LECTURE 29 : Visualization of Scientific Research Patterns and Trends with VOSviewer and CiteSpace

Dear learners, welcome to a practical session on Visualization of Scientific Research, Patterns and Trends with the Most Viewer and the Sitemap. As we have been discussing how the visualization can be powerful tools for identifying the key patterns in the bibliocorporeal data in the last couple of sessions and it utilized the various metrics and the statistical methods to evaluate the publication output of the journals, researchers and institutions of a country on a specific field based on the citation, bibliographic coupling and co-citation and co-authorship relationship etc. See, there are two software we are going to practice in this session, the one called Osu! Viewer and Another is a Sidespace. Both are popular and freely available tools for visualizing and analyzing the networks and trends and patterns in the scientific literature. The Osu! Viewer is a free tool for constructing and visualizing the bibliographic data and it is known for creating a co-authorship networks, bibliographical coupling, co-citation networks and co-occurrence networks and it can support the data of Web of Science, Scopers and Dimensions, Lens and Bookmate databases and it also support the data from the CrossWave, Europe PMC and OpenALEX that which data can be retrieved to the APIs and also it can support to the Semantic Scholars, OpenCitations and Wikidata and Osu! Viewer has been integrated with the Dimensions platform recently. User can instantly visualize the bibliographic networks without going out of the platform.

We can do the preserve of the practical things using the some sample data that we have already downloaded the sample data from the Scopers and Web of Science. Again, before going for downloading the data, we have chosen the some of the keywords, hung the one of the journal for downloading the data from the Scopers and Web of Science and as facilities given by the Scopers and Web of Science search features, we have used the search strings and downloaded the data. Let us go one by one now. See, there is a Osu! Viewer, search as a Osu! Viewer, we will find that URL and it can see overall it can also give you an idea what Osu! Viewer and what are the kind of the networks it can be created and what are the features and also it can give you that, you know, one can use the some of the examples and techniques and it is also giving you some tutorials and it has the manuals, again the video tutorials is available and one can go for the downloading and use the instructions if someone wants to go for the manuals.

Now, we are going for installing the Osu! Viewer as we can see the option here. One can click on the download Osu! Viewer for the Microsoft Windows. Maybe it will take little time, you know, for downloading this software. So, while downloading you can also explore the some of the highlights which the Osu! Viewer can give you like it is given the data, one can download from the above size corpus I have already explained to you and visualization, what are the visualization features it gives and techniques and here are the examples. See, one can look at it what are the visualization can create.

I mean, see here you can have the example of scientific fields and university profiles and also the university collaborations and you have journals. Means, this kind of the visualization network you can create or maybe the citation networks and co-citation networks you can create using the Osu! Viewer. Some, you know, tutorials, it also given the tutorials and manuals how the one can use this Osu! Viewer. The latest version of Osu! Viewer is 1.

6.20 which is released on October 31 of 2023 and after downloading you can just unzip that file and you will find that installer. Right click and click on the run as administration then you will just go for the S. Again, it's asking that, you know, this application required to install. So, if it's Java run time environment maybe I have to update the Java here. Okay, and I'm tweaking for download Java.

Again, I'm installing it. Now, it will going to install. It will take a little time. Right. You can see this how that the Osu! Viewer the installer after installation you will find that, you know, there is an option like network visualization and the overlay visualization and destiny visualizations and there is an option for here on the left side you will find the file item and analysis.

Now, we can quickly go for the how we can create the various type of development taking networks using this Osu! Viewer. As I mentioned that I have already downloaded the sample data from the Scopus and Web of Science. Let me show you how my data set look like. And here I have a Scopus data what I have downloaded in a particular journal and again, I have the data for Web of Science using a various again, you are in the specific domain. You already have a knowledge about the how we can download the data from the Web of Science Scopus.

I'm not going for how we can extract the data. And now we have data ready in that then we can go for the create. So, after creating there are three options called one for create the map based on the network data, the analyst, the create the map based on the data and third one is create the map based on the test data. We have the data and then so we are selecting the create a map based on the data. You can see that using this option we can get the citations and bibliographical coupling and co-citation map based on the data.

I'm going for nest now. After nest we have to select the data source. There are three options here. Download the data through the APA and read the data from the data files and read the data reference managers. As I was mentioning that you see this data what we have downloaded from the Web of Science Scopus.

So, we have selected the second one. Click on the nest. Here we have to choose the which data specifically from this Scopus Web of Science. I'm just selecting the data from the Web of Science. Now I'm going for browse.

Now I'll go for my data where I keep my data. See in the Web of Science has some limitations. We can't download all the data at a single time. We can download the small amount of data. It's a maximum of 1000 entries.

So, we can create the 1000 entries of data in the multiple files. All the multiple files can be added at once through the OSC view. I added the my Web of Science data and then I'm clicking for nest. That has been important. Giving the options a type of the analysis.

Now I want to tell you that how we can create the co-authorship and co-occurrence. And let's go with the co-authorship. The three options, the right side is given here. One can go for the author based co-authorship, or organization based co-authorship and country based co-authorship. If you can select the author based co-authorship, you just have to go for the nest.

And if you're going to give it a minimum document of an author, you always keep the minimum document of an author because if it's a minimum document of author, if you keep minimum in the numbers, it will take the maximum number of documents for consideration. Now I'm just keeping the two. I'm going for nest. Now it comes for the 961 that has been selected for this creating the author based network. Now we can also look at it after, you know, before final creating the networks.

If one can also manually can deselect that, then click on the finish. This is how you will be creating the author's network. This is the visualization that one can create. You can also look at the item where are your clusters, where are the clusters, how it runs. And you can have the option for analysis that you can look at it.

Or if you would like to rotate, you can click on the rotate. You can update the cluster. And here in the right side, it is given that how it's the weightage of networks. It may be you can click on the citation weightage or the document weightage. But most of the visualization goes for creating the visualization network with the document.

And there's an option for if you can also go with the, if you would like to change the font's style, you can also change the styles and you can have the length. And here there's an interesting option called, you know, how you can your curve line look like. It may be the color lines or it may be the curve lines. And there's an option called edit the colors. See, you can, for every cluster, you can change your colors.

So how you can look that visually presentable to your graphics. These are the options are available. You can go for the network visualizations and same thing. You can look at the, the overlay visualization and you can see that the density visualizations after you finalizing the visualizations, you can have the same where you can click on the save if you'd like to, or you can take this screenshot directly. If you'd like to save this as a, as an image format, you know, I'm just saving with co-authorship as a network visualizations.

Now this is how we can create the co-authors by the author. If you want to go for the another one, we have to go for the create and nest. And then, because we already had the data here and then we can go for the next year and we have done the co-authorship by the author. We can also do the co-authorship by the organization. You know, the one that we have to deselect the author and select the organizations and click on the nest.

We have to minimize these numbers, a number of organizations by the co-authorship and you can see that 705 numbers of documents have been considered for this, this network. And we can look at the name of the organizations and we can click on the finish. I mean, this is how we can find the visualization network of co-authors by the organizations. Those features are available for changing the fonts or changing visualizations and also the images. And you can always look at your clusters on the left side and you can do this some analysis.

And if you'd like to rotate your visualization, you can do that. I'm doing the screenshot. I'm going for co-authorship and algorithm. Now, I'm going back for the create the map-based data. I'm going to read the data from the databases files and we have already in the web of science.

Now, I'm going for co-authorship by the countries. I mean, we can see that the number of co-authorship is 20 wise. This is how we can create. It means you already know the cows and these clusters. The biggest one has the more co-authorship with the countries because it can clearly say that, you know, international collaboration of the authors.

If you would like to have a line, now there's an option for you putting the cows, how your line should be. You always can look at the you can just unclick the cow lines. It will directly and it's this can give you that, you know, you can just look at that, you know, from the where are these networks from have been collaborating with other countries like it's like the authors of ESA has been collaborating with the number of country authors. You can maximize the length.

This is option there. And also, if you'd like to how you can minimize your circles. This is this. There's an option also here. And this is the visualization, how we can put the scales and the others go with the citation base or the document number of documentation base, how the weightage you are going to give for the author collaborations, you know, between the countries.

Now I'm going to save this. And now I'm just going for creating the other visualization for data what we have extracted from the Scopus. Now I'm changing from Web of Science to Scopus. I'm going to my data source where I kept my data. My data is in folder.

Again, this is my folder. I have a Scopus data here. Now I'm just going for next. Now you can see that after enabling the uploading the Scopus data, you will have a co-occurrence and

citation based networks and bibliographic coupling and co-citations with the Web of Science data. What we have seen that we already seen that how we can create the co-authorship.

Now we can go for the co-occurrence. See when you look for the co-occurrence, it's like you have to analysis by the keywords. What are the similar keywords given by the researchers among the articles. Like there's an option you can also go with the all the keywords and the author keywords and index keywords. You know, if you go for the all the keywords, we can just you know, we can select the co-occurrence and all keywords you have selected on the right side of unit of analysis.

And we are just going for the next year. And you see here's the minimum number of occurrence of keywords is a five. I'm just going to decrease these numbers to increase the visibility. Now I'm going for I'm keeping three minimum occurrence of a keyword and I'm going for next year. And then it's showing that the thousand keywords have been selected for this network. I can see the keywords and number of occurrence and also the total link strength.

Now I'm going for finish. See, this is how the keyword based on co-occurrence network looks like. This is the human is the keyword is the maximum articles have been happier, which is which which is looks, you know, the bigger than other keywords. Again, the same all the features are available. If you'd like to go for the you know, the overall visualization, you can you can go with that. You have you have option for setting the color range for the year from the year.

And also you can look at the the color range. So you can see that the color is the same as the density visualizations. So I'm just selecting here for the overly visualizations. I'm changing the visualization scale here. The weight is the occurrence and the score, you know, the average publication here and I'm changing to our publication here to the average citation. And size of the variations it can be and look at the you know, it may be in a it depends if that my visualization looks like a circles or if I want to make a frame right.

I'm just selecting for this as a frame and I'm also putting the font to another font and it's also give the maximum length and the other options you can put the work of line look like a cow or the colored lines. There you can you will have a background colors are the only colors it depends right. So after you can modifying this and once you satisfied with the visualization option for go for the screenshot, right. And I'm just saving this like quarters networks of all keywords. Now we have seen that in a quarter some network of the all keywords the same way that we can also do for selecting only the author keywords.

Now he's selecting from the all keywords to the author keywords. I'm going for nest here because the numbers since there's less number of other keywords putting for the nest and finish. See this is how they we can create the co-occurrence networks using the the both

keywords by the authors and the all the keywords are indexed in the articles. I'm just I'm going to save this as a screenshot.

This is again author screenshot right. We have seen that how the co-occurrence networks can be created in the OS we were if you are going for creating the citation network see there's an option for create the citation network with this tool. This citations network can be created by the documents wise the unit of policies and also the sources and number of sources and the authors and the organizations and also the countries. Now let's look at the citations networks based on the organizations and I'm just selecting this based on the organizations. I'm putting the nest and I'm just minimize the number here. And I'm going to save this and we can cut the number of organization here and then finish.

See this is how we can see that you know the citation network based on the organizations. You can zoom it and you can look at the how it's visually connected among the organizations. Then you can save it as a screen. Citation networks is organizations.

And then you can save it as a screen. So, now I'm going for creating this citation network by the countries how the citation networks connected with the among the countries. And this is where 24 countries are there. I'm just going for nest. Okay, you can see that how the citation networks have been connected with the countries and this is where same. It states as the more citations and it's been connected with the every each countries you can see that the United Kingdom, Netherlands and Canada.

And other countries as well. Again, I'm changing some of the customization features how this visualization we can make it better using this customization features. And I'm saving with as a screenshot because there are other option also you can save results as a voice viewer file or you can share login and yes screenshot is always you can go for you know, download as a PNG files. We have seen this for citation networks of country, but if you would like to look at the citations type of analysis citation networks by the sources, you can go for you can select the source or the author and the documents if you'd like to do different type of the citation analysis. I'm selecting the authors number of authors should be minimum.

I'm just putting two. We can see this this is how this network can be created citation has been created by the author wise right with this screenshot. I'm just saving this also. Authors now we have created that citation network, but let's look at the bibliography coupling. Now how we can create the bibliography coupling using this voice viewer data is being already imported. Once you have imported the data into voice viewer platform, you don't need to you know import the data every time because you can now can do the multiple type of the analysis.

You can create the various type of the networks. I'm just going for the nest here and from the citation. I'm setting the bibliography coupling and now the options there for unit

analysis like the do the bibliography coupling by the documents or the sources and authors and organizations and the country as well. Now I'm going to select for the documents of bibliography coupling and see there are the numbers of citation of minimum documents and going next and I'm putting to finish. See this is how you can you can create that author wise bibliographical coupling and if you'd like to be changed if you'd like to go for creating the by the source wise if you'd like to create the bibliography coupling by the source wise again, you have to select the source.

Maybe it's look like we have insufficient sources in our data source. So it's need the minimum three sources, which is not available in our data sources means it is like journals the whatever the publication have been published in journals and the bibliographical coupling by the authors. I'm just selected the authors and now I'm going for the nest and here we can we can go again. We are increasing this numbers of minimum numbers of documents of an author and I'm putting the two and then it's look like you know, it's showing that the the 180 meets the other criteria. I'm selecting this 180 author service record for this creating this network and we can see the network authors network here and we can click on. This is how we always can look at that creating the bibliographical couplings by the authors.

This visualization network can be zoom and you can view that particular author have been connected. How many authors means what are the other authors? Again, you have citation base in the visualization part. You can do this some of the you can use this on features further on changing the visibility of the graphics like you can change the weight by the document or the by the citations and also you can use the you know, the how you will visualize size variation looks like if you would like to make it a frame or if you would like to go for the circle right and again, if there is a option there for changing the fonts and you can look at the curved lines how you can the curved lines look like you just would like to have the straight lines or the curved lines and using the background an option here and changing the colors also every cluster. There's the eight cluster are here. You can use the different color for different clusters and after you can use this options for rotate or if you would like to update your layouts you can do that and you can you can save it out right.

Bibliographic coupling authors. Yeah. Now again, I'm going back to the for creating the bibliographic coupling by the organization again, I'm going for nest and here I'm just decreasing the number here to increase the networks of the graph and this is the number of organization to be selected or 99 for this network and then put on the nest and you can look at the organizations. What are the organization can change and what are the number of documents and citations and also the total strength of the link and I also clicked and then we can click on the finish. Now, this is how the bibliographic coupling through based on the organizations can be creating using this OSU platform. This the features are available for editing or making this visual this graphics more presentable.

Then again, we can click on the screenshot. I'm just a first saving here. Can also create the

bibliographic coupling for create by the country wise. I'm selecting the final one country wise bibliographic coupling and we have increased the numbers here and this is made 24 countries have been made for creating these networks and these are the list of countries we can we always can look at it and we can also as mentioned and also deselect the countries which is may not required and we can click on the finish and this is how the country by the bibliographic coupling is required because data the most we can see that the United States has the more bibliographic coupling unity the state has more publications about this particular data what we have selected. So that's why we are getting that United States has been highlighting more with the visualization networks we have been creating here. We can save this as a country bibliographic coupling. And finally what we have another option with OSU is that we can also create the co-citation networks.

See when we say that co-citation network there are options for creating the co-citation networks of the cited references cited sources and cited authors. I'm selecting the cited references now. I'm also you know decreasing the numbers that's a minimum citations after cited references are I'm putting the maybe four to five and again next I can see the you know cited references and citation total strength here and then I'm click on the finish. See this is how we can create the co-citation networks using cited references and you always can see that it can be look at it in two ways.

One is the visualization network another is the density network. I'm going to save this as a co-citation network of cited references. Again I'm going to for creating the another co-citation network using with cited authors. Here I'm just minimizing the numbers. I put the 15 numbers though I got the 483 which means that the minimum authors of citations and author are 15.

And now the 483 of the authors have been selected for this. I'm just click on the finish. This is how we can sort a co-citation can be created using this. We have seen that how the worst we can be used for creating the various bibliographic network. It is given the options you know so once once if you'd like to evaluate the analysis the bibliographic data of the journals or the you know and authors or the researcher of an institution in the countries.

OSPR can easily give you the facility to create the various type of networks. Means how the collaboration network of individual researcher to other researcher. What are the major collaboration area and which countries collaboration publication are more and particular XYZ research area. Means what we have seen that the OSPR is open software. You know we have been discussed that in a lot of sessions there are a number of property and data visualization tools. But the worst we were having a freely available tools and also you can just it's like it's not a more complicated platform.

You can just import the data and then whatever the network that I could create you can just have to use the features are available and you can create the networks. The another visualization applications is site space. The site space is a Java based application for

visualizing and analyzing the trends and patterns in the scientific literature. And it supports structural and the temporal analysis of a variety of network are derived from the scientific publications including collaboration networks and co-citation networks and document co-citation networks. The site space is supposed to data from the web of science and it is not supposed to data from the any other databases like a scopus and others.

But it also supposed to the data obtaining from the PubMed and NSF abstracts and others. Site space provide the various functions to facilitate and understanding the interpretations of network patterns and historical patterns including identify the past topical areas and finding the citation outspots and automatic labeling clusters with the terms of citing articles. There are different version of the site space. Again we are going to practice with the basic and which is available freely and there is a site space version is also there and the site was advanced version is also there which are subscribe basis. Let's go to the site space website and how we can download and install this at the software. Again we have using the same data what we have used for creating the visualization networks in this.

What we were handling is the portal for the site space. It is showing that the site space the visualization patterns in scientific literature and there are some guidelines are given here how to use and again it is a download and if you can scroll it down you will find that about this tool and what are the requirement of for running this tool in your computers. Since it is a Java based application you should have the Java in your laptop and your PCs and it also given the manual link. So I am just going for the download here. Here is the option for download design.

We are going to practice using the site space basic that's version 6.2. Two version are there. There is a standard and is advanced. Obviously if you are going to subscribe and if you are going to purchase this version we will have more features and more options to do the visualizations of creating the cluster networks.

I am clicking on the viewer of product here. These are the options what we can get. You are going to click on the buy now. See it will ask you a user name that's a email address to create the account. If you are the new user you can just put in your email address and click on the continue or if you have this account you can just go and login.

I am going here to login using my user password. Ok it's asking the verification code. This is my verification code. Trust in device and verify. Now here is an option for downloading this product. Site space is a basic. See here is an option whether you can go with downloading all the files because it has some of the readings also and if you would like to go for the only installing files that you need you just go here and click it.

See it's going to be downloaded here but now for this PC I have already downloaded this site space application basic. Now I am just going for installing. After downloading you just have to click here and click on nest and nest. It's like you are going to install another

application where you have to mention that it's kind of the nest nest nest and I am just mentioning yes.

It's a simple installation process. Now I am going to complete. Now let me open that application. Site space. Yeah it should take a little time to open this application. So for this practices what we are doing in this basic process is that we have taken the web of size data of not more than 3 years. I mean it's about 4 years of web of size data and we are trying to use this site space and do the how we can create the keyword clusters and the country, country device clusters and institutions and others. And this is how it looks like after installing and now once you get this one you just have to click on agree.

You can see this you know you have a data source here. What I was mentioning that it's only support for data from the web of science and you will have some of the customisation field here. Time duration what data node types that which node you would like to create the clusters. You may have to go for the institutions countries and keywords and also the other things of using that visualizations and which view you are going to look at it and some of the options are like the projects and data and visualizations and the overlap apps those options are available.

Now here there is a one demo is already there. It's called as a tourism. But for this practical purpose we are going to create the new project using that has here is a new. See this is how after we click on the new we will found the titles we just we can put that any titles the project titles that you would like to have it. I'm just putting that in the. After that you should have to select that the project home. It's like that folder where you would like to save your images with your clusters and your network after we creating the network using this is stone.

I'm just taking the path here. I'm putting that this is my project and the data directory is something that where you have a data like for our data is from the Web of Science. Our data is in the folder. I'm taking the folder path here. This is my folder path.

Right now the data source is always in the Web of Science and you have that and they look here back. I'm just putting minus one. And now I'm going to save it here. After creating the project path and then I'm going to click here and say go. Now it's showing the rerun and again I'm click on OK. See after putting that you will find the qualified record for the 150 and showing that you would like to go for the visualize.

Now I'm going for a second visualize. Yes. See this is how the one after importing the data and we will find that for creating your visual networks. See on the left side you can look at it.

What are the reference source that you found. And you have the control panel here. The control panel. You would like to change your clusters. So what we have done is we have

selected the keyword cluster here and here you would like to rotate. You have the option for the rotate and here the tagline space.

See the tagline space you have. And if you can click this you will have the year ones. And this is where the colors and you have option for. It's colors and this is one that choose the one of the following source for the label creators. If you were to choose by the title words for creating labels are the keywords are the subject categories.

Now let's go over to the title words and click on the OK. Now you will find that clusters. This is like keyword clusters by the titles. So you can see that the number of clusters and this can also you can see by the years. If you can click the options here. If you would like to look at the year base clusters the keyword clusters you just have to go there and then you just have to move forward.

Now we have seen we have look at the 2024 clusters of keywords and. This is 2022. And 2020 right. This way you can create the keyword clusters using the size space and the other options are there. If you know another options if you'd like to look at with the timeline views and the uniform views and other views. If you can click you will find that uniform views.

This buttons and you have this we use views. This is how you can find it out. And if you'd like to look at the year wise timeline view you can click it out. You will find this year wise views again. It's a background if you would like to change it out.

It looks like this means you will find that the timeline views of this clusters. Creating this keyword clusters. There's an option for you always can download it. As a PDF.

Or if you would like to. Or if you'd like to save as images. This is an option is this save the visualization as an PNG file. And you can put the titles. There is another view also when you go for the second one the cluster by membership. See this is how you will you will find that visually the different types when you want to use this cluster membership views.

I'm going to save this also. If you'd like to use this central panel you can customize your. There's a lot of how it can look if you'd like to increase the font size. It can also be no increase the font size or if you'd like to include your note size. That has to be possible using this control panel.

And here you are finding node labels. Which one you would like to go for the citations. You can also show that. Cluster you would like to select those. And again you can also change the font size for this. Here you have the cluster labels. Those show the labels over the time that also be option is there.

There's old and font size means kind of the customization you can do using this control

panel. And there's an option for the color map here. And choosing the color. For different clusters and the layout that currently we are in the timeline layouts.

And you can choose the different clusters. Butters and you have the views. You may go use the clusters and if you'd like to use the uniform views. The three wings and the centrality and Sigma is also another option. If you'd like to look at this.

There's an option for the download. This is how we can create the keyboard-based clusters using the side space. And now I'm going back to how we can look at the country-based clusters. Using this side space. What you've seen is we have covered that how we can create the keyboard-based clusters using the side space.

And now let's look at that country-based clusters using the side space. The same data what we are using in the tool. Again I'm just clicking on here. Now we found that qualified records are 143.

The timeframe from 2000 to 2022. Now I'm just clicking on visualize. Now we are coming back to our this other visualization panel. Now I found that you know the countries are coming look this way. After this, see the options are what we have shown that for the views purpose. We can use the control panel and we can create the clusters are the uniform views.

Which can also be done here and the trees views can also be done. And you can use that trees views. Again it's asking that you know which words you would like to use for hit. And I'm just going to click OK. And this is how you will find it out.

I found it here the titles clusters and the countries are look like this. We can create the countries by the titles using just uniform views. There's an option for saving the same. Right.

Now we can look at the how institutionalized cluster can be created. I'm from the deselecting the countries. I'm selecting the institution here. I'm going to click on the go. And we can have that the visualizations option here.

We can click it. Now we are finding that the institutions. The institutions of visualizations. Let's see that font size. You can look at that. The country institutionalized clusters. See these are the clusters.

I'm just going to change the font. Again, selecting the clusters by the titles. We will find that different kind of clusters here. And lay words. We have the timeframe and we have the clusters. Color map. Yes. OK, so we'll found that this way you can create the institutionalized clusters, putting that.

You can also be look at that how you can see the the yearly by the yearly clusters when you

select this particular year. You can see this now we are in the 2020 and 2022 and 20. And we also saving this another example for creating this visualization as institutions. We have seen this how we can create the institutionalized clusters. And the finally we can also look at that how we can create the authors based clusters using this platform.

This idea from the institutions are going to have the authors. We can also look at that by creating the authors, co-authors networks with this. I'm going to click OK here. And we found that 142 records are qualified for this visualizations. I'm clicking on the visualization here.

And now I'm finding the authors networks. And now I'm looking that how it can look like and the different clusters. We can also look at it by zooming that and. See, if you want to select the different views and I'm setting the uniform view, so you will find the different different colors of different clusters. And there's another way you can also use the three rings using this. And again, labels and labels, it always going to give that if you'd like to use the clusters frequency, these options are available for showing that which frequency you would like to be present.

And thousands and the font size can be increased and decreased here. And the notes font size, you can you can also look at it and see. And the note size can also be increased based on how you would like to be present.

And font size always label linking font size. It is there. And the cluster labels. You can also look at the font sizes available in the cluster labels. You can minimize the overlap if you would like to click on the notes labels.

The cluster labels can be done using this overlap options here. It can be saved as a PNG here. Right. I mean, what we are practicing here. This is the basic version of cluster. Sidespace has the limited versions, limited facility to visualize the creating the core citation networks or institutional networks with using the minimum data. What we have done here, if we have the minimum data, then only it can be used because we can also attach the limitations of creating the cluster. Basic version of Sidespace, we can't go with more than the size of the limitation of networks.

If we are going to use the basic versions, it may not be good for the big data visualization networks. But it is always good for going for only one particular year of data you would like to create the visualization networks. Big, big, long, if you got data visualization, it is always good to you can subscribe the advanced version. And we can create the visualization networks using this Sidespace. With all the visualizations of bibliography data, what enables is the researcher to identify the trends and patterns and clusters within the large sectors of academic literature.

Using the OSU platform to identify the research impact and research networks and

collaborations. And many of the bibliographic and the scientific studies have been published with using the OSU platform. Sidespace is good for the small data and it may not be used for the advanced versions. The tools can be used for generating the network visualizations that represent the connections between the various elements of research output. Thank you. Thank you.