Using Tableau Software to Make Data Available On-Line
December 14, 2017

Erin Farley: I hope you all can hear me. My name is Erin Farley and I am one of JRSA’s research associates. For those of you who may be less familiar with JRSA it stands for the Justice Research and Statistics Association. We are a national non-profit organization that's dedicated to the use or research and analysis to inform criminal and juvenile justice decision making and we are comprised of a network of researchers and practitioners, which at the core include directors and staff from the state's statistical analysis centers.

Erin Farley: Before I welcome our presenter I want to just let attendees be aware that we are planning webinars for January and February. If you could all please keep an eye out for forthcoming notifications about those. Once they are finalized we will definitely make announcements.

Erin Farley: With that it's my pleasure today to welcome you to our webinar titled, "Using Tableau to Make Data Available Online." It will be presented today by Laurence Lucero who is coming to us from the Colorado SAC. She joined the Colorado SAC in 2011 where she is involved in a variety of research activities, including the participation of state-wide data collection projects, grant and budget management, web and dashboard design and staff support to the Colorado Commission on Criminal and Juvenile Justice.

Erin Farley: Laurence has skills in project management, personnel, procedures, IT coordination, and multiple software programs and of course this obviously includes Tableau. I would like to welcome Laurence for today's presentation.

Erin Farley: But before we do go any further I also want to thank our partners at the Bureau of Justice Statistics for helping make this webinar possible. I would also like to take a couple minutes to review some logistical items. We will be recording today's session for future playback. A link to the recording will be posted on JRSA's website and we usually post it in just a day or two. Today's webinar is also being audiocast via both the speakers on your computer and teleconference. We recommend listening to the webinar using your computer speakers or headphones. To do this usually when you register, you get online, you get prompted by an audio conference notification as you can see on the slide. If that doesn't happen you can also go up to the top of your page and go to audio conference. You can select audio from the top menu bar and then select audio conference. Once this pops up, there's a window that pops up, you can view the teleconference call in information or you can join via your computer.

Erin Farley: We do welcome questions throughout the presentation and most likely myself or Jason Trask, who is another JRSA staff member, we will be sort of keeping an eye out on the questions that are posted and we will interrupt and stop for a second and provide those questions to Lucero ... Laurence, I'm sorry. But the best way to do that is to go to the option to ask a question which is the chat box and then select all participants. If you select host, for example, it won't go to
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everybody, it will just go to Jason or the presenter, what have you. So if you do remember, if you have a question, please send it to all participants.

Erin Farley: This session is scheduled for approximately one hour. Again, if you do have any technical difficulties please reach out to Jason Trask and his email address is Jtrask@jrsa.org. One last thing. We do have a short survey at the end of our webinars and so we would appreciate your feedback and so please fill out that survey when it pops up.

Erin Farley: One more thing. We are trying to count how many people do attend our webinars and so if you have a chance if you have multiple people sitting around a computer watching the webinar we would just really appreciate if you typed in your name and how many people might be watching with you. That would really help us keep track of how many people are attending our webinars.

Erin Farley: Okay. So with that I am going to pass it over to Laurence. Okay. It is ...


Erin Farley: To you. Thank you.

Laurence Lucero: Thank you Erin and JRSA for the opportunity of being with you today. The topic of this presentation is the use of Tableau software to make data available online and the goal is to give you another view of how we at the Colorado SAC have developed interactive dashboards using the Tableau software.

Laurence Lucero: I will start with background of how we came to decide to explore different ways to display our data. We'll talk about the different Tableau products and I will talk briefly about that because I'm not too familiarized with all of those, and some of the basic steps to construct visualization. Finally I will demonstrate how to construct a workbook with Tableau. To do so I will have to switch back and forth between the PowerPoint, the Tableau desktop, and our website so I apologize in advance if there are some delays in the screen displays. If you have any question during the presentation, as Erin mentioned, please feel free to send a message via the chat box. I think we will have some time at the end of the presentation to address your question or so. So the Tableau software.

Laurence Lucero: The background. We became aware of Tableau as a method of presenting and correcting with data about five years ago. We use a BJS/SAC grant to provide training to the SAC staff on Tableau and we first started using Tableau and developing the dashboard with our crime statistics state-wide and by county. Then in 2015 the Colorado General Assembly mandated studies and analysis and I’m going to name them here. Basically requiring disaggregation by multiple crime types, law enforcement agencies, schools. The Senate Bill 15-185 is our race and ethnicity and gender at major decision points that requires disaggregation by decision point, race, and ethnicity and crime type.
Laurence Lucero: So the disaggregation of all these variables would have required huge, unwieldy reports. So we had to do something. We began learning Tableau and experimenting with visual. We worked closely with Tableau Help Desk to troubleshoot visualization problems we encountered. Now we use Tableau for multiple projects and I will go over those in a minute.

Laurence Lucero: So what is Tableau? Tableau is a software tool which produces interactive data visualization products such as graphs, tables, and maps.

Laurence Lucero: The different Tableau products, and I apologize in advance if I am a little hesitant on this one. I can basically talk about the products we are using at the SAC but I'm not too comfortable with the other ones that I'm going to talk briefly about. First of all the Tableau Desktop. Tableau Desktop is a software, it actually is a tool that you have installed on your computers and the tool allows you to create interactive dashboards by connecting multiple data source from your data warehouse. Once you've developed your dashboards or your workbook you have the capability to publish them on the Tableau Public which is a free publishing website. Anybody can see the dashboard once it's published. There is also an option to allow the workbook and its data to be downloaded by viewers or not.

Laurence Lucero: Tableau Server, it's more of an enterprise-level Tableau software. You can publish dashboard with Tableau Desktop, share them throughout the organization with a web-based Tableau server. You have more control of how you share your dashboard as the administrator, grant levels of access.

Laurence Lucero: The Tableau online is a hosted version of the Tableau Server on the cloud. It's basically the same as Tableau Server as there's an administrator that grants level of access to the dashboard.

Laurence Lucero: Going back to the Tableau Desktop there are two types of Tableau Desktop, the professional and the personal desktop. The difference resides basically in the cost but there's pretty much the same features between the two. The main difference is that the Tableau server and onlines require the Tableau Professional so it's a little bit more costly.

Laurence Lucero: Finally, the Tableau Reader. It's a free desktop application that enables you to open and view applications that are built in the Tableau Desktop. You can filter, drill down data, but you can not edit or perform any kind of interactions.

Laurence Lucero: For our purpose at the Colorado SAC we have three staff using Tableau Desktop and we publish on the Tableau Public. We do not use a Tableau Server as it's basically intended for larger organization with 10 or plus developers. We are just now exploring using the Tableau Online as a tool to securely share workbooks with stakeholders involved in our projects. To do so we set permission to access, view, or even edit the workbook. So it's more of a collaboration tool.
Laurence Lucero: Steps to construct visualizations. First, you format your data to be compatible with Tableau. So a column is viable. There is also a Tableau add-in that is available for Excel to format the data for Tableau. It makes it a little more automatic to format your data to be compatible with Tableau.

Laurence Lucero: You load your data and I will demonstrate all that in a couple minutes. You build your graphs in sheets. You build your dashboards, including multiple sheets. Then you publish your dashboard onto the Tableau Public. Again, there's an option to allow the workbook and its data to be downloaded by the viewers. Then once published a URL is generated and you can embed your URL on your website.

Laurence Lucero: I just wanted to show you a little bit of an example of how the data should be formatted. Tableau allows multiple type of applications that can work with all these type of files. Now I'm going to go to ... I'm sorry. This is when I switched between monitors so I'm going to show you now what desktop or dashboard looks like.

Laurence Lucero: I'm hoping you can all see that and please Erin or Jason let me know if you have some comments saying otherwise. This is an example of our crime statistical data for Colorado. I color-coded the dashboard for you to see the difference between the dashboards and the sheets. So basically, like I mentioned earlier on, the dashboard includes multiple sheets. This is a sheet and this is a sheet. I'm going to go straight to the arrests by county and you can see here there's a map, interactive map, and when I click on that map on that county, in that particular county I have the crime rates for that particular county showing up below. I'm going to actually demonstrate to you how to do that.

Laurence Lucero: I'm going to create a new worksheet. This is what a worksheet looks like. Once you get your data and I'm hoping I'm not going too, too fast. I have a multiple data here but the one sheet I'm interested in for the purpose of this presentation is this one. That data, that spreadsheet appears here so if I click on each spreadsheet it will show all the variables popping up here. Then Tableau recognizes or categorizes the type of data into either ... they call that the dimension and the dimension would be your independent variables or your categories, your [inaudible 00:14:08] data and your measure is your numbers, your values.

Laurence Lucero: You have here your marks but I'm first going to demonstrate how to build a graph. If I pull that crime dimension or variable and I put it in a column here are all my crimes categories. If I drag, and it's a drag and drop process. If I drag my arrest into either the row or here, it's pretty flexible and I'm going to show you that. Here appears my data. I can choose the type of graph I want to display on that far right column here.

Laurence Lucero: Then you can ... This mark box here to find your colors. They are the details of your visualization. So if I want that crime statistics data split in age group,
instance, I would pull my colors and I want to know what is the juvenile numbers of arrest. What are the juvenile numbers of arrest? What are the adults number of arrest? That kind of box popping out is called tool tip and it's usually prompt automatically and you have access to that to edit as you decide. Now if I want to make the numbers appearing you can also do so my showing the mark label. Again, here is your details of your graph. I want to ... So the tool tip.

Laurence Lucero: Something extremely interesting also that I've found is a calculation features allowed in Tableau. There's three types of ways you can create a calculation field. Either your own custom calculation field, so if you grab that arrest here and you say I want to create a calculation field it's basically a formula that you create. So it can be as elaborate as you decide. Or Tableau has also prepared some predefined calculation fields. So if I drag that arrest value to my details and tell them to add that calculation table and I decide that I want the page of the total table down of my table. I'm going back to this one, for example. So here's my calculation fields and I'm going to actually take that out. Up. Tableau has calculated the fields automatically and if I want to have that on I should be able to have that on, sorry. There we go. Right. It worked earlier on but I'm missing something. I apologize for that. But you can have the person page and have the value numbers right here. It's a matter of a couple of clicks.

Laurence Lucero: So I'm going back to this one. I'm going to now create a map. So the data that I'm using currently has data values with all the counties of Colorado included in it. If I double click on my county dimension a map appears and I decide I want a map of the county. Here's a map of all the counties of Colorado. Because Tableau recognizes ... it's called geocoding. Tableau recognizes country names, state and province names, city names, and area codes for many countries. If the location is not recognized you have the ability to custom geocode the data and attribute the geographical role. Then I want to drag the county names into the labels and here are all the counties of Colorado showing up.

Laurence Lucero: Now for the sake of building my dashboard I want to be able to connect this map with the dashboard I created here. Basically what I want to do is display the data for the arrest data for Fremont County, for example, with this graph. To do so you create an action and so I'm memorizing the names of my sheets here but I create an actions. Disregard what you see here because these are previous filters that I created. I want my sheet 17 to impact my sheet 16 and I'm going to select and I say okay. Okay.

Laurence Lucero: So presuming that it's all set up now I'm going to create my dashboard. So this is my dashboard seven and I'm going to drag the map but I'm going to ... I have flexibility in terms of formatting and I'm going to drag ... I'm sorry, this is not the right map actually. Excuse me for a second.

Laurence Lucero: I'm going to drag the map that is sheet 17. Okay, the sheet 16. And I'm going to float that one, too. Okay. If everything goes well I have here all state-wide data
and actually I want to see a little bit of numbers. Here we go. So if I click on Eagle County my numbers change. If I click on Douglas County my numbers change. If you don't mind I'm going to take out these calculation. I'd just rather have numbers to be more ... There we go. Here we go. And you have all the arrest numbers over the years. That's also something I need to address.

Laurence Lucero: Additionally the filters are very interesting. It's cross-tabulating, basically. So your filter allows you to break down the data by another category or variable for counties, for example. In this particular case I'm going to filter the data by years. Actually we are good. Sorry. I can do that. I'm going to use all these and I'm going to display the years on your right. The filters appears and if I go back to my dashboard and display the filter on the dashboard, which you can do ... There we go. You'll see that. I'm going to show on these data for 2016 for Rio Blanco and here I go.

Laurence Lucero: There's an additional very interesting feature I wanted to point out to you but I won't be able to demonstrate here. It's what they call context. So you can basically create a dependent filter from another numeric filter. For example, in our case here I have a county and within that county I have a number of law enforcement agencies. If I create the context, if I add a context they call that, to my counties and I select a particular county here only the law enforcement of that county would display. I find there's a relationship between the two filters that is being established and I find it really, really useful actually for our projects.

Laurence Lucero: With that being said I was going to go back to show you a little bit of what it actually looks like on our webpage. This is a crime statistic I was just showing you, so this is ... As you can see the filters on the right. As you click on the particular filter the numbers vary. Colorado US crime rates and they are filtered by type of crimes. Violent crimes, property crimes, or property or violence. If I select only the aggravated assault I have the crime rate per 100,000. So we decided to compare Colorado with United States. The arrest rate is a little bit the same. Categorized by the type of crimes. Arrest rate by counties, the one I was just showing you, and also we added a filter of age group, adult or juveniles. So for state-wide I can get all that and if I select Denver, for instance, all the numbers varies. We have a tag for incarceration and I hope I'm not going too, too fast but I'm happy to answer any question afterwards.

Laurence Lucero: Finally our correctional data. So we have Community Correct, DOC, Division of Youth Services actually, parole, probation, and YOS which is our Youthful Offender System here. And we have the data since 1998. This is one of our dashboard webpage we have developed.

Laurence Lucero: So the mandates we had received back in 2015 includes this particular project. This is contacts with with students by school and we need to report these incidents with students by law enforcement, by schools, by type of crime, by race and ethnicity. It was pretty much impossible to create such large reports
with all the data mandated by the legislators. So the Tableau was a really good solution for us. So we used actually a map from the school district and if you click on metro here that gives you the data for all the metro area school district. As I was mentioning earlier on if I select a school district here the context has been established that only the schools within that district here will appear. As you can see I'm going to take that out. That way we list the number of incidents. This particular dashboard used two different data source because the race and ethnicity comes from the Department of Education, Colorado Department of Education. Our incidents are actually provided by law enforcement.

Laurence Lucero: You have incident by contact type, by gender, and so we are always interested in knowing how a school ... how it's doing. And you have the type of crime. So when it's blank there's no data. Okay.

Laurence Lucero: Finally I wanted to show you the race and ethnicity. This is the second large project we had in 2015 and so this is a landing webpage. You click on the interactive dashboard and that also is very interesting. The map is actually a map provided by our Colorado Judicial Branch and the neat things about Tableau ... It took us a little while to figure it out but the neat thing about Tableau is that you are able to work with HTML as well and so we have to coordinate for every judicial districts because Tableau doesn't know the judicial district, obviously, so we had to use that kind of map. I will spare you the details but we had to do a little bit of HTML code and it's working well with Tableau.

Laurence Lucero: If you click on the Ninth Judicial District you know where you are at and you have all the data for the judicial district. Arrest and summons that happen in that judicial district. Case files and where there's been an arrest by race and ethnicity, a custody warrant, a summon, the grand total. Categorize by type of offenses, violent, property, drugs, other offenses. These are the arrest case files.

Laurence Lucero: Similarly we have the demographics for that judicial district so we've been working with two ... We have joined multiple data source. Filing outcome. Sentences. And we invite you to look at these. Finally, revocation.

Laurence Lucero: I'm not sure where I am at, I'm sorry. Just a second. There we go. As I mentioned earlier on Tableau produces multiple maps and I've found them interesting to explore so I just listed them here, some of them, anyway.

Laurence Lucero: So how working with your webpage. You publish your dashboard in Tableau Public. You retrieve your URL and you can embed your URL in the webpage or direct link.

Laurence Lucero: Things to know about Tableau. It's not always intuitive and training for users is recommended. First basic training is about 40 hours and it's offered online. There's an annual maintenance fee that allows regular software update of the product and technical assistance. Technical assistance is requested through a
ticket system and there's a very active community forum which is also very good source for technical help. We've been using it regularly.

Laurence Lucero: I'm surprised at how fast that went because I'm almost at the end of this presentation. We listed here all the websites that we have developed and the list is non-exhaustive. We are planning on developing more based on the projects we receive. I wanted to conclude that we are aware that there are numerous similar software package in the market. Why we are not advocating for this tool more than another Tableau has been an effective solution for us. We are still exploring and learning some of the features and the learning curve that has been sometimes slow and challenging, but overall pretty rewarding. With that I'm taking any questions.

Erin Farley: Hi, Laurence. It's Erin. Can you hear me okay?

Laurence Lucero: Yes. A little bit loud.

Erin Farley: Great. Let me talk ... Yeah, I have a weird ...

Laurence Lucero: [inaudible 00:32:51]

Erin Farley: I think my microphone is a little cranky.

Laurence Lucero: Okay.

Erin Farley: Let me see while we're waiting for any questions, I was wondering if there was maybe one other example you could provide of sort of a challenge that you might think others might face who are in similar situations and how Colorado overcame it. Is there anything that comes to mind that you could share with listeners?

Laurence Lucero: Well, frankly my first struggle was the learning curve. It took us a couple of years to be comfortable with the Tableau. It has really unlimited features and options but it took us a little while when we had some troubleshoots and the filters were a trouble. Being able to use maps and making interactive graph on these maps I was just showing was a little bit challenging. It took us several days, months, to figure it out. But that would be one of my biggest challenges, for sure. Could you go back to the slide that lists all the data format that can be used? Of course. I think it's not specifically limited to that list. This isn't, for your question.

Erin Farley: Have you received any particular public feedback from people, agencies that rely on your presentations, your visual data presentation via Tableau?

Laurence Lucero: Yeah. They appreciated it. Really they sounded really interested. Many are interested and downloaded the data and at time it's a little bit challenging for us because some of these data contain some privacy issues. That also is something
to be aware of when you use Tableau Public. You want to make sure that your data is protected as it should be, or not if you don't need to do so.

Laurence Lucero: I have a question on the site. I'm sorry, I'm reading it. "Can you show multiple selected counties at a time?" You can but it's ... Are you meaning multiple county as a sum up or are you meaning multiple counties ... You can create a sheet where you select all your counties but if you want to sum up a couple of counties you can do that, certainly.

Erin Farley: Okay. And then-

Laurence Lucero: Let me show you. I'm sorry.

Erin Farley: No, that's okay. I'm just catching ... My screen was small and catching the ... The other question is also in this project did you allow sharing of one county's data with another?

Laurence Lucero: Okay. In this project did you allow sharing ...?

Erin Farley: In other words were counties able to see each other's data?

Laurence Lucero: Yes. Absolutely, absolutely. This is posted onto our website so they certainly can do that. Yeah, yes. They are able to do that.

Laurence Lucero: I had some questions earlier on during my presentation last month about costs and I apologize, I didn't put that in the presentation. But basically ... And I'm going to go back there to the slide. Okay, here. The Tableau Desktops, as I mentioned there's a couple of types. There's a personal Tableau and the professional. The personal, I can assure you, works really well and we had it for a few years until we switched to the professional only because we started using the online. So the personal desktop initial cost is $1,000. Then you pay an annual renewal of about 200 to $400. The professional desktop is a bit more costly. It's $2,000. The annual renewal is about 400 to $600. I mentioned Tableau Server, I believe, and again it's probably Tableau is revising their cost and their price so I can't really talk for what they are doing now but their servers start at about $10,000. So it is costly but it would be a good solution if you have in your organization 10 or more developers. Your online Tableau is about $500 a year every year. Yeah.

Erin Farley: Okay. Do we have any other questions? Were you doing any mapping before using Tableau?

Laurence Lucero: No.

Erin Farley: Okay.

Laurence Lucero: No.
Erin Farley: Okay. So while we wait in case just a couple more minutes we're going to launch the poll. Let's see. I don't know Jason if you can do that for me. I don't have the ... I think I need the magic ball to be able to launch it. He's going to launch the poll and if everyone who is still on could take a few minutes and just answer those questions and then we can also wait and see if anybody else has any questions either.

Erin Farley: So you spoke about sort of advancing the areas that you're going to use Tableau for. What sort of projects do you have on the horizon? Anything that you can speak to?

Laurence Lucero: Well, yes. We are working on the marijuana dashboards, actually.

Erin Farley: Okay.

Laurence Lucero: Yes. So it's pretty exciting. I'm not the lead on that and it's our statistical researcher ... We're working together to developing these dashboards. That would include actually criminal justice information, actually health. We have data from the Department of Health, I believe. So we're working on it as we speak now so it's pretty exciting.

Erin Farley: That's great. Is that Jack Reed that you're referring to?

Laurence Lucero: Yes, yes.

Erin Farley: Okay. JRSA has pulled him in for a webinar in the past about marijuana legalization in Colorado.


Erin Farley: That's good. Do you guys know what sort of timetable that is? Like a couple years or in a year?

Laurence Lucero: No, hopefully less than that.

Erin Farley: Cool.

Laurence Lucero: We met actually yesterday to finalize a couple of things on the ... The Tableau's are developed but we need to run a couple of things so it may take us a few months I'm hoping. I'm sure Jack was hoping the same but we're working on it.

Erin Farley: Great.

Laurence Lucero: It's going to be really neat so check it out.

Erin Farley: Yeah.
Laurence Lucero: It's going to be really pretty.

Erin Farley: Well, you know when that is released in Colorado just reach out to JRSA and we'd be more than happy to advertise that as well.

Laurence Lucero: Great.

Erin Farley: to, you know, direct interested people to that.

Laurence Lucero: Okay.

Erin Farley: Let me check on more time and see if we have any more questions. I don't think so.

Laurence Lucero: Wonderful.

Erin Farley: With that we'll wrap it up and Laurence, thank you so much for your presentation and everybody for attending and joining us today. We hope that you enjoyed the presentation and will join us for future ones. As I said, we will be making some announcements in the near future about webinars for January and February so keep your eyes out for that and thank you again and have a great afternoon, everyone.

Laurence Lucero: Thank you.


Laurence Lucero: Bye.