

Transcript | How to Use Data to Tell Better Stories

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00:00:13.660 --> 00:00:24.870

Joel Smith: Hello, everybody! Hello and welcome! You are in the right place. Welcome to today's masterclass on how to use data to tell better stories.

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00:00:38.860 --> 00:00:49.439

Joel Smith: Okay, perfect. Yeah, it would be great to hear from you all. So, please do post in the chat where you're joining us from, and what organization you work for.

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00:00:49.560 --> 00:01:08.100

Joel Smith: Today we're going to explore the two core pillars of effective data storytelling, visualization and narrative. You'll hear from an expert in government data communication who transforms complex information into clear, compelling visual stories.

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00:01:08.380 --> 00:01:24.469

Joel Smith: For those of you who may be joining us for the first time, first of all, welcome. Apolitical is the world's largest network for global government, used by over a quarter of a million public servants and policymakers from more than 170 countries.

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00:01:24.560 --> 00:01:34.679

Joel Smith: Our mission is to make government smarter, and we do this by equipping public servants worldwide with the knowledge and skills they need to lead the change.

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00:01:34.890 --> 00:01:51.369

Joel Smith: Okay, I'm just going to jump into the chat and see who we have joining us. Lovely to see you all. We've got, Catherine from Leeds, the first person to comment, so thank you, Catherine. Steve Green from Company's House, we've got Jazz from the Home Office.

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00:01:51.390 --> 00:02:08.719

Joel Smith: We've got, people dialing in from Edmonton, Alberta, from Glasgow, Ontario. Wow, coming thick and fast now, it's hard to keep up. Halifax, Florida, lovely to have you all here with us today.

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00:02:08.789 --> 00:02:27.960

Joel Smith: We're also very thrilled to extend an invitation to you all to join our Data Skills Network. This is an online community to build your data skills through connection and conversation with peers across government. And this space is open to all, whether you consider yourself a data novice or a data expert.

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00:02:27.960 --> 00:02:37.349

Joel Smith: My colleague will post a link in the chat where we will continue the conversation started at today's event, so please do click through there and introduce yourself.

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00:02:37.730 --> 00:02:51.020

Joel Smith: Now, I'll get a few quick technical notes out the way before we get into today's conversation. So, this event is recorded for on-demand viewing on the apolitical website, so please don't record it yourself.

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00:02:51.210 --> 00:03:02.840

Joel Smith: Contact details for any privacy concerns are in the apolitical homepage footer, and closed captions are available on this event, and they can be toggled on or off in your screen settings.

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00:03:03.210 --> 00:03:22.510

Joel Smith: Okay, great. So before we introduce our speaker, we're going to run a few quick polls to get a sense of where you're coming to today's conversation from. So, this should just pop up for you on your screen in a second, so let's have a look at this first poll. What is the greatest challenge you face when telling stories with data?

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00:03:22.790 --> 00:03:38.490

Joel Smith: Is it identifying the most relevant narrative within the data? Is it simplifying complex information without losing essential meaning? Is it designing clear and effective visualizations? Is it tailoring the message to diverse audiences?

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00:03:38.730 --> 00:03:42.660

Joel Smith: Or establishing trust in the data and its sources.

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00:03:42.790 --> 00:03:49.149

Joel Smith: I'll just give you a minute to get your answers in, and we can see how everyone is feeling.

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00:03:51.210 --> 00:03:55.990

Joel Smith: Interesting. You can't see it yet, but I can see we do have a clear winner.

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00:03:58.350 --> 00:04:05.609

Joel Smith: Okay... So the results are in, and it looks like, leading the way, most people...

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00:04:05.670 --> 00:04:21.430

Joel Smith: have the biggest challenge with simplifying complex information without losing essential meaning, 43% of you. So really narrowing in and simplifying that data. Okay, great, thank you. So on to the next poll.

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00:04:21.570 --> 00:04:33.559

Joel Smith: So the next one should pop up for you. What is your primary source of data in your work? So, is it internal government data, survey data, open data?

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00:04:33.560 --> 00:04:41.999

Joel Smith: External research and analytical reports, or other. Post in the chat if you're getting your data somewhere else that we've not listed.

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00:04:42.440 --> 00:04:46.390

Joel Smith: Really interesting to kind of see where this data's coming from.

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00:04:50.860 --> 00:04:53.860

Joel Smith: Okay, results are coming in.

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00:04:55.530 --> 00:04:56.700

Joel Smith: Interesting.

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00:04:59.200 --> 00:05:13.830

Joel Smith: Yeah, good. Well, as expected, I think the vast majority of you, primary source of data is internal government data, 64% of you, followed by survey data, 14%, and then about 12% open data.

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00:05:13.830 --> 00:05:24.450

Joel Smith: 7% external research, and a few others, I can see in the chat from all of these sources, so great, good, good widespread of data.

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00:05:24.570 --> 00:05:36.539

Joel Smith: Joe works in user research, so data is usually from your own qualitative research. Great, okay, so we've got a nice, a nice mix, as well as, as well as the internal government data.

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00:05:36.740 --> 00:05:44.610

Joel Smith: Well, thank you for, thank you for taking part in those polls. I will pass over to my colleague Christopher, who will be introducing our speaker for today.

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00:05:45.290 --> 00:06:02.659

Christopher Rosselot: Thank you, Joel. I'm Christopher, also a Community Manager here at Apolitical, and to introduce our wonderful speaker, we're fortunate to have Dr. Steve McFeely with us today. Dr. Steve McFeely is the Chief Statistician and Director of the Statistics and Data Directorate at the OECD.

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00:06:02.660 --> 00:06:19.040

Christopher Rosselot: Prior to joining the OECD, Steve served as the Director of Data and Analytics at the World Health Organization, and as Director of Statistics and Information at UN Trade and Development. Before joining the UN, he was the Deputy Director General at the Central Statistics Office in Ireland.

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00:06:19.040 --> 00:06:25.690

Christopher Rosselot: You can read the full bio by visiting the Resources tab at the bottom of your Zoom screen and heading to the Speakers section.

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00:06:25.750 --> 00:06:43.629

Christopher Rosselot: Now, before we launch into today's panel, I thought we could start with a quick icebreaker question, just to get us warmed up. So, Steve, what's your data superpower? Is it finding the story, spotting the outlier, or fixing a messy spreadsheet? And I'll give you a moment to think.

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00:06:43.630 --> 00:06:51.510

Christopher Rosselot: Everyone else, I asked the same question to you, and I'd love for you to share your answers in the chat. Again, the question is, what is your data superpower?

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00:06:51.510 --> 00:06:55.749

Christopher Rosselot: Is it finding the story, spotting the outlier, or fixing a messy spreadsheet?

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00:06:55.990 --> 00:06:56.850

Christopher Rosselot: Steve?

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00:06:58.020 --> 00:07:05.299

Steve MacFeely: Hi, Christopher, and good afternoon, everybody. I think... I'm not sure I have a superpower, but if I did, I think it's probably finding the story.

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00:07:05.420 --> 00:07:08.730

Steve MacFeely: I think over the years, I've been good at connecting

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00:07:09.390 --> 00:07:14.179

Steve MacFeely: Elements that maybe people haven't connected before, and seeing connections.

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00:07:14.310 --> 00:07:16.190

Steve MacFeely: That maybe people hadn't...

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00:07:16.460 --> 00:07:27.530

Steve MacFeely: hadn't thought about connecting before, and certainly that's my interest, is joining data together, so I think that's probably my superpower. Not bad at outliers, too, though.

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00:07:28.760 --> 00:07:40.960

Christopher Rosselot: Excellent. Well, connecting the story is the reason we're here today, and thank you to you, and to everyone else who answered in the chat. Now, to dive into the fantastic world of data. Steve, over to you for the next 30 minutes.

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00:07:41.990 --> 00:07:47.960

Steve MacFeely: Okay, thanks, Christopher, and thanks, Joel. So, good afternoon, good morning, good evening, everybody, wherever you are.

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00:07:48.250 --> 00:07:54.400

Steve MacFeely: Let me just get the most stressful part of the day over. Let me share my slides, and if this works...

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00:07:54.880 --> 00:07:56.930

Steve MacFeely: Everything else should be okay.

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00:08:01.170 --> 00:08:05.579

Steve MacFeely: So, can I confirm... That you can see my slides.

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00:08:06.000 --> 00:08:07.329

Steve MacFeely: Okay, super.

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00:08:07.830 --> 00:08:08.670

Steve MacFeely: So...

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00:08:09.240 --> 00:08:15.690

Steve MacFeely: I'm going to give a very simple presentation today. This is not going to be complicated, so don't worry if you're not a statistician.

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00:08:15.830 --> 00:08:18.549

Steve MacFeely: We're really going to talk in very simple terms.

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00:08:18.890 --> 00:08:23.909

Steve MacFeely: And in fact, the poll one was interesting. I'm going to come back to those results in a moment.

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00:08:24.380 --> 00:08:31.610

Steve MacFeely: So let me start. I'm going to talk about the outline. So this is an example of a very poor visualization.

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00:08:31.870 --> 00:08:37.609

Steve MacFeely: If you wanted to understand what this presentation's gonna be about, there's too much information.

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00:08:37.990 --> 00:08:39.680

Steve MacFeely: The timing is wrong.

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00:08:39.789 --> 00:08:45.939

Steve MacFeely: the access is wrong, so I'm starting with a really bad example, and I'm hoping

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00:08:46.210 --> 00:08:48.969

Steve MacFeely: From there on, we're going to talk about better examples.

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00:08:49.140 --> 00:08:53.080

Steve MacFeely: in simple terms, what I'm talking... what I'm gonna talk about today

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00:08:53.460 --> 00:08:57.060

Steve MacFeely: Is some lessons, some things we shouldn't do.

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00:08:57.470 --> 00:09:02.410

Steve MacFeely: And some things that we should do that will just simplify how to present information.

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00:09:03.120 --> 00:09:08.720

Steve MacFeely: So let's start with an example that has nothing to do with statistics, but has to do with flags.

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00:09:09.390 --> 00:09:12.840

Steve MacFeely: So the North American Dexological Society

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00:09:13.000 --> 00:09:16.869

Steve MacFeely: Has 5 key principles for good flag design.

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00:09:17.190 --> 00:09:22.880

Steve MacFeely: And in a way, these speak very much to statistics as well, and to data visualization.

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00:09:24.110 --> 00:09:26.290

Steve MacFeely: The first one is keep it simple.

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00:09:26.470 --> 00:09:34.409

Steve MacFeely: And we just heard in Poll 1 that, in fact, a lot of people identified this as a key challenge. How to simplify the message.

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00:09:35.340 --> 00:09:42.850

Steve MacFeely: Use meaningful symbolism, and I'll talk about that later on when we get to things like visualizations and infographics.

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00:09:43.960 --> 00:09:53.650

Steve MacFeely: Keep things... to 2 or 3 colors. Now, for charts, this isn't necessarily the case, but there is...

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00:09:54.300 --> 00:10:05.910

Steve MacFeely: the broad principle is correct. Don't over-clutter charts, and make sure when you present something that the reader's eye is drawn to the thing that you want them to look at.

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00:10:06.020 --> 00:10:11.470

Steve MacFeely: So... And I'll talk about this over and over again, you need to be clear

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00:10:11.590 --> 00:10:14.639

Steve MacFeely: In your mind about what it is you want to communicate.

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00:10:15.100 --> 00:10:19.899

Steve MacFeely: No lettering or seals. So, for charts, this is very important.

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00:10:20.060 --> 00:10:25.170

Steve MacFeely: Don't put in dense information. Don't put in stuff that's too small to see.

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00:10:26.280 --> 00:10:29.319

Steve MacFeely: And be stinctive. Be distinctive or unique.

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00:10:29.460 --> 00:10:34.840

Steve MacFeely: So find things that really are suggestive of what the topic is about.

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00:10:34.940 --> 00:10:39.080

Steve MacFeely: So, as I said, even though this isn't about statistics, I think there's lessons

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00:10:39.210 --> 00:10:42.370

Steve MacFeely: That we can learn from flags, because a good flag

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00:10:42.640 --> 00:10:45.869

Steve MacFeely: Straight away, you know the Italian flag or the French flag.

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00:10:46.400 --> 00:10:53.310

Steve MacFeely: It's simple, but you already understand what it stands for, so it's a very, very potent, symbol.

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00:10:54.730 --> 00:10:59.250

Steve MacFeely: Okay, so in a lot of cases today, and particularly because of technology.

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00:11:00.070 --> 00:11:06.109

Steve MacFeely: The first problem we have, I think, is too much of a good thing. We can present incredibly complex

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00:11:06.400 --> 00:11:12.209

Steve MacFeely: amounts of data, But often, this is the type of stuff that we see. It's just a mess.

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00:11:14.110 --> 00:11:20.479

Steve MacFeely: if I put this up, it's like, what's the message? What am I trying to convey? You have no idea. I mean, it's just...

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00:11:20.640 --> 00:11:39.550

Steve MacFeely: spaghetti on one side, or this really complex pie chart on the other, but what's the message? I mean, I'm gonna have to explain it to you, or you're gonna have to read the text. There's nothing jumping out, there's nothing that's really clearly articulating what's the message I'm trying to convey.

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00:11:40.700 --> 00:11:41.999

Steve MacFeely: So, just to...

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00:11:42.650 --> 00:11:52.250

Steve MacFeely: to go back to a bit of literature, you need to be clear what you want to say before you start. No technology, no visualization.

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00:11:52.390 --> 00:11:56.470

Steve MacFeely: It's going to solve your problems if you don't know what you want to say.

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00:11:57.340 --> 00:12:12.429

Steve MacFeely: We can go back to, Alice's Adventures in Wonderland almost 200 years ago. When she meets the Cheshire cat, what does he say? If you don't know what... where you're going, any road will do. And that's the point. You need to know where you want to go.

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00:12:13.110 --> 00:12:22.339

Steve MacFeely: So, before you forget about... forget about visualization, the hardest thing is to identify what's the message that you want to communicate.

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00:12:24.020 --> 00:12:28.890

Steve MacFeely: So let's go back to that messy set of charts that we showed a minute ago.

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00:12:29.630 --> 00:12:34.810

Steve MacFeely: I'm not advocating this, but... If we had to use those two charts, for example.

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00:12:35.860 --> 00:12:39.899

Steve MacFeely: One simple thing we could do on the... on the time series chart.

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00:12:40.190 --> 00:12:47.059

Steve MacFeely: We can take out all of the data, or all of the bullet points, so that we've simplified the actual text.

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00:12:47.420 --> 00:12:52.249

Steve MacFeely: And then the actual telephones of communication, which is the thing that we want to talk about.

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00:12:52.400 --> 00:12:55.919

Steve MacFeely: We put that in a different color, and we grayscale everything else.

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00:12:56.020 --> 00:13:00.420

Steve MacFeely: So that the elements that we want to talk about is identified.

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00:13:00.610 --> 00:13:08.380

Steve MacFeely: The same with the cookie market. We want to talk about caramel. We don't want to talk about the other ones, so we highlight the element.

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00:13:08.710 --> 00:13:15.350

Steve MacFeely: So, if you have a very complex chart, and if for some reason you need to present all of the detail.

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00:13:16.550 --> 00:13:21.320

Steve MacFeely: And perhaps that's the case, although I would challenge that you ever need to do that, but if you did.

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00:13:21.690 --> 00:13:32.259

Steve MacFeely: try and simplify down, gray out what's not relevant, and zoom into what is relevant. So at least, if I look at this chart now, my eye is drawn to the blue.

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00:13:33.660 --> 00:13:38.399

Steve MacFeely: So straight away, I've a better idea of what it is the person is trying to tell me.

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00:13:40.880 --> 00:13:44.749

Steve MacFeely: Okay, one very simple rule, and I just want to get it out of the way at the start.

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00:13:45.550 --> 00:13:49.100

Steve MacFeely: 3D is bad. So just don't do it.

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00:13:49.330 --> 00:13:53.689

Steve MacFeely: It's so tempting now with, all of the new tools that we have.

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00:13:54.330 --> 00:14:01.500

Steve MacFeely: But they distort our visual perception. So, if we take the pie chart on the right.

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00:14:01.850 --> 00:14:03.960

Steve MacFeely: Because we can see the...

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00:14:04.120 --> 00:14:09.669

Steve MacFeely: the depth of the Nissan, the green, and the depth of the Ford in the red.

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00:14:10.000 --> 00:14:11.700

Steve MacFeely: It's actually made the sh...

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00:14:12.070 --> 00:14:17.540

Steve MacFeely: It presents the slice of the pie chart. It makes it look bigger than it actually is.

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00:14:18.130 --> 00:14:25.590

Steve MacFeely: And this is a problem, because then it makes the Nissan, the green, and the Ford red, look bigger than they should be proportionately.

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00:14:26.100 --> 00:14:35.999

Steve MacFeely: So just, simple rule, 3D charts, don't do them. Just stay away from them. They'll come up in all of the applications, they look really... they can look lovely.

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00:14:36.540 --> 00:14:40.400

Steve MacFeely: But they're just too hard to read, and they distort our visual perception.

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00:14:42.610 --> 00:14:48.339

Steve MacFeely: Okay, now, I guess a lot of what I'm going to talk about for the next few minutes is about axes.

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00:14:49.340 --> 00:14:54.590

Steve MacFeely: So the first thing is axes matter. It's become very trendy

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00:14:55.180 --> 00:14:58.230

Steve MacFeely: To present charts now that don't have axes.

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00:14:58.630 --> 00:15:04.360

Steve MacFeely: So, first of all, make sure your X and Y axes are labeled clearly.

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00:15:05.620 --> 00:15:08.620

Steve MacFeely: But now, let's take the example of,

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00:15:09.050 --> 00:15:13.529

Steve MacFeely: the left-hand chart, we're comparing two James Bond movies, Casino Royale

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00:15:13.780 --> 00:15:19.810

Steve MacFeely: and Quantum of Solace. So we've taken the chart on the left, from a blog.

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00:15:22.780 --> 00:15:28.759

Steve MacFeely: If you look at this and you don't pay attention to the axis, it looks like the box office takings

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00:15:28.870 --> 00:15:30.559

Steve MacFeely: for Casino Royale.

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00:15:30.670 --> 00:15:34.119

Steve MacFeely: were significantly higher than quantum of Solace.

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00:15:35.130 --> 00:15:39.570

Steve MacFeely: But in actual fact, if you look at the right-hand side, where we put in the full scale.

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00:15:40.010 --> 00:15:47.189

Steve MacFeely: We realized that there was actually virtually no difference between box office takings between the two movies.

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00:15:48.380 --> 00:15:52.580

Steve MacFeely: So, same data, but just presented incorrectly and correctly.

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00:15:52.970 --> 00:15:56.410

Steve MacFeely: And you can see the effect visually is completely different.

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00:15:57.330 --> 00:16:02.320

Steve MacFeely: So, always look at the axes to see where they start and where they finish.

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00:16:02.690 --> 00:16:03.920

Steve MacFeely: Because...

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00:16:04.060 --> 00:16:15.109

Steve MacFeely: If you don't know, then it's very hard to understand whether the chart that's being presented is actually proportionate, and is telling you something, correctly.

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00:16:15.980 --> 00:16:27.010

Steve MacFeely: A similar story here, when we look at interest rates. Again, this is taken from a blog which is trying to argue that there's been a dramatic increase in interest rates.

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00:16:27.530 --> 00:16:32.869

Steve MacFeely: But again, In here, we haven't even gone back to zero, I've just gone to 2.8.

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00:16:33.430 --> 00:16:41.080

Steve MacFeely: Just to show you, once we broaden the scale, you get a completely different visual perception So...

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00:16:41.320 --> 00:16:45.280

Steve MacFeely: On the left, it looks like interest rates have risen very, very dramatically.

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00:16:45.570 --> 00:16:51.590

Steve MacFeely: On the right, you realize there's been virtually no change in interest rates over the last 5 years.

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00:16:52.350 --> 00:16:58.809

Steve MacFeely: And that's all by just changing the y-axis, so this is really, really important.

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00:17:00.860 --> 00:17:04.889

Steve MacFeely: Another trick that's used, in particular when people

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00:17:05.849 --> 00:17:12.750

Steve MacFeely: Unfortunately, we see axis manipulation usually when people are trying to convince you of something.

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00:17:13.240 --> 00:17:18.519

Steve MacFeely: Which is why it's so important to pay attention to the axis, so that you can make up your own mind.

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00:17:18.849 --> 00:17:21.730

Steve MacFeely: In this case, it's about global temperatures.

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00:17:23.190 --> 00:17:28.149

Steve MacFeely: And here they're trying to convince you that there's been no change in temperature. So what they've done.

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00:17:28.700 --> 00:17:37.440

Steve MacFeely: Is they've compressed the scale, so they've added in a load of extra, like, they've made the axes much larger than it needs to be.

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00:17:39.670 --> 00:17:43.689

Steve MacFeely: Now, if we compress this down, and we look at a smaller scale.

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00:17:43.970 --> 00:17:46.820

Steve MacFeely: We can see, in actual fact, there has been,

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00:17:47.590 --> 00:17:52.379

Steve MacFeely: a change. Now, again, this is where you need knowledge as well.

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00:17:54.940 --> 00:17:58.619

Steve MacFeely: You need to understand temperature, so you need the context, so...

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00:17:58.870 --> 00:18:16.819

Steve MacFeely: you need to read up as well to understand whether a change of one degree is significant or not. I mean, the chart can't do that for you. All it can do is present the data. You still need to read up and make an assessment yourself, then, of whether a 1% change is important or not.

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00:18:18.130 --> 00:18:23.380

Steve MacFeely: A different trick that's often used is on the x-axis.

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00:18:24.860 --> 00:18:30.590

Steve MacFeely: Which is, you truncate the information to pick the period that suits your argument.

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00:18:31.010 --> 00:18:36.269

Steve MacFeely: So, on the left-hand side, Somebody has picked the x-axis.

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00:18:36.770 --> 00:18:44.240

Steve MacFeely: So that they're saying, okay, look at the mean temperature, and there's basically no change.

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00:18:45.460 --> 00:18:47.920

Steve MacFeely: Now, for that period, that's correct.

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00:18:48.350 --> 00:18:54.749

Steve MacFeely: The question is, is that the correct timescale To look at temperature change.

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00:18:55.210 --> 00:19:10.649

Steve MacFeely: And again, this is where you need supplementary information. The chart can only do so much, so you need to read up and make sure that the length of time, the periodicity, is the correct length of time for the variable that you're looking at.

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00:19:10.990 --> 00:19:16.510

Steve MacFeely: Just as a bit of information, this was a big challenge when the SDGs were introduced.

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00:19:17.080 --> 00:19:25.250

Steve MacFeely: there was... there was a lot of pressure to try and standardize the... the periodicity of the SDG reporting period.

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00:19:25.490 --> 00:19:29.760

Steve MacFeely: So the SDGs run from 2015 to 2030.

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00:19:31.290 --> 00:19:35.999

Steve MacFeely: The politicians wanted us to go back to 2000 at the earliest.

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00:19:36.340 --> 00:19:45.379

Steve MacFeely: But in fact, for a lot of the environmental variables, the environmental statisticians said, no, that doesn't make any sense. We need a much longer time series.

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00:19:45.620 --> 00:19:50.580

Steve MacFeely: So, again, it's very important that you understand the variable in question.

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00:19:50.950 --> 00:19:53.339

Steve MacFeely: Now, on the right-hand side, what I've done

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00:19:55.450 --> 00:19:59.079

Steve MacFeely: I've picked a long time series that runs over 50 years.

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00:19:59.400 --> 00:20:03.539

Steve MacFeely: But what you can see is if you bunch any particular

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00:20:03.860 --> 00:20:06.299

Steve MacFeely: Kind of subset of about 10 years.

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00:20:06.770 --> 00:20:09.179

Steve MacFeely: You can actually find,

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00:20:09.660 --> 00:20:17.260

Steve MacFeely: A kind of, like, a staircase, where it looks like, for each of the 10 years, there's been no... there's been no change in mean temperature.

163

00:20:17.820 --> 00:20:21.679

Steve MacFeely: But in fact, when you look over the 50 years, you can see without doubt

164

00:20:21.840 --> 00:20:24.260

Steve MacFeely: That there has been a change in temperature.

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00:20:24.560 --> 00:20:30.580

Steve MacFeely: So this is to make the point that your selection of X axes is incredibly important.

166

00:20:30.760 --> 00:20:32.990

Steve MacFeely: So, again, just as a user.

167

00:20:34.020 --> 00:20:36.410

Steve MacFeely: Be aware, when you're looking at charts.

168

00:20:36.910 --> 00:20:43.630

Steve MacFeely: What selection of Y and axes have they picked? On the y-axis, are they starting at 0?

169

00:20:44.080 --> 00:20:57.350

Steve MacFeely: on the x-axis, why have... where have they started? And then just ask yourself, why have they started there? And would it make a difference if we had a longer time series? And as a statistician presenting the data.

170

00:20:58.400 --> 00:21:01.920

Steve MacFeely: It's very important that you ask yourself that as well.

171

00:21:02.220 --> 00:21:05.529

Steve MacFeely: Do you want to focus in on a short time series.

172

00:21:06.440 --> 00:21:17.719

Steve MacFeely: Do you want to present a longer time series? And maybe what you should do is present the two side by side, so that you can... you can... you can present a more robust and fuller analysis.

173

00:21:21.320 --> 00:21:26.410

Steve MacFeely: Okay, another trick that we see, unfortunately, is inverting Etsy's.

174

00:21:26.750 --> 00:21:31.290

Steve MacFeely: So, at first glance, if you looked at this, You're in a hurry.

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00:21:32.320 --> 00:21:37.109

Steve MacFeely: Maybe they haven't presented the Y-axis, or maybe even you just don't have time to look at it.

176

00:21:37.340 --> 00:21:39.660

Steve MacFeely: and you see gun deaths in Florida.

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00:21:39.970 --> 00:21:47.379

Steve MacFeely: Now, in the chart, they've gone to the trouble of saying, in 2005, there was an event, so Florida enacted

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00:21:47.680 --> 00:21:50.170

Steve MacFeely: The Stand Your Ground law.

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00:21:50.510 --> 00:21:57.330

Steve MacFeely: So when I look at that chart, at first glance, I think, oh, wow, as soon as they enacted this law.

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00:21:57.840 --> 00:22:01.569

Steve MacFeely: gun deaths fell very, very dramatically in Florida.

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00:22:03.450 --> 00:22:06.670

Steve MacFeely: But in fact, then I look at the axis, and I think, oh, hang on a second.

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00:22:06.800 --> 00:22:08.639

Steve MacFeely: The axis is upside down.

183

00:22:09.380 --> 00:22:11.719

Steve MacFeely: So, if I inverted that chart.

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00:22:12.640 --> 00:22:17.519

Steve MacFeely: What it's actually telling me is when that law was enacted in 2005,

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00:22:17.640 --> 00:22:26.319

Steve MacFeely: Gun deaths actually increased very dramatically, from about 450 Down to 800 and something.

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00:22:26.790 --> 00:22:29.050

Steve MacFeely: So, by inverting the axis.

187

00:22:29.170 --> 00:22:36.600

Steve MacFeely: They've produced a very counterintuitive result, and it's... you'd be surprised the number of people who fall for this.

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00:22:36.730 --> 00:22:38.750

Steve MacFeely: And don't actually pay attention.

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00:22:39.160 --> 00:22:41.980

Steve MacFeely: So, again, always be careful.

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00:22:42.370 --> 00:22:47.849

Steve MacFeely: Looking at the axes, And I would suggest, as statistical presenters.

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00:22:48.350 --> 00:22:55.080

Steve MacFeely: That we always use the more intuitive, where we start zero at the bottom, and work up, and work to the right.

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00:22:57.100 --> 00:23:00.040

Steve MacFeely: I see a shoe... a few short faces.

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00:23:00.250 --> 00:23:03.719

Steve MacFeely: There's far worse happening out there, believe me.

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00:23:05.430 --> 00:23:11.299

Steve MacFeely: Okay, and another thing to be alert, both as a user and as a compiler.

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00:23:11.860 --> 00:23:14.999

Steve MacFeely: Is matching images with your story.

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00:23:15.370 --> 00:23:22.810

Steve MacFeely: So... this isn't maybe the best example, but nevertheless, it's... I used it some years ago.

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00:23:23.120 --> 00:23:27.290

Steve MacFeely: This was a story about inflation, no, the...

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00:23:27.500 --> 00:23:30.749

Steve MacFeely: There's two things wrong with this story, from my point of view.

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00:23:31.520 --> 00:23:36.650

Steve MacFeely: One is, they're actually talking about inflation, so they're presenting inflation figures

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00:23:37.340 --> 00:23:43.020

Steve MacFeely: But they're talking about cost of living, so if there's any price statisticians in the audience.

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00:23:43.470 --> 00:23:47.010

Steve MacFeely: You'll know the cost of living and inflation aren't the same thing.

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00:23:47.380 --> 00:23:53.680

Steve MacFeely: So we shouldn't actually be using those terms interchangeably, because they are actually conceptually different.

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00:23:54.320 --> 00:24:00.949

Steve MacFeely: But on top of that, they've added in a picture with the shop closing down, So, subliminally.

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00:24:02.260 --> 00:24:06.909

Steve MacFeely: without even... I see cost of living rising at the fastest rate in two years.

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00:24:07.300 --> 00:24:10.050

Steve MacFeely: Oh, shops must be closing down because of that.

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00:24:11.570 --> 00:24:15.020

Steve MacFeely: That's a completely different story. Again, that's business demography.

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00:24:15.520 --> 00:24:16.290

Steve MacFeely: So...

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00:24:16.530 --> 00:24:26.079

Steve MacFeely: Either deliberately or unintentionally, they've really conflated a number of issues in this article, both by using an image that doesn't match the story.

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00:24:26.380 --> 00:24:28.840

Steve MacFeely: And then in the actual text itself.

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00:24:29.470 --> 00:24:36.749

Steve MacFeely: They're merging two different conceptual issues, and they're using them synonymously, which is problematic as well.

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00:24:37.040 --> 00:24:45.909

Steve MacFeely: So again, be very careful about the image that you select, because it... straight away, it's telling users something.

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00:24:46.130 --> 00:24:54.020

Steve MacFeely: Whether you realize it or not, people are going to make a connection between the headline and the picture, whether that's what you intended or not.

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00:24:54.220 --> 00:24:59.650

Steve MacFeely: So be very careful. But also, as a user, When you see these things.

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00:25:00.010 --> 00:25:02.790

Steve MacFeely: Ask yourself, why did they pick that picture?

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00:25:03.840 --> 00:25:13.120

Steve MacFeely: you know, is it a deliberate... I mean, am I being... are they trying to convince me of something, or is it just sloppy journalism? I mean, we'll never know the motive, but just be aware

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00:25:13.280 --> 00:25:18.069

Steve MacFeely: Of the things that happen, because they do affect, how we think.

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00:25:21.170 --> 00:25:25.180

Steve MacFeely: Okay, for users in particular, there's another issue.

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00:25:25.760 --> 00:25:29.610

Steve MacFeely: Which is, don't present a statistic that doesn't make sense.

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00:25:30.070 --> 00:25:32.820

Steve MacFeely: Unless you're... you're really going to make clear

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00:25:33.370 --> 00:25:36.329

Steve MacFeely: What the issue is, and why it's happened.

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00:25:36.430 --> 00:25:41.350

Steve MacFeely: So... This is an article that was presented,

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00:25:41.750 --> 00:25:49.330

Steve MacFeely: In the Financial Times. Now, in fairness to the Financial Times, they presented it correctly in the sense they presented it as a mystery.

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00:25:49.610 --> 00:25:53.380

Steve MacFeely: So, in this case, both the USA

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00:25:53.820 --> 00:25:58.779

Steve MacFeely: and the UK were saying they both had a trade surplus vis-a-vis each other.

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00:25:58.960 --> 00:26:09.210

Steve MacFeely: Which is impossible. So if one country has a trade surplus, the other one must have a trade deficit. It's impossible that both countries can be winning a trade war.

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00:26:09.550 --> 00:26:15.109

Steve MacFeely: Well, unless maybe... You're a president, but for most of us.

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00:26:15.970 --> 00:26:17.860

Steve MacFeely: There's a winner and there's a loser.

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00:26:18.050 --> 00:26:25.419

Steve MacFeely: Now, the difference... the reason this comes about... so these statistics are correct, but the reason they're correct is

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00:26:26.080 --> 00:26:30.370

Steve MacFeely: The two different countries were using a different geographic classification.

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00:26:30.600 --> 00:26:34.209

Steve MacFeely: And that was the problem, but the problem was that wasn't explained.

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00:26:34.650 --> 00:26:35.440

Steve MacFeely: So...

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00:26:35.760 --> 00:26:41.990

Steve MacFeely: the article just presented, and they said, oh, this is really strange. Both countries are saying there's a surplus.

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00:26:42.280 --> 00:26:48.769

Steve MacFeely: But they didn't delve in, so they said, you know, statisticians attempt to solve the mystery. There was no great mystery.

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00:26:50.140 --> 00:26:54.549

Steve MacFeely: If they'd asked, they would have been told. So, the UK was using

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00:26:54.650 --> 00:26:59.730

Steve MacFeely: a different classification where they included, Jersey and the Channel Islands.

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00:26:59.980 --> 00:27:03.300

Steve MacFeely: Whereas the Americans weren't included in the Channel Islands.

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00:27:03.630 --> 00:27:07.670

Steve MacFeely: And from a services point of view, that has a huge impact because of banking.

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00:27:07.860 --> 00:27:10.840

Steve MacFeely: And it led to this massive distortion.

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00:27:12.210 --> 00:27:18.789

Steve MacFeely: So, again, You know, just be aware, sometimes it's just sloppy journalism, sometimes it's laziness.

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00:27:19.070 --> 00:27:23.079

Steve MacFeely: But as a presenter, if it's you, if you're the statistician.

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00:27:24.630 --> 00:27:29.109

Steve MacFeely: Don't put stuff up like this unless you make it clear very quickly

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00:27:29.250 --> 00:27:32.679

Steve MacFeely: what the reason is. Like, cut to the chase very quickly.

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00:27:33.320 --> 00:27:35.780

Steve MacFeely: Don't leave people hanging on, trying to...

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00:27:36.030 --> 00:27:42.279

Steve MacFeely: You know, you're not writing a murder mystery where you're gonna leave the surprise until the end.

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00:27:42.670 --> 00:27:46.429

Steve MacFeely: Put it up at the start. It's a classification discrepancy.

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00:27:46.730 --> 00:27:52.110

Steve MacFeely: And just get it over with, and put people out of their misery, explain it, and then go through the detail.

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00:27:55.820 --> 00:27:59.450

Steve MacFeely: Okay, another thing that we see all the time is...

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00:28:00.560 --> 00:28:03.620

Steve MacFeely: The mix-up between correlation and causation.

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00:28:04.210 --> 00:28:07.839

Steve MacFeely: So we see a lot of what we call spurious correlation.

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00:28:08.310 --> 00:28:11.210

Steve MacFeely: Probably the best example I've seen is...

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00:28:11.950 --> 00:28:15.259

Steve MacFeely: Ice cream consumption and shark attacks in Australia.

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00:28:16.240 --> 00:28:19.330

Steve MacFeely: So, those two things are highly correlated.

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00:28:20.090 --> 00:28:28.210

Steve MacFeely: But I don't think anybody would... would argue that there's a... there's causation that either eating ice cream causes shark... shark attacks.

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00:28:28.640 --> 00:28:32.979

Steve MacFeely: Or having been attacked by a shark gives you an appetite for ice cream.

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00:28:33.450 --> 00:28:36.449

Steve MacFeely: They just happen at the same time during the summer.

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00:28:36.660 --> 00:28:44.270

Steve MacFeely: So, there's lots. The example I've picked here, if you look them up on the web, you can find some hilarious correlations.

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00:28:44.650 --> 00:28:52.000

Steve MacFeely: This is the... cases of measles and marriage. So, if you were to present this as causation.

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00:28:52.230 --> 00:28:55.180

Steve MacFeely: You would be implying that either having measles

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00:28:55.630 --> 00:29:00.210

Steve MacFeely: Leads to greater marriage, or vice versa, because the directionality isn't clear.

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00:29:00.630 --> 00:29:02.990

Steve MacFeely: But this is what we call a spurious...

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00:29:03.580 --> 00:29:13.569

Steve MacFeely: correlation. It just happens that they coexist, but there's no relationship between the two, that both variables are independent. There's no relationship between them.

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00:29:13.980 --> 00:29:19.590

Steve MacFeely: But yet, time and time again, we see these things presented as if there's a relationship.

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00:29:19.920 --> 00:29:24.059

Steve MacFeely: So, again, as a user, You have to think carefully.

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00:29:24.340 --> 00:29:26.740

Steve MacFeely: Is that plausible? Is that realistic?

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00:29:28.170 --> 00:29:33.650

Steve MacFeely: And as a statistical producer, You really have to be honest, and...

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00:29:33.980 --> 00:29:39.370

Steve MacFeely: Just because there's a correlation, don't present it as evidence. It's evidence of nothing.

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00:29:39.490 --> 00:29:48.200

Steve MacFeely: Unless you do some further statistical testing to actually identify causation, and then also try and identify the direction

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00:29:48.320 --> 00:29:51.040

Steve MacFeely: Of the, the causation.

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00:29:54.030 --> 00:29:56.160

Steve MacFeely: Okay, so some ingredients.

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00:29:56.350 --> 00:29:58.600

Steve MacFeely: There won't be any surprises here.

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00:29:59.580 --> 00:30:01.710

Steve MacFeely: Up at the top, clear labeling.

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00:30:01.980 --> 00:30:03.310

Steve MacFeely: Really simple.

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00:30:03.560 --> 00:30:07.660

Steve MacFeely: Say what it is the chart is. Labels are so important.

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00:30:08.720 --> 00:30:13.070

Steve MacFeely: Labels should include... should include year, reference year.

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00:30:13.520 --> 00:30:20.609

Steve MacFeely: If there's thresholds, it should say something about the thresholds, and it should say something about the core variable.

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00:30:21.830 --> 00:30:29.300

Steve MacFeely: axes. It should be absolutely clear what the axes mean. If you don't understand the axes.

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00:30:29.650 --> 00:30:32.549

Steve MacFeely: Then it's a useless visualization.

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00:30:34.210 --> 00:30:42.449

Steve MacFeely: So, as I say, also, highlight, like, if it's change that you want to present, make it easy

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00:30:42.950 --> 00:30:51.339

Steve MacFeely: So, some of the things I like about this, so the OECD average is cleared, it's in a blue line, so it's not a country, so it's presented with countries.

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00:30:51.570 --> 00:30:53.380

Steve MacFeely: But you can see it's different.

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00:30:53.970 --> 00:30:56.920

Steve MacFeely: You can see boys and girls presented differently.

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00:30:57.780 --> 00:31:02.599

Steve MacFeely: And then also, branding and source. So where did this statistic come from?

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00:31:02.750 --> 00:31:08.279

Steve MacFeely: And this is critical, because To help you understand

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00:31:08.440 --> 00:31:13.420

Steve MacFeely: the veracity of a statistic, of a chart. You need to know who produced it.

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00:31:13.570 --> 00:31:16.000

Steve MacFeely: And then you can decide for yourself.

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00:31:16.570 --> 00:31:24.680

Steve MacFeely: do I trust OECD or not? If you don't trust them, that's okay. If you do trust them, at least then you think, well, okay, that's a trusted source.

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00:31:25.250 --> 00:31:28.909

Steve MacFeely: So here you can see it's an OECD chart, and you can also see

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00:31:29.080 --> 00:31:35.849

Steve MacFeely: where the chart came from, and that means you can replicate it. You can go to that source and find it.

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00:31:35.980 --> 00:31:51.499

Steve MacFeely: And that's incredibly important from a scientific principle, that you can trace where the information came from, and you can verify for yourself that those data are presented correctly. Because oftentimes these will be,

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00:31:51.730 --> 00:31:55.189

Steve MacFeely: Replicated in a newspaper, in a magazine, or in a blog.

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00:31:55.310 --> 00:32:02.140

Steve MacFeely: So, if you want to go back to the source material to make sure that it's correct, it's really important that you know the source.

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00:32:05.210 --> 00:32:08.759

Steve MacFeely: Again, just another visualization. I mean, in this one.

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00:32:08.930 --> 00:32:15.950

Steve MacFeely: what it does very nicely. I mean, one, it's beautiful looking, and I think making charts beautiful is very important.

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00:32:16.250 --> 00:32:22.260

Steve MacFeely: But you can see the scales are different on the left and right, so you can see there's been growth in energy

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00:32:22.370 --> 00:32:25.130

Steve MacFeely: Over the 24 years.

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00:32:25.460 --> 00:32:28.480

Steve MacFeely: You can also see which sectors or which countries

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00:32:28.710 --> 00:32:32.209

Steve MacFeely: where the growth has been, so I think this very neatly

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00:32:32.480 --> 00:32:35.369

Steve MacFeely: Conveys a couple of things together.

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00:32:35.530 --> 00:32:39.270

Steve MacFeely: Both. You can see which countries have grown the most.

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00:32:39.390 --> 00:32:41.840

Steve MacFeely: And you can also see the overall growth.

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00:32:42.210 --> 00:32:46.309

Steve MacFeely: Again, all labeled very clearly. You can see the source branding.

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00:32:46.680 --> 00:32:52.260

Steve MacFeely: So, again, very, very simple for a user to understand where this information came from.

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00:32:53.880 --> 00:33:00.729

Steve MacFeely: Again, just some other examples of charts, which... they're not super complicated, and in a way, that's their strength.

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00:33:00.850 --> 00:33:03.100

Steve MacFeely: Is there simple. The one on the...

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00:33:03.460 --> 00:33:06.519

Steve MacFeely: On the left, it actually even has a note.

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00:33:06.790 --> 00:33:13.499

Steve MacFeely: So it's also telling you that for a couple of countries, just be aware that there's something different, so...

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00:33:13.610 --> 00:33:19.090

Steve MacFeely: For the US, these are estimates, you know, so they're not actually country-reported data.

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00:33:19.330 --> 00:33:22.629

Steve MacFeely: So, again, it's giving you a lot of important information.

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00:33:25.660 --> 00:33:30.889

Steve MacFeely: This one I really like. This is from the... every year, the United Nations presents,

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00:33:31.040 --> 00:33:32.650

Steve MacFeely: a report on SDGs.

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00:33:33.480 --> 00:33:36.500

Steve MacFeely: And it's trying to tell you about the progress.

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00:33:36.730 --> 00:33:41.370

Steve MacFeely: And I think the... the kind of dashboard on the left is very, very clear.

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00:33:41.790 --> 00:33:44.910

Steve MacFeely: So you can see 18% on target.

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00:33:45.270 --> 00:33:52.430

Steve MacFeely: 17% moderate on target, and then we're starting to get into poor... poor progress or no progress.

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00:33:52.770 --> 00:33:56.520

Steve MacFeely: And the colors are intuitive, so we're going from green to red.

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00:33:56.740 --> 00:33:58.940

Steve MacFeely: If those colors were inverted.

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00:33:59.510 --> 00:34:07.969

Steve MacFeely: it wouldn't make sense, because automatically you... we think of red as kind of danger, as bad. We think of green as go, or as good.

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00:34:08.199 --> 00:34:14.889

Steve MacFeely: So the colors are aligned Kind of ergonomically, to tell us, intuitively, even without the numbers.

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00:34:15.070 --> 00:34:16.789

Steve MacFeely: What's good, what's bad?

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00:34:17.100 --> 00:34:20.900

Steve MacFeely: And then we can see on the right, it's broken down by the 17 goals.

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00:34:21.090 --> 00:34:27.649

Steve MacFeely: So you... again, you can see, without even paying much attention, I mean, if you just look at the chart on the right.

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00:34:28.120 --> 00:34:30.620

Steve MacFeely: You can see there's not a whole lot of green.

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00:34:30.969 --> 00:34:38.199

Steve MacFeely: There's a bit more orange, so you can see goal 7, Goal 9, they're doing pretty good, without really spending any time

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00:34:38.580 --> 00:34:44.249

Steve MacFeely: having to kind of agonize over the chart. Equally, you can see Goal 2, Goal 4,

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00:34:44.449 --> 00:34:50.109

Steve MacFeely: Goal 10. There's a lot of red and a lot of pink, so things aren't going well.

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00:34:50.230 --> 00:34:58.760

Steve MacFeely: And that's really important. You're not having to spend a lot of time scratching your head, going, what the hell is this thing telling me? It's very, very intuitive.

327

00:35:01.800 --> 00:35:04.110

Steve MacFeely: This I love. I love infographics.

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00:35:04.450 --> 00:35:08.659

Steve MacFeely: And I love clever infographics, providing they're not too clever.

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00:35:08.900 --> 00:35:14.940

Steve MacFeely: So this comes from UNCTAD, the UN Trade and Development. So they're talking about container traffic.

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00:35:15.380 --> 00:35:21.479

Steve MacFeely: So, you have the actual chart in the middle, but then it's framed beautifully by a crane and a ship.

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00:35:21.780 --> 00:35:34.050

Steve MacFeely: So, the graph actually looks like containers stacked, waiting to be loaded onto a ship. So, I just think it's a very, very clever chart. Very elegant, very simple, but it tells you a lot.

332

00:35:34.350 --> 00:35:49.540

Steve MacFeely: And you can see in the chart itself, the proportions are correct. So straight away, without having to agonize, I can see Asia's the big player, followed by Europe, and then North America, developing Americas and stuff are small players.

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00:35:49.800 --> 00:35:56.399

Steve MacFeely: So it's very easy to read, very, very fast, and I think it looks very beautiful. It's very, very simple.

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00:35:58.910 --> 00:36:03.600

Steve MacFeely: Another... another thing we can use is interactive tools, but

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00:36:04.210 --> 00:36:11.590

Steve MacFeely: We need to be careful. Once we start introducing interactive... interactivity, it allows the user to play

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00:36:12.050 --> 00:36:13.429

Steve MacFeely: Which can be good.

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00:36:14.220 --> 00:36:18.070

Steve MacFeely: But then we really need to focus on what the message is, so...

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00:36:19.100 --> 00:36:25.129

Steve MacFeely: This is a tool, again, from UN Trade and Development, so they're looking at revealed comparative advantage.

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00:36:25.770 --> 00:36:30.340

Steve MacFeely: So, just to explain, on the right-hand side, you can pick any country you want.

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00:36:30.570 --> 00:36:35.250

Steve MacFeely: And you can pick a year, I think they present about 20 years or 30 years of data.

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00:36:36.070 --> 00:36:39.319

Steve MacFeely: So, in this case, we're looking at China in 2024.

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00:36:39.700 --> 00:36:43.580

Steve MacFeely: And again, without knowing anything about China, but I can see straight away

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00:36:44.100 --> 00:36:54.360

Steve MacFeely: that, according to this, China's revealed comparative advantage is in Miscellaneous manufactured goods, machinery and transport equipment.

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00:36:54.980 --> 00:36:58.049

Steve MacFeely: Manufactured goods, and a bit on chemicals.

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00:36:58.320 --> 00:37:03.090

Steve MacFeely: So, okay, that's very intuitive, but it's super clear.

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00:37:03.240 --> 00:37:10.889

Steve MacFeely: from the interactive chart as well. So I'm not having to spend a whole lot of time agonizing, going, what the hell is this thing showing me?

347

00:37:11.490 --> 00:37:12.860

Steve MacFeely: Now, in the middle.

348

00:37:13.320 --> 00:37:18.489

Steve MacFeely: what they do, I can't really show you this on a flat chart, but if you hit on any one of those dots.

349

00:37:18.920 --> 00:37:21.509

Steve MacFeely: It will actually tell you what the product is.

350

00:37:22.140 --> 00:37:28.029

Steve MacFeely: And it will tell you the volume of trade and the revealed comparative advantage of each individual product.

351

00:37:28.190 --> 00:37:30.579

Steve MacFeely: So it's a very, very powerful tool.

352

00:37:30.830 --> 00:37:34.370

Steve MacFeely: But again, it's still very, very simple.

353

00:37:35.140 --> 00:37:37.750

Steve MacFeely: And it took us a long time when I worked there.

354

00:37:37.980 --> 00:37:40.290

Steve MacFeely: To develop this, because when the...

355

00:37:40.540 --> 00:37:46.069

Steve MacFeely: When the people from the Comparative Advantage Unit came at the start, they had tons of information.

356

00:37:46.410 --> 00:37:49.690

Steve MacFeely: And they didn't know what they wanted. They wanted to visualize it

357

00:37:49.860 --> 00:37:54.440

Steve MacFeely: But they couldn't articulate what it was they wanted, and it took us a long time

358

00:37:54.970 --> 00:37:59.709

Steve MacFeely: Believe you me, this looks nothing like what they presented at the start. They had all sorts of ideas.

359

00:38:00.310 --> 00:38:10.899

Steve MacFeely: And it was simplified, simplified, simplified. All the time. We were trying to distill down to what's the core message. What is it that you're really trying to explain?

360

00:38:15.780 --> 00:38:20.590

Steve MacFeely: Maps are incredibly powerful. We're a visual species.

361

00:38:22.490 --> 00:38:27.410

Steve MacFeely: The reason I've highlighted this chart is because we're presenting SIDS.

362

00:38:27.930 --> 00:38:32.800

Steve MacFeely: And from a mapping point of view, this was very challenging. So, small island developing states.

363

00:38:33.010 --> 00:38:35.410

Steve MacFeely: As you would expect, are small islands.

364

00:38:35.690 --> 00:38:37.400

Steve MacFeely: They're little pinpricks.

365

00:38:37.590 --> 00:38:42.320

Steve MacFeely: So when you present a map of the world, you can see SIDS.

366

00:38:42.990 --> 00:38:49.079

Steve MacFeely: So what we did is we used these... if you went into the interactive thing, these are pulsing.

367

00:38:49.440 --> 00:38:51.859

Steve MacFeely: And what it does is it draws your eye.

368

00:38:52.250 --> 00:38:57.100

Steve MacFeely: to where they are. So, these are the Atlantic and Indian Ocean SIDS.

369

00:38:57.360 --> 00:38:59.699

Steve MacFeely: So, again, very, very simply.

370

00:39:00.130 --> 00:39:07.650

Steve MacFeely: we're drawing you right to where they are, and we're... we're putting them in context, so you can see there's 3 in the Atlantic, there's,

371

00:39:08.570 --> 00:39:14.430

Steve MacFeely: 5 in the Indian Ocean. The other thing you can do straight away, if you're actually paying attention.

372

00:39:15.330 --> 00:39:21.190

Steve MacFeely: You will see that Bahrain and... Guinea Bisseau.

373

00:39:21.560 --> 00:39:22.770

Steve MacFeely: aren't islands.

374

00:39:23.080 --> 00:39:28.470

Steve MacFeely: So this is a very good visualization, too, because it's... Very quickly.

375

00:39:29.170 --> 00:39:32.670

Steve MacFeely: it's gonna make you ask a question, why are they SIDS?

376

00:39:32.930 --> 00:39:36.099

Steve MacFeely: The Sid is a small island, developing state.

377

00:39:36.230 --> 00:39:38.660

Steve MacFeely: But two of the SIDS aren't islands.

378

00:39:39.170 --> 00:39:41.010

Steve MacFeely: So it's... it's already...

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00:39:41.180 --> 00:39:51.189

Steve MacFeely: throwing up one of the most unusual aspects of SIDS, which is if you look at the United Nations SIDS classification, many of the islands aren't islands.

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00:39:51.660 --> 00:39:55.869

Steve MacFeely: So the map not only is showing you where they are.

381

00:39:56.100 --> 00:40:00.200

Steve MacFeely: But it's also showing you one of the conundrums of the classification.

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00:40:00.570 --> 00:40:08.130

Steve MacFeely: So, for me, I really like this, because it tells you a lot subliminally, without, again, having to really think too carefully about it.

383

00:40:10.050 --> 00:40:16.309

Steve MacFeely: This is probably one of my favorite visualizations. This is so clever, and it's so elegant, it's so beautiful.

384

00:40:16.550 --> 00:40:18.729

Steve MacFeely: And this comes from Swiss Medio.

385

00:40:19.440 --> 00:40:22.829

Steve MacFeely: So, on the left-hand side, we're looking at temperature.

386

00:40:24.210 --> 00:40:26.389

Steve MacFeely: Now, why do I think this is so good?

387

00:40:27.930 --> 00:40:32.900

Steve MacFeely: It's so good from... to my mind, because it's showing us a couple of things, so...

388

00:40:33.390 --> 00:40:38.510

Steve MacFeely: If you look at the red line, you can see it's a red line, and then halfway through.

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00:40:38.630 --> 00:40:41.839

Steve MacFeely: The red line is surrounded by pink.

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00:40:42.430 --> 00:40:44.320

Steve MacFeely: So what's that telling us? So...

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00:40:45.170 --> 00:40:51.549

Steve MacFeely: You can see, again, if you look from 0 up until just before 12, there's, like, a grey box.

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00:40:52.290 --> 00:40:58.939

Steve MacFeely: So, I took... I took this, I downloaded this just before noon on Tuesday the 16th.

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00:40:59.480 --> 00:41:02.650

Steve MacFeely: So everything in gray is past tense.

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00:41:03.990 --> 00:41:07.239

Steve MacFeely: So, in other words, the temperature now has been measured

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00:41:07.750 --> 00:41:11.569

Steve MacFeely: So they know what the temperature is. The uncertainty has been removed.

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00:41:12.910 --> 00:41:22.480

Steve MacFeely: You can see for the last, maybe, 45 minutes, so there's obviously information still coming in, so they're confirming the measurements, so there's still a bit of uncertainty.

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00:41:22.730 --> 00:41:24.240

Steve MacFeely: Even in the past.

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00:41:24.920 --> 00:41:28.739

Steve MacFeely: But once we go into the future, so everything to the right of 12,

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00:41:28.850 --> 00:41:31.850

Steve MacFeely: Has this big pink bar around the red line.

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00:41:32.280 --> 00:41:36.460

Steve MacFeely: And you can see that pink line is getting bigger as we go into the future.

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00:41:37.040 --> 00:41:45.269

Steve MacFeely: We can see the pink line is a bit deeper on the downside, so what it's telling us is there's uncertainty around the temperature.

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00:41:45.800 --> 00:41:51.860

Steve MacFeely: going into the future. So, they're... they're forecasting the temperature will be around 2 degrees.

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00:41:52.410 --> 00:41:55.979

Steve MacFeely: But on the downside, it could be even below zero.

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00:41:56.170 --> 00:41:58.930

Steve MacFeely: Coming up just after midnight.

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00:42:00.060 --> 00:42:04.080

Steve MacFeely: So, it's telling us an awful lot. It's telling us

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00:42:04.320 --> 00:42:12.519

Steve MacFeely: Their prediction for the temperature, but they're also telling us that there is uncertainty, and they're giving us a measurement of what that uncertainty is.

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00:42:13.090 --> 00:42:17.750

Steve MacFeely: And exactly the same on the right-hand side, if we look at the forecast for wind.

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00:42:17.910 --> 00:42:24.499

Joel Smith: Sorry, Steve, just to jump in quick, just to give you a quick 2-minute time check, just to make sure we have time for questions, thank you.

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00:42:24.760 --> 00:42:31.850

Steve MacFeely: again, we see uncertainty, so I just think these are beautiful charts. They look pretty, and they're so clear and so clever.

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00:42:34.430 --> 00:42:40.619

Steve MacFeely: Why does that matter? So let me give you an example from WNHO, and let me just skip on to the la- this is a repeat.

411

00:42:41.070 --> 00:42:43.200

Steve MacFeely: So this is health emergencies.

412

00:42:43.340 --> 00:42:48.219

Steve MacFeely: Now, why is uncertainty so important? Every measurement has uncertainty.

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00:42:49.590 --> 00:42:54.550

Steve MacFeely: But in this case, we can see uncertainty increasing as we move into the future.

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00:42:55.830 --> 00:42:58.370

Steve MacFeely: But it becomes critical in this chart

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00:42:58.610 --> 00:43:03.179

Steve MacFeely: So, sorry, let me go back for a second. If you look at the healthier populations on the left.

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00:43:03.390 --> 00:43:04.980

Steve MacFeely: We see uncertainty.

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00:43:05.450 --> 00:43:13.139

Steve MacFeely: But the uncertainty doesn't matter so much here, because it's all above the target. So, in other words, the target has been achieved.

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00:43:13.830 --> 00:43:15.739

Steve MacFeely: But now let's look at this one.

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00:43:17.280 --> 00:43:20.659

Steve MacFeely: The target is within the uncertainty band.

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00:43:21.640 --> 00:43:28.960

Steve MacFeely: So it becomes critical, because Our prediction, our mean prediction, is that we're not going to reach the target.

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00:43:29.900 --> 00:43:33.139

Steve MacFeely: But within the variance around that estimate.

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00:43:33.950 --> 00:43:39.839

Steve MacFeely: We actually straddle the target. So the point is, we may have actually achieved the target.

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00:43:39.980 --> 00:43:48.829

Steve MacFeely: But due to model imprecision, we can't actually say. So, uncertainty becomes really critical as we approach a target.

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00:43:49.480 --> 00:43:54.680

Steve MacFeely: or as we approach zero. So... For example, things like inflation.

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00:43:55.220 --> 00:43:58.330

Steve MacFeely: If the target's definitely positive, it's one thing.

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00:43:58.920 --> 00:44:08.050

Steve MacFeely: If we're not sure if it's positive or negative, because it's hovering around zero, then that uncertainty becomes absolutely important. So it's very important

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00:44:08.640 --> 00:44:13.840

Steve MacFeely: That we convey that uncertainty to the users, so that they understand

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00:44:14.850 --> 00:44:20.690

Steve MacFeely: That we can't say with absolute certainty whether we've achieved the target or not.

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00:44:21.060 --> 00:44:25.240

Steve MacFeely: Okay, so just to wrap up then.

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00:44:25.930 --> 00:44:33.660

Steve MacFeely: Be clear about what you want to communicate. No visualization can compensate for a cluttered mind. If you don't know what you want to say.

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00:44:33.860 --> 00:44:35.479

Steve MacFeely: That's your first challenge.

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00:44:35.720 --> 00:44:37.110

Steve MacFeely: Keep it simple.

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00:44:38.190 --> 00:44:44.619

Steve MacFeely: Label axes, legends, titles, sources... you might think it's unsexy, but it's incredibly important.

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00:44:45.220 --> 00:44:50.970

Steve MacFeely: Select the right chart for the right purpose. We didn't get into that today, but I'll say a little bit about that in a moment.

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00:44:51.200 --> 00:44:54.750

Steve MacFeely: At all costs, avoid 3D charts, they're just bad news.

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00:44:54.920 --> 00:44:58.670

Steve MacFeely: Make it beautiful if you can. I mean, make it look pretty.

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00:44:59.250 --> 00:45:04.770

Steve MacFeely: And then finally, I would use what I call the 10-second rule. When you develop a chart.

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00:45:05.250 --> 00:45:08.470

Steve MacFeely: Give it to somebody else who's not working on your project.

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00:45:09.130 --> 00:45:13.110

Steve MacFeely: ask them to describe the chart. What does that chart say?

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00:45:13.570 --> 00:45:20.190

Steve MacFeely: If after 7 to 10 seconds, they're still scratching your head, they're still scratching their head, the chart doesn't work.

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00:45:20.970 --> 00:45:23.340

Steve MacFeely: They have to understand quickly.

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00:45:23.690 --> 00:45:26.359

Steve MacFeely: And if they don't, the chart isn't working.

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00:45:28.270 --> 00:45:33.650

Steve MacFeely: If you need some help, just one... there's many guides, but the Financial Times

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00:45:33.930 --> 00:45:40.059

Steve MacFeely: have a fantastic resource, which is the interactive GitHub, where you can see along the top

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00:45:40.450 --> 00:45:56.429

Steve MacFeely: They have deviation, correlation, time ranking, distributions, spatial flows, and they make recommendations. They give very good advice on the best chart for the best type of data. So that's a very good resource to use, but also even just to read and train yourself

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00:45:56.540 --> 00:45:58.610

Steve MacFeely: On, on getting advice.

447

00:45:59.280 --> 00:46:04.840

Steve MacFeely: And with that, I'll stop. Please use the OECD. All of our information is free.

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00:46:05.120 --> 00:46:09.789

Steve MacFeely: And... come and get advice from us anytime, we're happy to give it. Thank you.

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00:46:10.010 --> 00:46:18.970

Joel Smith: Brilliant. Thank you so much, Steve. Thank you for that brilliant presentation. Lots of... lots and lots to take away. I can see the emoji reactions rushing in.

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00:46:18.970 --> 00:46:41.189

Joel Smith: With the applause, so do remember to keep dropping in any questions you have for Steve in the Zoom Q&A. We've got lots of questions already, we'll try and get through as many as we can. Just before we dive into questions, to give you a bit more time just to get any of your questions in, I just want to let you know that we've also curated a great follow-on resource from today's topic that we think you'll find useful.

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00:46:41.190 --> 00:46:50.760

Joel Smith: Exclusive access to a teaser session from the apolitical's popular course, Becoming a Better... a Data Confident Public Servant.

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00:46:50.850 --> 00:47:06.900

Joel Smith: So, to receive your course teaser, if you go to that data skills network I mentioned earlier, after the event, I've put a post which should be pinned to the top of that community, so if you just comment on that post that I've put.

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00:47:06.900 --> 00:47:19.729

Joel Smith: We will send you the resource by email, so anyone that just comments on that, we will send you that teaser to the course in the coming days. So, I think my colleague Victoria's just posted that in the chat as well, so you can access it there.

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00:47:19.880 --> 00:47:33.939

Joel Smith: So, on to the Q&A period. We've got loads of questions, so we'll try and get through as many as we can. I will start with, actually the first question we got in, which has got a load of upvotes from Amiya.

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00:47:33.940 --> 00:47:40.229

Joel Smith: Amir's asked, how would you appropriately pair anecdotal evidence with the data?

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00:47:40.230 --> 00:47:48.760

Joel Smith: for example, in sharing a single patient story that might contrast underlying data trend results. How would you, kind of.

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00:47:48.840 --> 00:47:50.600

Joel Smith: Combine that.

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00:47:52.400 --> 00:47:59.299

Steve MacFeely: Okay, so... Anecdotal information can be very good, because it can bring us... it can bring

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00:47:59.480 --> 00:48:04.190

Steve MacFeely: kind of data alive, so what I would do is, if I have robust

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00:48:04.440 --> 00:48:08.920

Steve MacFeely: aggregate information, I would present that first. So those are the statistics.

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00:48:09.240 --> 00:48:15.849

Steve MacFeely: And then I would use... I would supplement that separately With the anecdotal information.

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00:48:16.070 --> 00:48:22.149

Steve MacFeely: oftentimes, try and turn the anecdotal information into a story. So, for example.

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00:48:22.690 --> 00:48:25.440

Steve MacFeely: Myself and some colleagues published a blog

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00:48:26.050 --> 00:48:29.019

Steve MacFeely: About 3 years ago, on,

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00:48:30.350 --> 00:48:36.660

Steve MacFeely: CRVS, so, you know, birth registrations and deaths. The New York Times picked it up.

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00:48:37.030 --> 00:48:45.180

Steve MacFeely: They presented our statistics, but they did an amazing job where they went, they found some families in Costa Rica, I think it was.

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00:48:45.790 --> 00:48:50.619

Steve MacFeely: And they basically turned our story, like, they really made the story come alive.

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00:48:50.830 --> 00:48:55.619

Steve MacFeely: By focusing on some anecdotal information, which was really about a couple of families.

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00:48:56.120 --> 00:49:04.090

Steve MacFeely: And they turn the aggregate statistics into stories, and that's a fantastic way to present information, if you can do it.

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00:49:04.240 --> 00:49:13.430

Steve MacFeely: But separate them, make sure that you're presenting the statistics as statistics, and then the stories are just examples of those statistics.

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00:49:14.320 --> 00:49:30.899

Joel Smith: Brilliant. Thank you. Super helpful. We had a few other questions, so I'll kind of try and combine these a little bit around, using kind of... you mentioned a lot of, kind of, using coloured graphs, and these questions kind of focus more around the accessibility of those, so,

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00:49:30.900 --> 00:49:35.400

Joel Smith: You know, obviously, a lot of people suffer from color blindness.

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00:49:35.400 --> 00:49:45.469

Joel Smith: Is there a way to kind of adapt these graphs, or the STG progress chart that you showed, adapt it for colorblind people? How would you go about that?

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00:49:46.570 --> 00:49:53.890

Steve MacFeely: Yeah, I'm not an expert in this, but there is. I mean, a lot of the work that we do, especially when I was in the UN,

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00:49:54.050 --> 00:49:56.579

Steve MacFeely: We went through a lot of trouble,

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00:49:56.750 --> 00:50:00.590

Steve MacFeely: To make sure that all of the visualizations and the maps

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00:50:00.730 --> 00:50:03.860

Steve MacFeely: were visual accessible, so there was a number of...

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00:50:03.990 --> 00:50:06.720

Steve MacFeely: things that were done, I'm the wrong person to ask.

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00:50:07.080 --> 00:50:24.310

Steve MacFeely: in terms of what the actual technical elements were. But yeah, there's stuff that can be done and is done, continually to try and make things more accessible. But if somebody wants to follow up, I can talk to some of my visualization guys.

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00:50:24.610 --> 00:50:27.199

Steve MacFeely: And dig up some of that information.

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00:50:27.770 --> 00:50:41.990

Joel Smith: Brilliant. Yeah, this might also be a good place in the Data Skills Network. I'm sure there's going to be a lot of, a lot of people in there that will have, some solutions, for that, so, do get posting in there, and, hopefully we can drum up some good resources.

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00:50:42.150 --> 00:50:52.419

Joel Smith: We had another question here from Molly, said, I've made some beautiful reports before, but have always worked with a design team to produce them.

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00:50:52.440 --> 00:51:06.610

Joel Smith: That sort of resource, obviously, is a luxury in the public sector. Do you have any tips or tools to kind of beautify, reports or graphs with no additional kind of support or resource?

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00:51:07.800 --> 00:51:17.089

Steve MacFeely: Oh, yeah, I mean... I mean, look, Excel is actually very powerful, just in terms of chart building, but there are a whole bunch of,

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00:51:17.820 --> 00:51:23.890

Steve MacFeely: like, free-to-use, tool building. Again, I would have to ask,

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00:51:24.510 --> 00:51:30.879

Steve MacFeely: I mean, let me give a shout out. There's a lady in UN Trade and Development called Sonia Blusher.

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00:51:31.110 --> 00:51:35.750

Steve MacFeely: I worked with her for years, and she was a genius at just seeing into my head

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00:51:36.290 --> 00:51:38.920

Steve MacFeely: And being able to visualize what I wanted.

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00:51:39.100 --> 00:51:52.359

Steve MacFeely: So again, I can talk to her to get a list of tools, but there are many tools, because everything that we used in UN Trade and Development was open source. We didn't use any licensed software.

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00:51:53.950 --> 00:52:03.440

Joel Smith: Okay, great. Good to know that that's... that's out there, and yeah, again, if we can get some... some resources kind of shared in the community, maybe that would be... that would be super helpful.

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00:52:03.600 --> 00:52:16.879

Joel Smith: I got a question here from, Pune, which I thought was quite interesting, of, what happens if you have an enormous amount of data, but you don't know what story to tell? How do you kind of find the story in the data?

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00:52:18.290 --> 00:52:23.740

Steve MacFeely: Yeah, so this is often the biggest issue. So you do a survey, or you get a big administrative file.

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00:52:24.260 --> 00:52:27.160

Steve MacFeely: And then it's like, okay, now I have it. So...

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00:52:27.310 --> 00:52:36.580

Steve MacFeely: I often start with visualization, so I just start slicing and dicing the data at random. Start aggregating, I mean, aggregate up to

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00:52:36.810 --> 00:52:39.930

Steve MacFeely: to the highest level, is what I usually do.

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00:52:40.150 --> 00:52:44.070

Steve MacFeely: And just start, you know, using histograms or whatever it is.

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00:52:44.670 --> 00:52:46.699

Steve MacFeely: to see what do I see.

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00:52:47.340 --> 00:52:50.279

Steve MacFeely: Usually, once you've sliced and diced it for a while.

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00:52:52.710 --> 00:52:55.439

Steve MacFeely: Kind of outliers or stories will emerge.

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00:52:55.590 --> 00:53:08.739

Steve MacFeely: And then that's often when you have to park the data for a minute and go and talk to... especially if it's administrative data, you have to be very careful. So if you start... if you spot a spike or something that looks like

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00:53:09.090 --> 00:53:16.150

Steve MacFeely: something interesting in the administrative data. It's very important that you go back to the people who actually maintain that database.

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00:53:16.350 --> 00:53:23.860

Steve MacFeely: To make sure that that data is actually a statistical phenomena, and it's not just some sort of an administrative shock.

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00:53:24.260 --> 00:53:28.479

Steve MacFeely: I say this from personal experience. I was working on business demography

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00:53:28.680 --> 00:53:40.370

Steve MacFeely: One time, and we thought we'd found a result in the Irish demography data back in the early 80s. There was this huge spike in enterprise births, and we thought we really had a great story, because it aligned

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00:53:40.520 --> 00:53:42.100

Steve MacFeely: With some other events.

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00:53:42.540 --> 00:53:45.280

Steve MacFeely: But in fact, when we investigated.

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00:53:45.730 --> 00:53:51.930

Steve MacFeely: There'd been a... they were transitioning from one data system to another, and there was a massive backlog.

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00:53:52.150 --> 00:53:59.659

Steve MacFeely: And when they finally copied over all the data, about 6 years' data was actually all birthed to the same reference period.

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00:53:59.840 --> 00:54:04.570

Steve MacFeely: So, it was an administrative spike, but there was no actual statistical event.

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00:54:05.010 --> 00:54:10.119

Steve MacFeely: So, just make sure you always understand the context of the data that you're analyzing.

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00:54:10.880 --> 00:54:25.289

Steve MacFeely: Slice and dice, and then start slowly building a narrative. And then, once you build the broad narrative, then start mining down in the... into the data, looking for examples that illustrate the point that you found.

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00:54:26.730 --> 00:54:31.650

Joel Smith: Perfect, thank you. That's, yeah, a really, really sort of tight way to look at it.

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00:54:31.840 --> 00:54:50.029

Joel Smith: I guess probably the final question we have time for, another one from Amir, actually. When presenting results and policy options to senior policymakers or leadership, how do you decide what you want to share versus what senior leadership might, or could be, kind of, interested in?

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00:54:50.150 --> 00:54:58.210

Joel Smith: How, you know, put in brackets, how this could affect the sort of color shading scheme in a deliverable, or something like that.

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00:55:00.140 --> 00:55:03.000

Steve MacFeely: Okay, this is a very important question.

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00:55:03.450 --> 00:55:05.069

Steve MacFeely: As a statistician.

517

00:55:06.060 --> 00:55:14.529

Steve MacFeely: I'm clear in my mind. I don't... I'm agnostic. I don't have skin in the game. I want to present the best statistics I can

518

00:55:14.760 --> 00:55:21.260

Steve MacFeely: So that I can help other people use that information to inform their decisions. So...

519

00:55:21.830 --> 00:55:27.550

Steve MacFeely: It's not my job to solve inflation. My job is to measure inflation and to present the information

520

00:55:27.940 --> 00:55:33.740

Steve MacFeely: So, it's very important that While I'm making my charts beautiful.

521

00:55:34.120 --> 00:55:36.310

Steve MacFeely: I don't want to do it in a way

522

00:55:37.740 --> 00:55:40.560

Steve MacFeely: Where one color is standing out so much that

523

00:55:41.470 --> 00:55:49.339

Steve MacFeely: I'm drawing the right to that... that result only, unless that... unless I'm doing that deliberately, because I really want to make them see that result.

524

00:55:49.860 --> 00:55:57.289

Steve MacFeely: I think the main thing you can do in all your visualizations and all your statistics is present

525

00:55:57.460 --> 00:56:05.110

Steve MacFeely: The big story, then mine down into the small story. Present all of the information as impartially as you can.

526

00:56:05.880 --> 00:56:07.369

Steve MacFeely: But make sure...

527

00:56:07.580 --> 00:56:15.009

Steve MacFeely: I mean, a lot of decision makers, they won't want the footnotes, but make sure they're available, either in an annex or something, so that

528

00:56:15.340 --> 00:56:26.370

Steve MacFeely: If there's important messages that maybe they don't want to see, but you still think you need to present them, make sure they're there. Don't skip on the detail, but start with the simple.

529

00:56:26.560 --> 00:56:29.760

Steve MacFeely: And then leave the detail. If they want to read it, it's there.

530

00:56:30.970 --> 00:56:33.370

Steve MacFeely: Don't make... don't not make it available.

531

00:56:33.670 --> 00:56:46.180

Joel Smith: Yeah, for sure, perfect. Well, thank you so much, and sorry we couldn't get through all of the questions, there were lots in there, but if you have a burning question, please do ask it in the community. I'll now just hand over to my colleague Christopher to close us out.

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00:56:47.020 --> 00:57:04.960

Christopher Rosselot: Well, we've had some great reactions today, but I'd like you to join me in one more round of virtual appreciation and applause to Steve for sharing, and most importantly, thanks to you, the attendees, for investing and learning and being so engaged as we talk about how to tell stories with data.

533

00:57:04.960 --> 00:57:16.079

Christopher Rosselot: Speaking of data, the team is going to pull up a quick poll to find out how you felt about today, which will help us continue improving our content, and we really appreciate your responses to this poll.

534

00:57:16.080 --> 00:57:22.380

Christopher Rosselot: And thanks for the applause that we continue to see coming in. This was our last event of 2025.

535

00:57:22.410 --> 00:57:33.409

Christopher Rosselot: But don't fret! Our January 2026 events are already live on the political site, and you can register now, even if you're not available to attend live.

536

00:57:33.600 --> 00:57:58.389

Christopher Rosselot: We'll send you the recording to catch up whenever it suits for you, if you're not available to attend live, and we'll start the new year with how to prepare for promotion in 2026, during the second week of January, with insights from speakers who successfully navigated the promotion process at a variety of organizations. And our second event is Hacks for Working with Gemini, the week after, for actionable Gemini tips to help you work

537

00:57:58.390 --> 00:58:01.060

Christopher Rosselot: More efficiently and effectively.

538

00:58:01.060 --> 00:58:05.670

Christopher Rosselot: And there are many more in the following weeks, so check out the links posted in the chat.

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00:58:06.680 --> 00:58:20.209

Christopher Rosselot: Alright, that's all we have time for today. We hope you found it helpful, and we want to say a huge thank you to Steve, to everyone who has made today happen, and to you, the attendees, for taking time out of your busy days.

540

00:58:20.220 --> 00:58:34.069

Christopher Rosselot: Keep an eye out for the email coming your way with today's recording and resources, and as we've heard over and over, don't forget to post in the Data Skills Network, where we'll follow on with more resources as well. We hope to see you at another apolitical event very soon.

541

00:58:34.120 --> 00:58:35.349

Christopher Rosselot: Have a great day.

542

00:58:35.530 --> 00:58:36.310

Christopher Rosselot: Bye.

543

00:58:37.560 --> 00:58:41.199

Steve MacFeely: Thank you, I'm wishing you all a very Merry Christmas and a Happy New Year.

544

00:58:41.700 --> 00:58:43.670

Joel Smith: Thanks, all. Goodbye.