the components of visual form, what is good visual form, we'll introduce a framework that will do that. Then, we'll talk about creating inviting data visualization database. We'll give you a definition there.

In this module again, we're using this framework, which has guided us along the way and shown us the elements of a successful data visualization.In the next lesson, first lesson of this module, we will be focused in on the visual form. Actually, from here on out, we're going to focus on the visual form.



Remembering our Bellabeat case study, we have constructed an outline for a story. We identified an objective, we found some key questions that we know are missy and pretty robust and complete. For each of those key questions, we've identified a data source that will help us answer that. Now, we're going to focus in on this last piece of data tech adoption over time, which will help us in our case study, answer the question, "Why is awareness critical to Bellabeat's product adoption?' Through this data and through the analysis, we helped show that adoption over time of technologies have led to success for those technologies and maybe even give us a sense for how quickly we should expect the adoption of Bellabeat's new technologies to take place across our market. Now, we have also found data. That's where we are, and as we move through this module, we'll start to analyze this data, seek some patterns from it, and then turn those visualizations into client-ready database.

Lesson 3-1 Finding Patterns in Data

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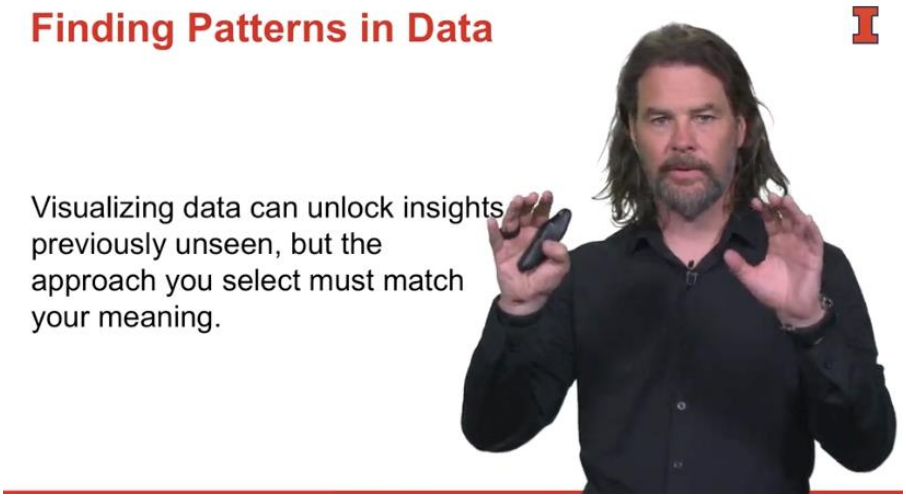
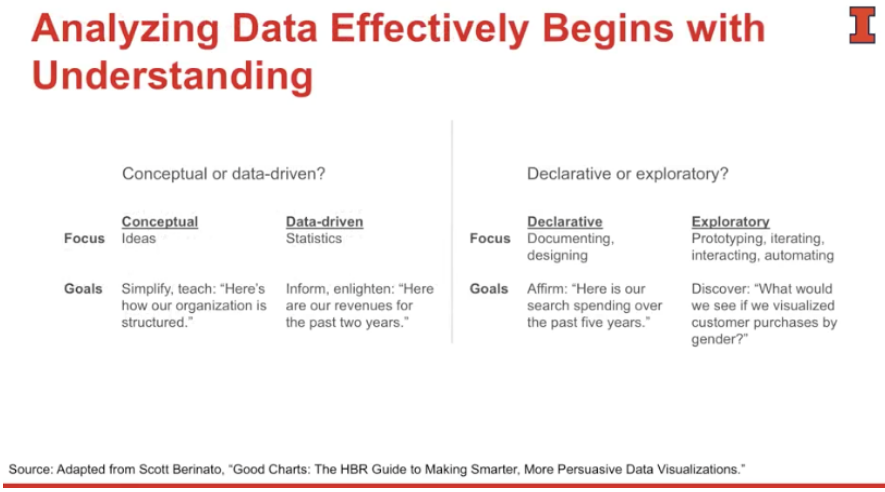
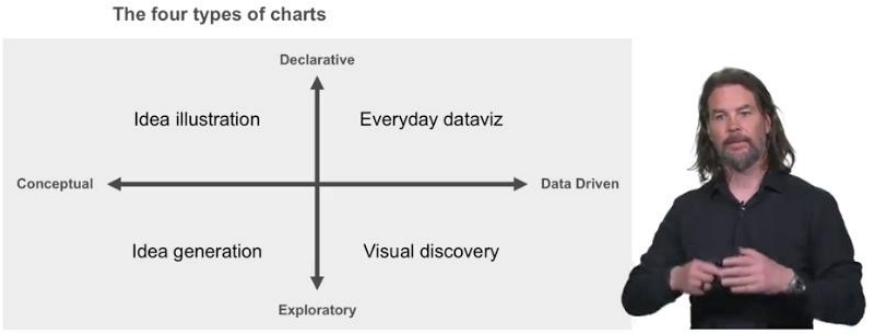


Finding patterns in data. Now, that we have data, we want to start to identify the stories that we see and the best way to do that is to visualize that data and see what patterns jump out. There will be things that come to us through visualization that we wouldn't be able to see when the data is in tabular form. But before we dive in, let's get an understanding of the different types of charts that we will create.



A framework is laid out very well by Berinato and he asks a couple of very important questions to assess where you are on your communication journey and then what sort of chart you should use. The two questions are, are you at a point where you are conceptual or data-driven. Do you have data or not? Then, the second is are you at a point or stage where you can be declarative with a message, you have something that you want to tell and communicate or you're still exploring and looking for that data? Depending on how you answer those two questions determines where you are on your journey, and therefore, the kind of effort that you need to put in and the type of chart that you need to create

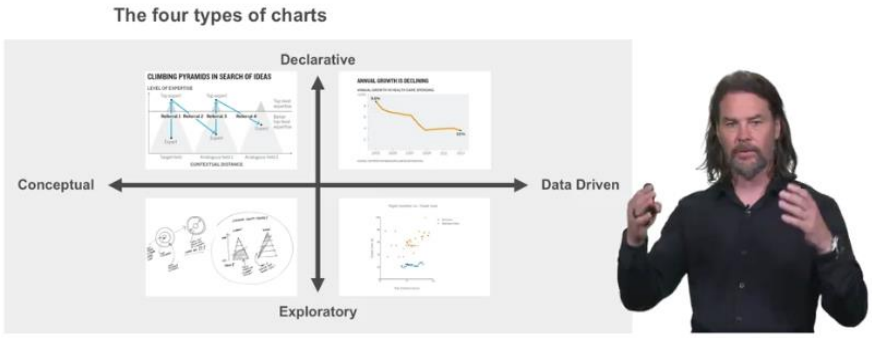
Each quadrant requires different forms of visualization.



Source: Adapted from Scott Berinato, "Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations."

So, those two questions then translate well into this two-by-two. At each phase, there is a different type of chart that you will be creating. If you are declarative but yet conceptual, so you are trying to tell the story through not data but through concept, you are creating what Berinato would call idea illustration. Idea generation is conceptual, still exploratory, still trying to figure out how we put a concept visually in front of an audience. Visual discovery is where we are being exploratory with a dataset. So we're looking into that data trying to find our story and everyday database what I might call client ready database, is a declarative statement based on data. We have a story we want to tell, we want to get that in front of a client and audience.

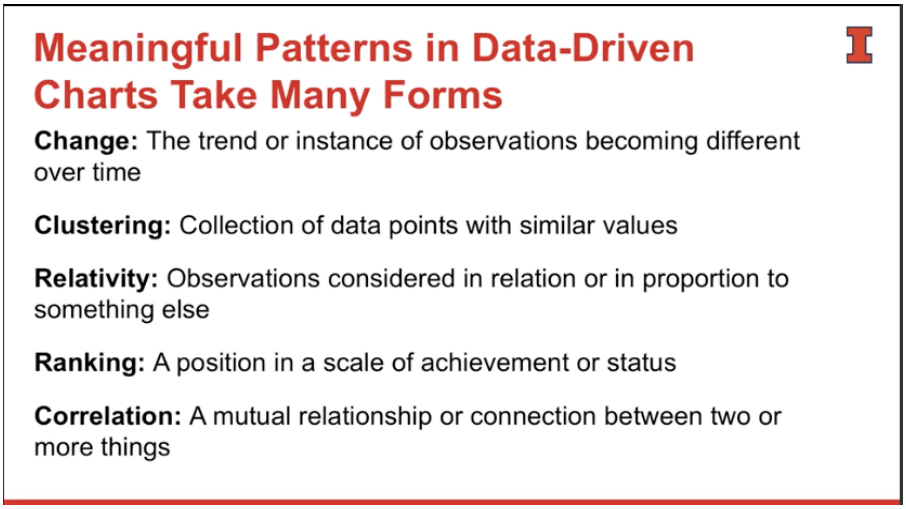
Data storytelling is best done when charts are involved.



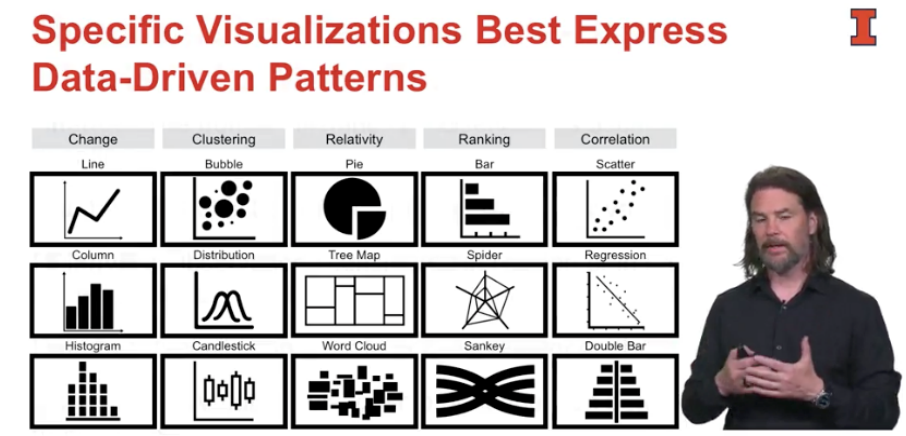
Source: Adapted from Scott Berinato, "Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations."

Visual discovery is where we are being exploratory with a dataset. So we're looking into that data trying to find our story and everyday database what I might call client ready database, is a declarative statement based on data. We have a story we want to tell, we want to get that in front of a client and audience. At each of those phases, there's a different type of chart we'll create. Conceptual declarative is something that we want to put forward, so we do need to put some effort into creating a conceptual chart like that. Conceptual exploratory, we don't really know what's going to stick, this is in a room with your your teammates brainstorming and drawing ideas on a white board. The things that are more important for us in this course are on the right side of this framework. This is where we are being data-driven, and we will really be talking about two different phases. We're either in exploratory mode, we have data, we don't

know what the story is yet, or we are in declarative mode with our data. We have our story set, we want to communicate that story, and that's going to have great implications on the amount of time that we spend polishing our database. Where we are today, is simply looking for patterns. So, there is no need to polish these visuals. What we're going to create is work product is for our eyes only, it is allowing us to test the hypothesis that we have or answer the questions that we've asked looking for patterns.



When we do that, there are five different types of patterns that we will be looking for. We will look for change, either change over time and trend or sudden change. We will look for clustering, collection of data points that are similar to one one and yet different from others. We will look for relativity, how two different data points relate to one another. Ranking, what is best, what is worst, what is at the top of the scale, what's the lowest of the scale and and everything in between. Then correlation between datasets. How does one set of data influence or impact another. Those are the patterns we should be seeking because each of them reveal a story. Now, when we are looking for those patterns, there are certain visual techniques that will reveal them.



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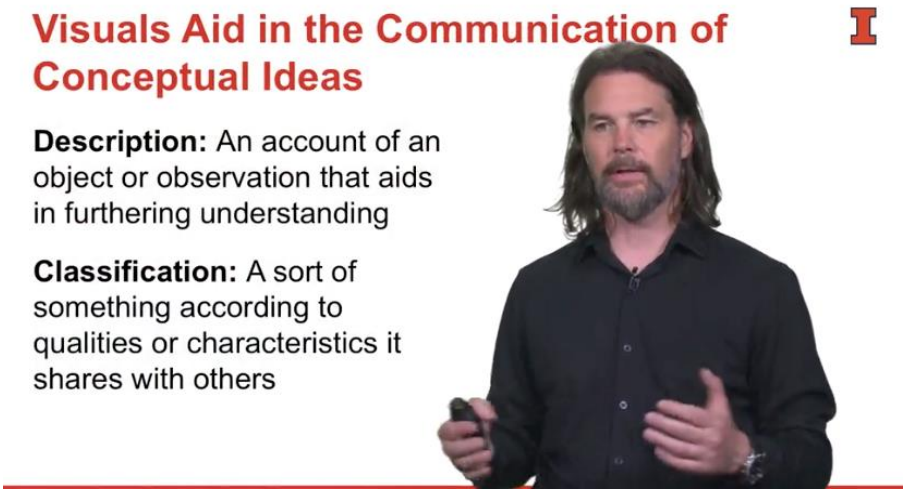
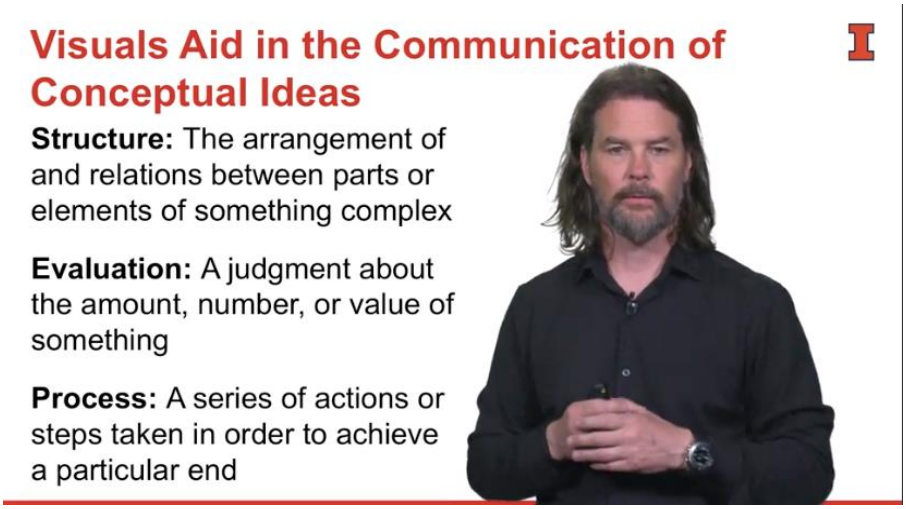
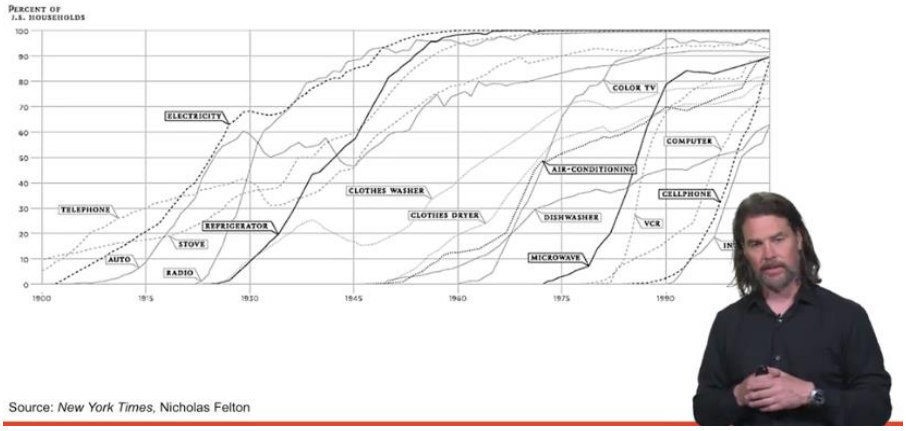


This works on conceptual ideas, as well. When we're dealing with conceptual ideas, we're looking for either a description, a classification, structure, evaluation, some process, and for each of those different conceptual ideas, there is a visual form that works, and then a number of others that wouldn't for that particular conceptual form.

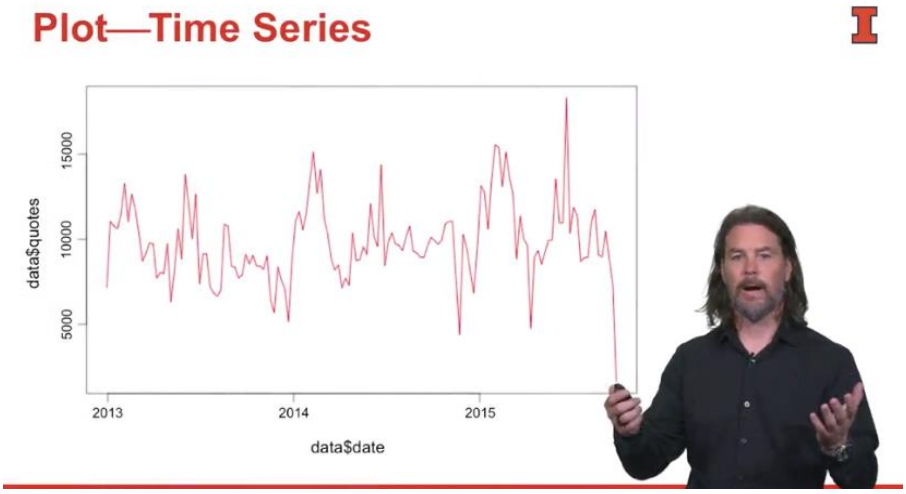


Again, for an analyst, if we are revealing or trying to declare conceptual ideas, ensuring that we're using the right visual technique, the right visual pneumonic, to make that that point is

important. So, let's see this idea come to life, we'll use the Bellabeat case study that we've been tracing. Again, we're at a point we have data and we're able to start to assess the the adoption of technologies over time as we seek to answer the question of why awareness is important for Bellabeat? If we were to take this data and throw it into a visualization, one of the visual technique that we may use that would work well would be a line chart.

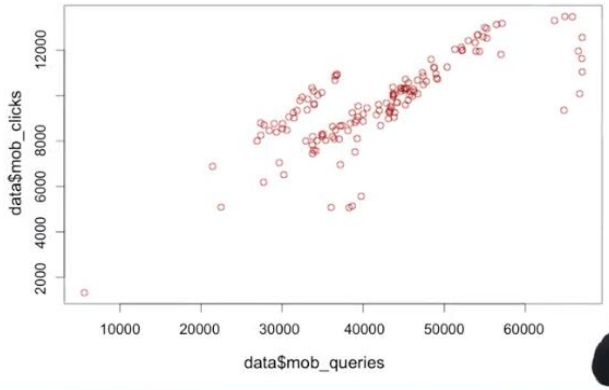


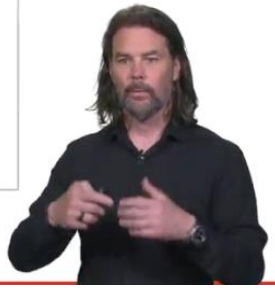
We know from the previous conversation that that aligns. That line chart would show adoption over time and from this point, can start to pick out the interesting stories that will either answer our key question or allow us to know that we need to go back to the drawing board. Now, to do this at this point, one tool that I find useful is R. I talked about R before. But, R does a great job of moving an enormous amount of data and visualizing it really efficiently.



You can create box, time-series plots

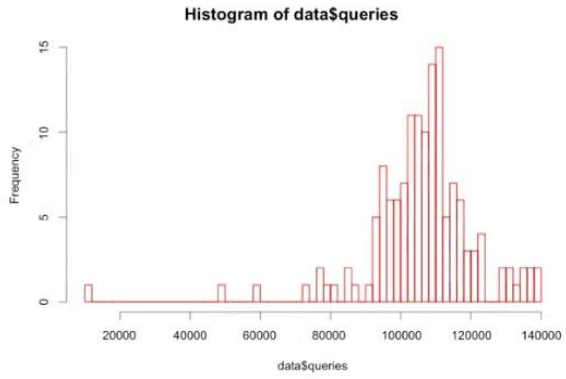
Plot—Relationship





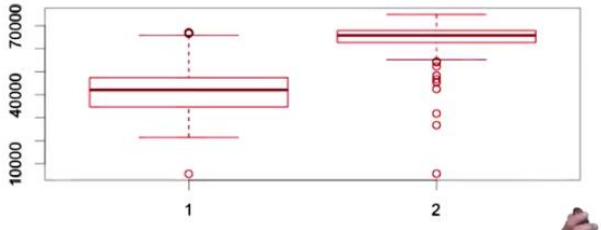
time-series plots or relationship-plots

Histograms



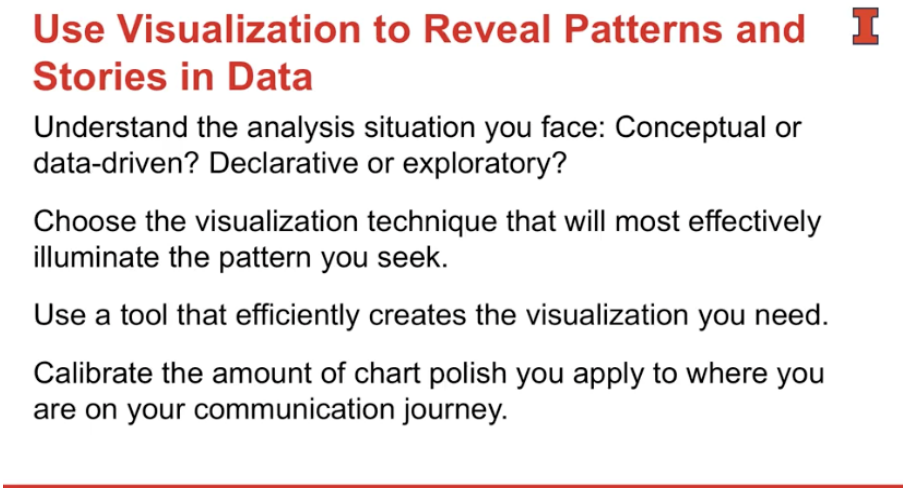
histograms, boxplots.

Boxplot



boxplots.

Even using the power of R and the community of developers, you can find scripts and new packages like Gpairs, you see described here, that do things that other programs are not able to. In this case, do tremendous correlation across a wide variety of data in one single visual, so that you as an analyst know where your story is and where it is not.



These things are important to us because the most effective and efficient way for us to get at data and get at data stories is to visualize that data and start to see these patterns. To do that, we do need to understand where we are, right? We need to understand if we're dealing in conceptual matters or a data-driven matters. We need to know are we in a state of declaring a story or we still exploring? The answers to those questions dictate which type of chart we use. The visual technique that we apply to seek either to reveal or ultimately to communicate that pattern needs to fit with that pattern. So, as an analyst getting familiar with the techniques that you can use and when to apply them appropriately, is important. The tool that we choose should provide the visual technique very efficiently. At this point, efficiency is very important. We don't want to fumble around with a hard to use tool to get at the visualization we want to create. Learn those tools that do work for you quickly so that you can move on to the next phase of your evaluation in your analysis. Finally, importantly, calibrate the amount of polish you have to where you are on the communication journey. When we are exploratory with the dataset, it doesn't matter if the visual looks great yet. We're not going to show that visual to our clients, to

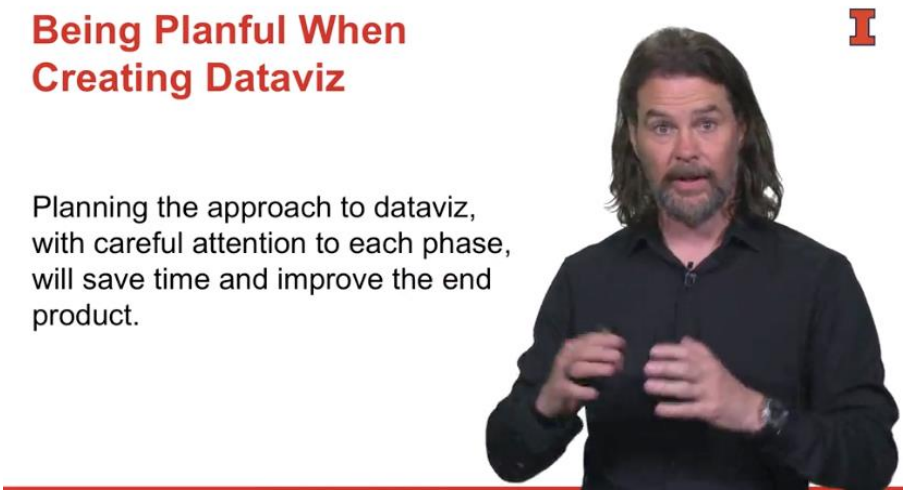
our stakeholders. It's for our eyes only. Once we start to migrate into what Berinato calls every day databases or client ready database, we do start to apply that polish, utilizing pre-attentive atributtes, doing the things that are going to make that message stick quickly, but at this point, is not relevant, not necessary and would only serve to slow us down.

References

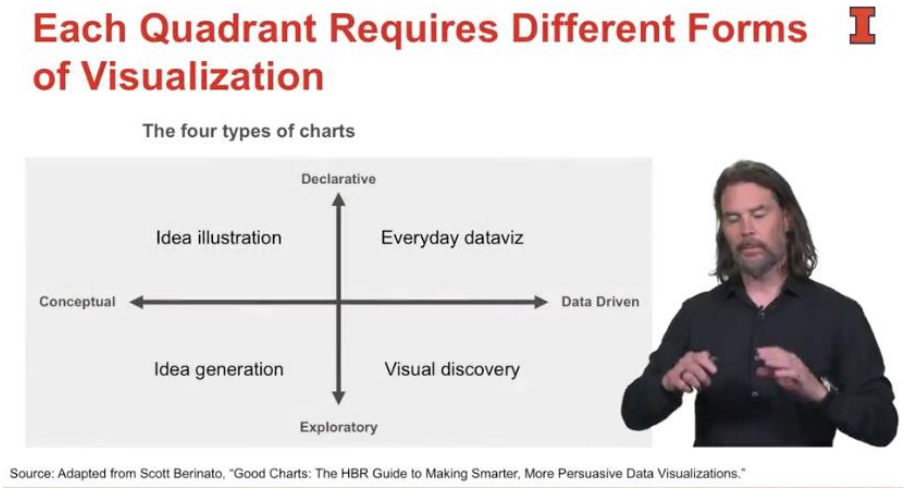
Felton, N. (2008). *How Americans Spend Their Money* [Online image]. Retrieved from https://goo.gl/vNNdYH

Lesson 3-2: Being Planful When Creating Dataviz

Lesson 3-2.1: Being Planful When Creating Dataviz

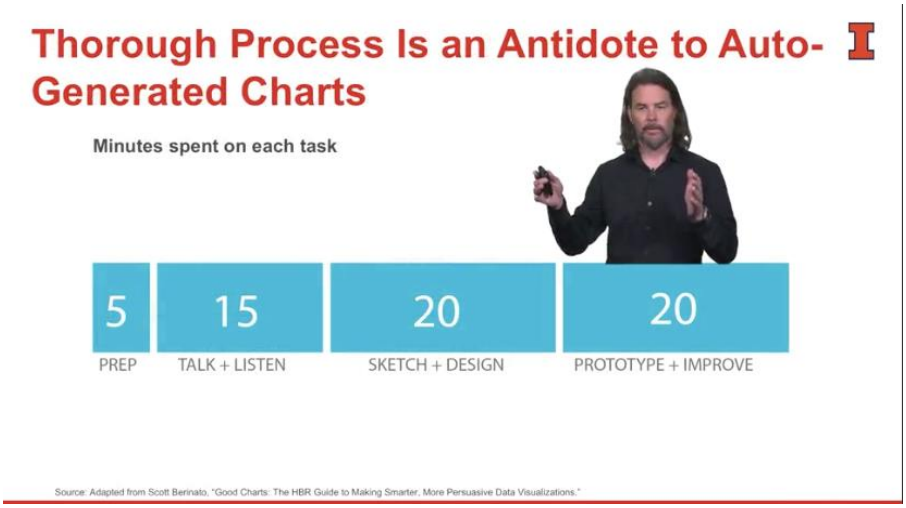


Being Planful When Creating Dataviz. So, now we're starting to migrate into this everyday dataviz or this client-ready dataviz, and when we do this, our approach is going to change. We do need to start putting more attention to detail, we need to apply more polish to this visualization because this is what we're going to put in front of our stakeholders. So, the kind of effort is going to be notched up a little bit on this visual.

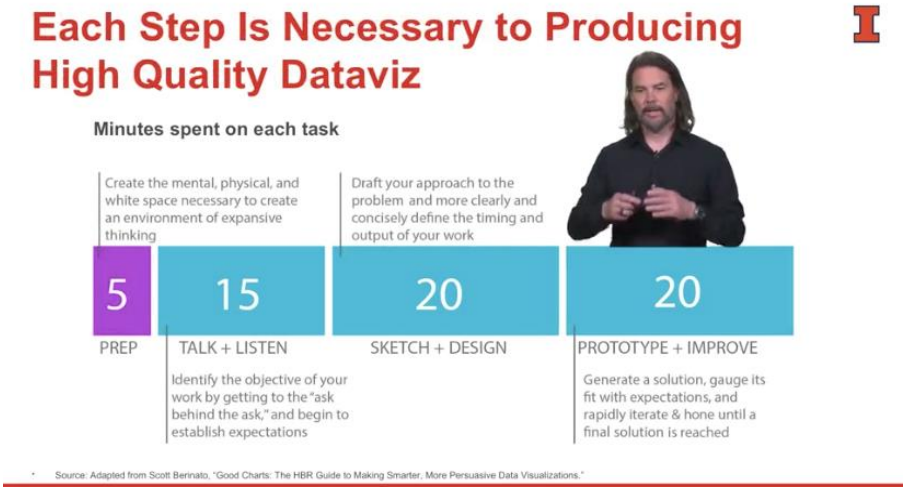


Again, we are moving from a point of visual discovery to everyday database,

and Bernado lays out I think a very solid plan on how we might approach that transition.

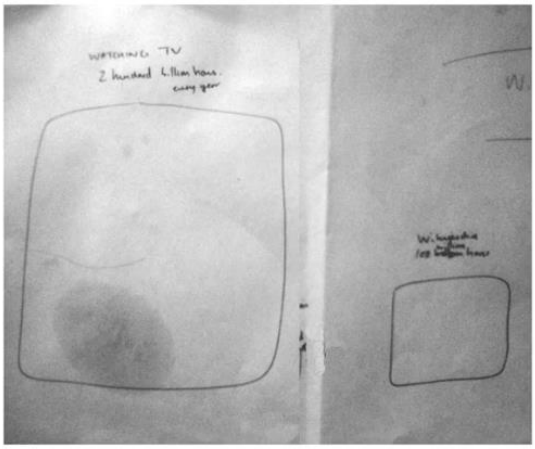


What he says is that if he had an hour to spend creating an everyday database, he would break it up in this way. He would have five minutes of prep where he would actually create



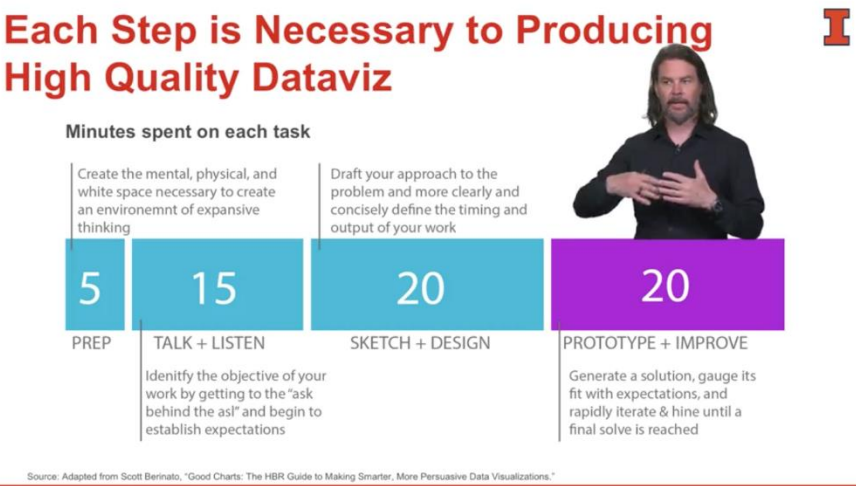
the mental physical white space that he would need to work appropriately. He would then talk and listen for 15 minutes. So, gaining further context, understanding who the audience is that he

is presenting to and informing him, in forming the ideas that he'll need to achieve with that everyday database. The second two-thirds of the time are spent actually on the imagery and creating the visual. Half of that time 20 minutes is spent actually drafting by hand kind of an old world traditional concept but in this case it works very well. Prototyping and improving then is the final one. So, that first five minutes really is used just to clear your head and get yourself ready for work. The talking and listening to the following 15 minutes. The purpose there is to get an understanding of what it is you need to achieve. You've got this great insight, you think you've got a good story, validate that. Work with your colleagues to ensure that it is on mark that it is on path. Once you have that, start then towards the actual development. The sketching piece is a bit of a lost art and I think too often, we take this idea that we have and we rush into our applications and start using our computer to generate graphics. Well, if we just took a moment and with pen and paper, visualize some ideas, we would no longer be limited by our understanding of the the package, the application, or the limitations of the application itself. We could just design where we're relying only on our creativity.

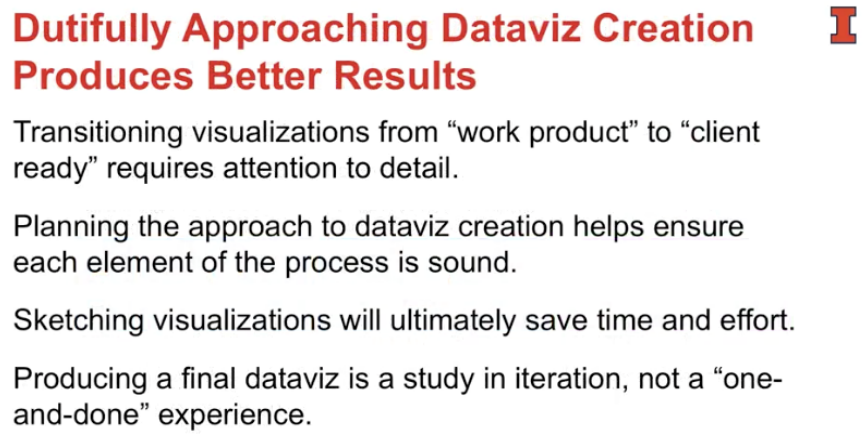


Source: David McCandless

This is something that the the great data visualization artists do. David McCandless certainly does. I shared this image earlier where he with pen and paper drafts every data visualization that he creates. It's a good practice. It's a good habit to build and will make you more efficient and ultimately better at communicating with data.



After that is done, 20 minutes, the final one third of this hour is spent prototyping and improving the visual. The idea here being that the first visual you create shouldn't feel like the last visual. It is a starting point. You can begin then in your application to improve it over time and there are techniques that you can apply to make it incrementally better as you go. That is important. Too often we feel like we're putting all this effort into a final database. We should think of it more as a fluid process and iterative process indeed.



So, being planful at this point is important as we transition from this work product output into client ready database, this requires more attention to detail. Planning our approach out and being beautiful about that really does ensure that each element of that process is sound and we'll build ultimately to a great data visualization. Sketching pen to paper is a under-represented art that should not, should be something that you build as a habit of your own. Will save you time, will save you effort ultimately and most importantly will allow you to open up your creativity as you think about the way that you might effectively visualize the data and the data store that you want to tell. Finally, producing that final database, it is a study in iteration. It is not a one-and-done experience. You should not feel like the first database that you're going to crank out is the right one. Put out a database, work with it, apply some of the tools that we'll talk about later on in the course to make it better and better and really treat it like a living, breathing, iterative, data visualization.

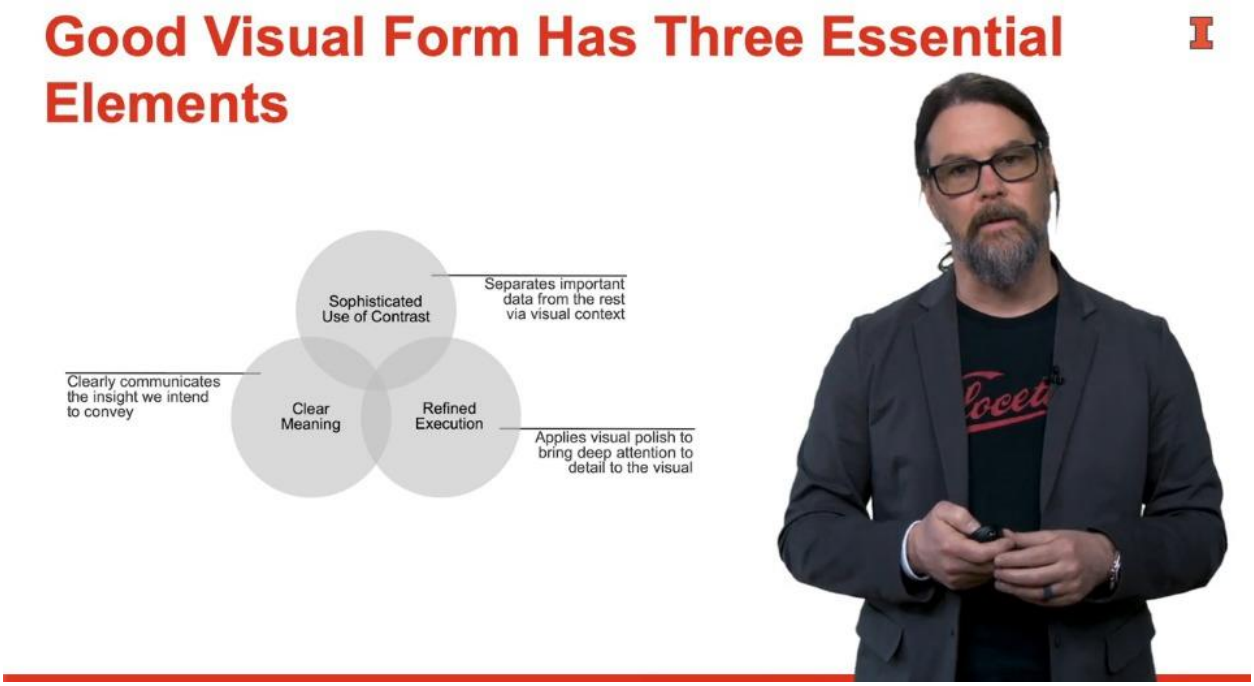
Lesson 3-3: Understanding The Components of Visual Form

Lesson 3-3.1: Understanding The Components of Visual Form

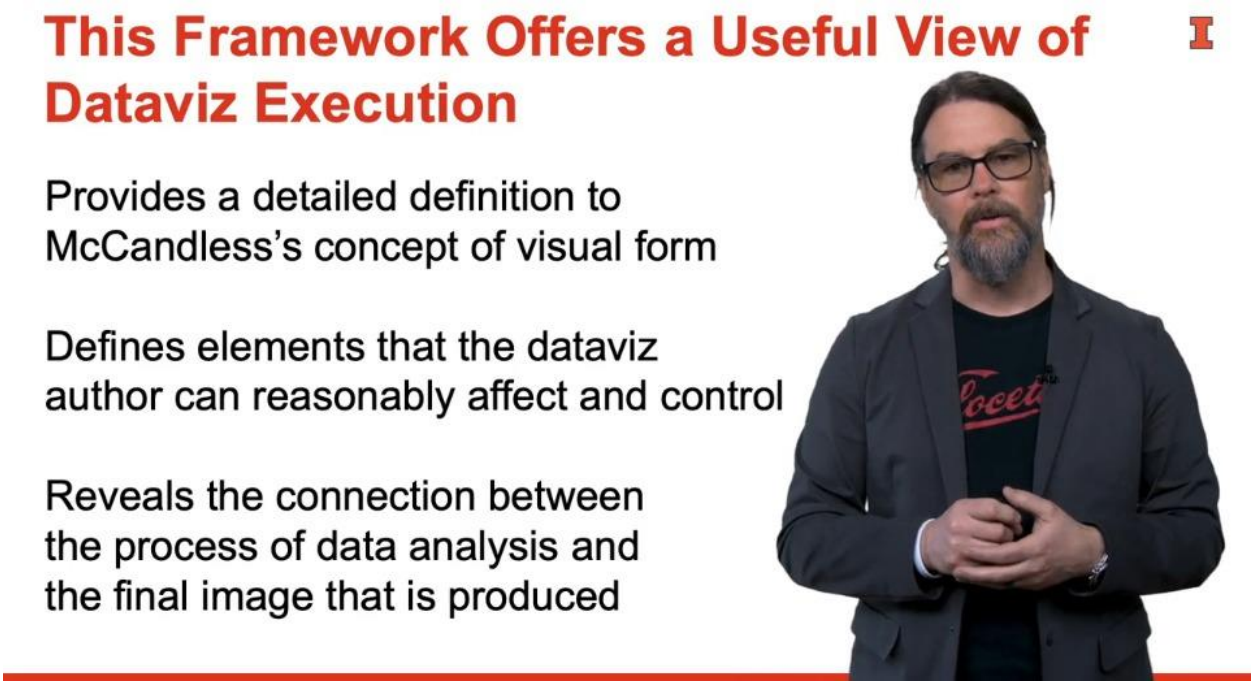
Understanding the Components of Visual form. Up into this point, we've been using a framework that has displayed to us all the different elements that need to go into a data visualization for it to be successful. But we really haven't delved too far into what good visual form really means or really used any kind of definition of that. That's what we're going to talk about right now.

So here is this framework that we've been using. Again, every single element, vitally important. The visualization only works if they are all present and all successful. This idea of the visual form, the actual picture that we're creating as we communicate with our audience is very important. But to this point, we don't really know what makes for good visual form and what doesn't. So I hope to provide a little bit of a definition there.

As we think about what makes good visual form, there's a really a three part framework that helps us answer that question. Good visual form has three different elements. It has very clear meaning, it has sophisticated use of contrast, and it has refined execution.



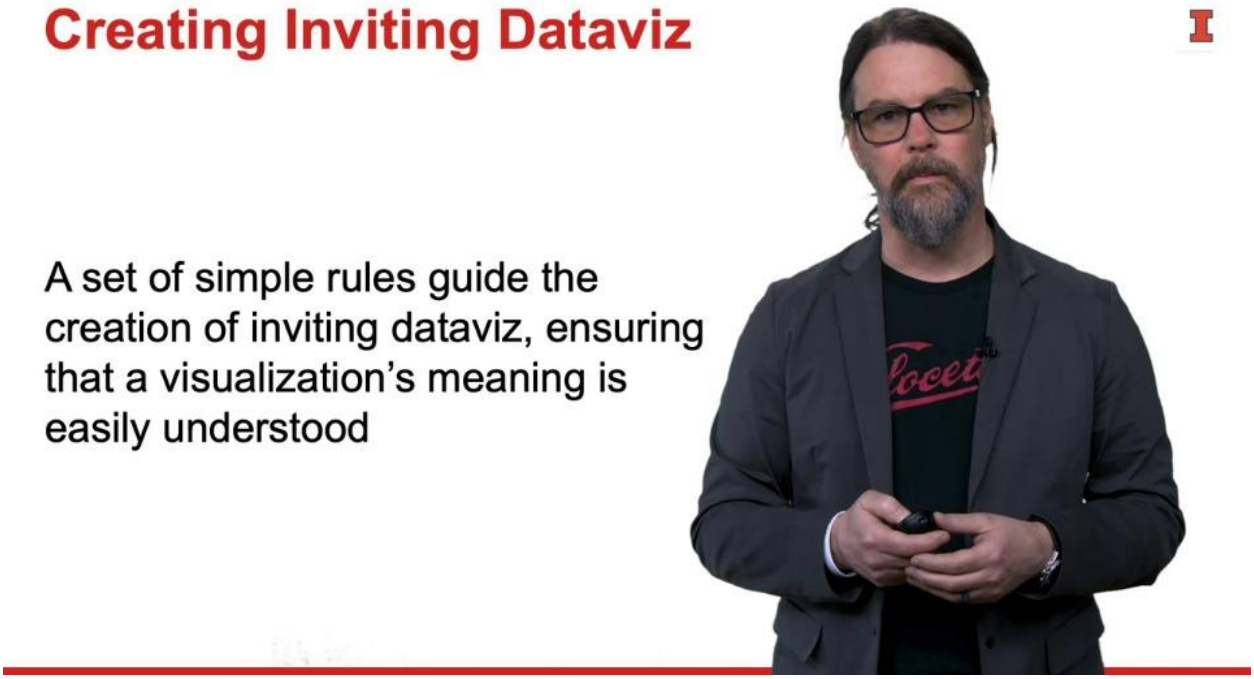
Clear meaning clearly communicates the intended insight, that insight that we have worked so hard to pull out of our data. Sophisticated use of contrast draws our audience's attention to the elements of that chart that we want them to see and keeps them away from those distracting elements that we don't want them to spend much time on. Finally, this idea of refined execution puts a lot of polish on the visual. It gives great attention to detail. It also serves to keep our audience focused on what is important and not to be distracted by those elements that aren't as important on a page.



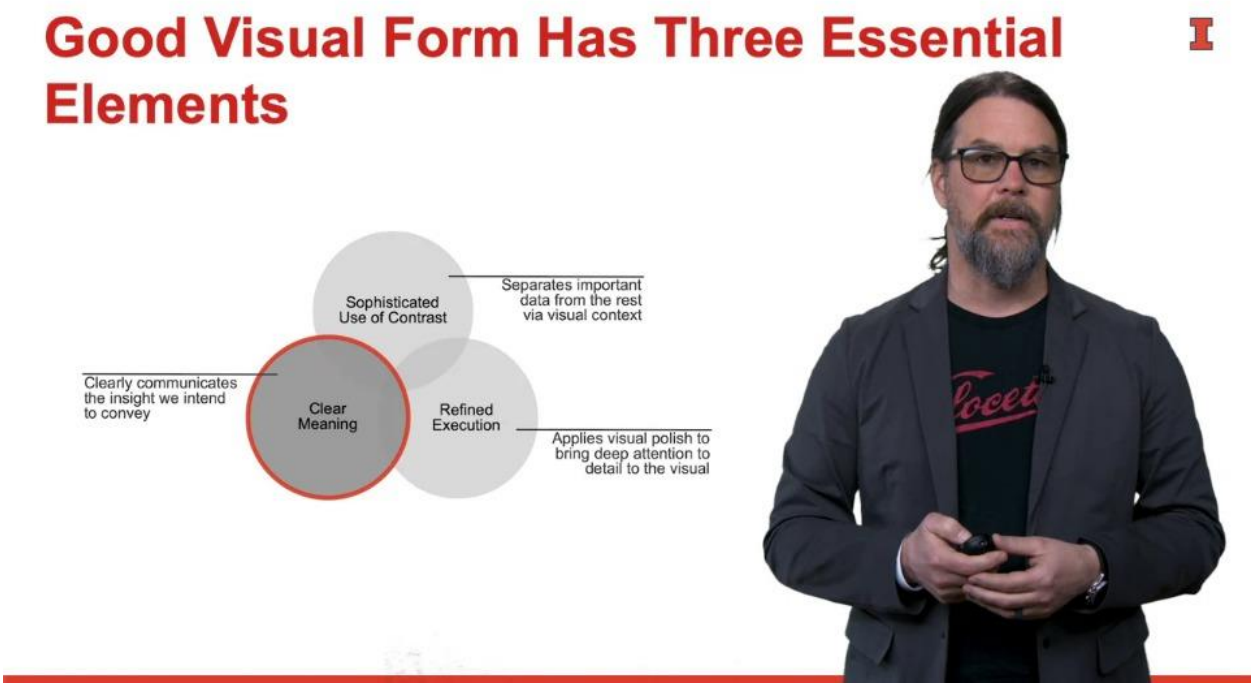
This framework is important for a number of reasons, and I like how it ties back to the original five-step McCandless framework on visual form. It does that tie very directly. We are taking this element of McCandless's framework, that being visual form, and we are defining what makes for good visual form inside of that framework. It also then reveals that connection between the process of data analysis, data collection, setting a goal, all those important elements that we've been talking to up until this point, and ties it directly to the image that we will ultimately produce.

Lecture 3-4: Creating Inviting Dataviz

Lesson 3-4.1: Creating Inviting Dataviz



Creating inviting dataviz. We're going to look at now this framework that we'll use to define good dataviz and good visual form. A little more closely, we're going to take each element and investigate each of them so that we get a deep understanding of what these things mean.



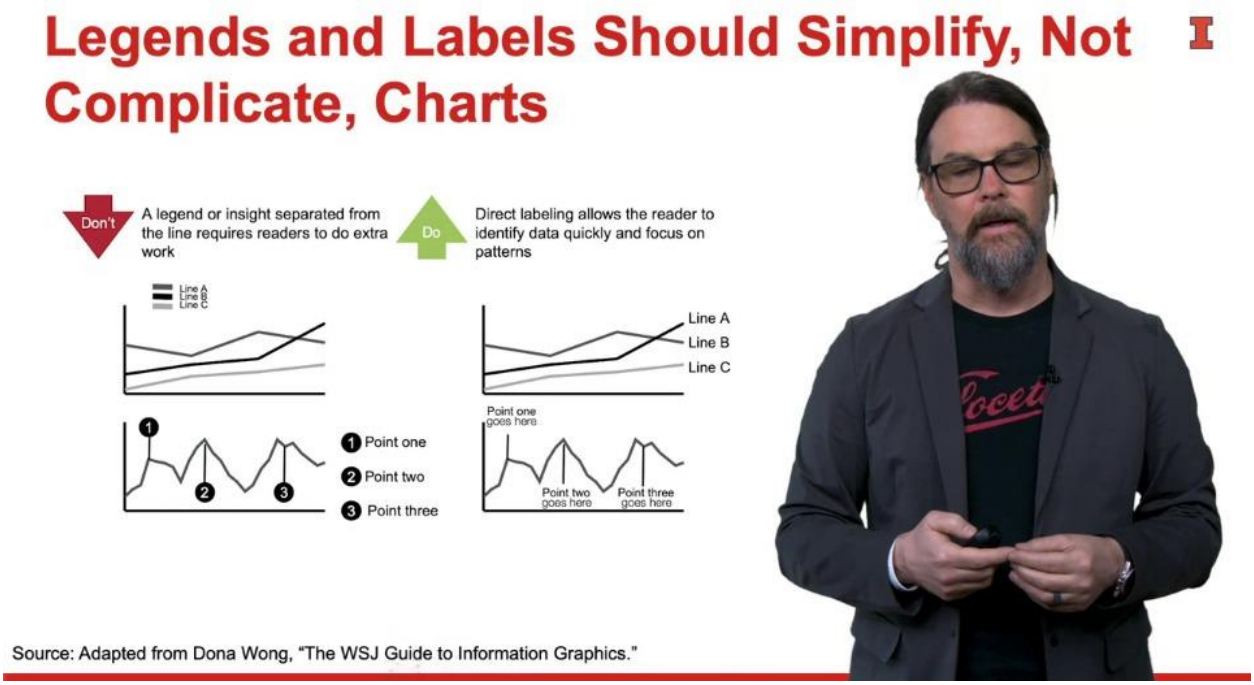
The first one up in this framework that again, we're using to define good visual form is this idea of clear meaning. Inviting visualization clearly expresses the insight that we want it to present to our audience. There is a really pretty straightforward and easy way for us to ensure this, and that is through the use of some really common visual elements that all too often are used inappropriately or incorrectly. Those visual elements include headlines and subtitles.

Dona Wong, who put together a fantastic guidebook on good visual attention to detail when she was leading data visualization at the Wall Street Journal spend some time talking about headlines. She talks about the need for a proper font choice and the sizing that we should use in the bolding, all of that makes perfect sense. If you follow Dona Wong's guidelines, you get that headline to really pop off the chart. But I think there are some other things that are important here, namely what that headline should be. That headline should in very simple English express to your audience, here is what you are looking at. It should read as sales over the last five years or consumer segments by size, something that is very obvious and straightforward that simply orients your audience to what they're looking at and takes any kind of questions around the introduction of a new set of data off the table. There are some important elements that we should think of as we are building out these headlines.

One is that, they need to be presented in very clear, simple language. This is not time to get cute with our headlines or to try to present something that may cause more questions for our audience than provide answers. We should place this headline in a simple location, right above the chart, aligned on the left, and it should always be in the same place so that our audience knows what to expect as we move from slide to slide and can anchor on some spot on the page. It should also be printed horizontally and in bold, a little larger than the other elements on the chart so that it does really stand out just as Dona Wong would say.

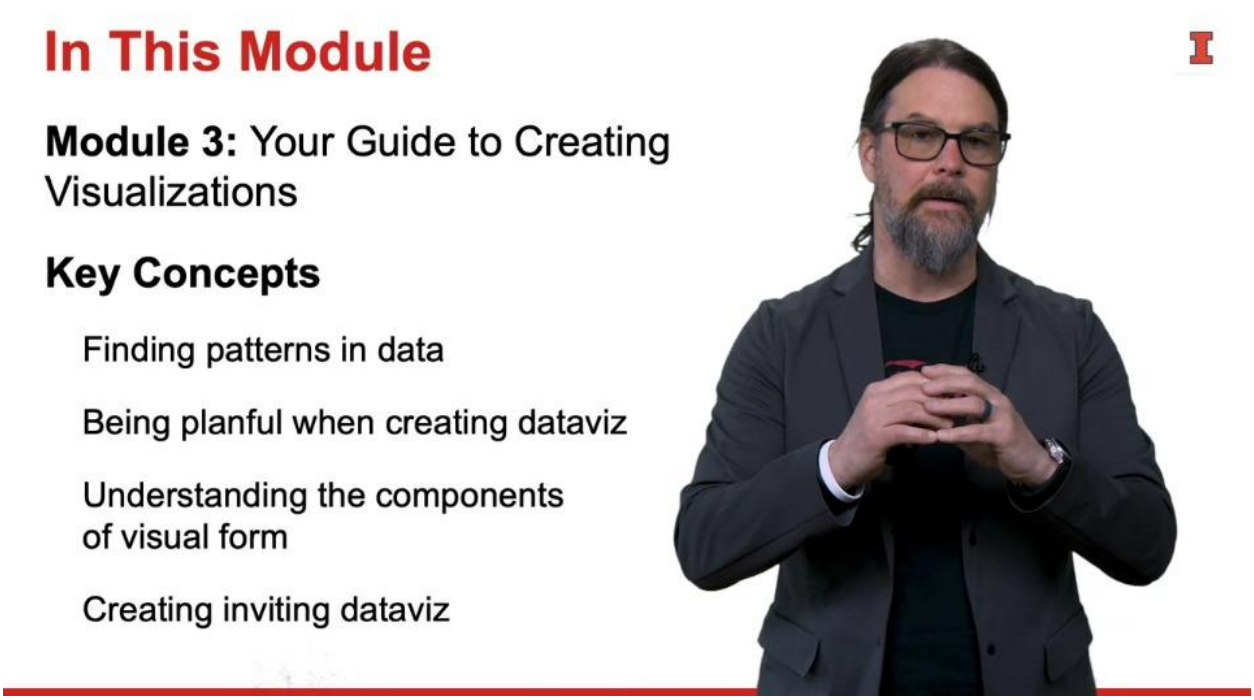
One pro tip that you can use to ensure that your headlines are good and solid for you in conveying the clear meaning that you hope they will is to take your presentation and just flip through it rapidly reading nothing, but the headlines on your charts. This will show you, does that story string together? Is it consistent? Are you talking about the things, the data elements that you want to present to your audiences and substantiation for the recommendations you're making? By doing that, you can really quickly get a sense for where you need to make changes, where you need to swap the order of the data that you're presenting, and on, and on. That's the headline, but there's another very important element as well, and that is the subtitle. We should present a subtitle on every single chart that we create. That subtitle should be printed a couple of font sizes smaller than the headline and placed right below the headline. Here's what the subtitle should do. The subtitle should present the inside that you want your audience to think of after they look at your chart. It is your opportunity to put in writing the story you want them to think. So while your headline simply answers, here's what this chart is, the subtitle then tells them, here's what you should think, here's the take-away from this chart. Again, we should avoid any flowery language, we should be very straightforward, we should avoid jargon. We in no way want our audience to misconstrue or misinterpret what the subtitle says.

Another pro-tip around subtitles is just like you flip through the deck and read your headlines, you can do the same thing with your subtitles. In that way, ensure that the topics are what you want them to be, that the takeaways are what you want them to be, that they're worded in a way that's easier to understand, and in the right order. So headlines and subtitles become two of the most important ways that we can convey very clear meaning and create inviting visualizations.



There's some other things that we can think about as well, and Dona Wong spend some time in her book talking through these guidelines. One is this concept of direct labeling. She says, in no way should we ever use a key, and I certainly believe her. If I put a legendary a key on my page that will define the data that I'm presenting, what I'm forcing my audience to do is flip back and forward between the key and my data. It becomes very confusing for them. It takes their eyes off the important visualization that I've created, which is really the start of the show and where I want their attention fully focused. A very simple technique of direct labeling, meaning placing that label at the end of a line in a line chart or on the pie of a pie chart rather than using a legend. It's a very easy way to convey clear meaning to your audience and do that in a way that is not confusing for them in any way.

Another idea is this idea of using annotations. What we can think of annotations as our tools that direct the audience's attention to important parts of our chart. They're used most effectively when they identify data, and some pattern in data, and explain what that pattern means. You can see in the example here I've got a number of annotations calling out certain elements of the data chart and explaining what those are. This does a couple of things. One is that, it does clearly convey the meaning of those patterns that I recognized in my data. More importantly, it is a written guide of the insights I want my audience to take away. If I'm presenting this chart without annotations, if there is someone in my audience who is not paying attention, and even if I've told the most elegant story around how the data substantiates my point of view, they've missed that. If anyone has taken a picture of this chart without annotations and putting it up to LinkedIn or out to Twitter, no one is seeing the story either. But when I have the annotations there, they are calling attention to the right parts of the data and they are explaining very clearly to my audience what I want them to think in my interpretation, that becomes a living record that travels along with that visual wherever it goes.



All right. We talked about a lot of things in this module. We covered a great deal of ground. We talked about finding patterns in data and how we can use visual techniques to pull those patterns out of that data to help us tell stories. We've talked about being very planful when creating data visualizations, the attention to detail that needs to go in to that visual that we hope will effectively and efficiently communicate with our audience. Next, we take a look at the components of visual form. We found a framework with three different elements that defined for us what does good visual form do, and importantly now, we've taken one of those elements, creating inviting visualization, and gone a little deeper into this idea of creating clear meaning through the use of headlines, subtitles, direct labeling, annotations, and other techniques.