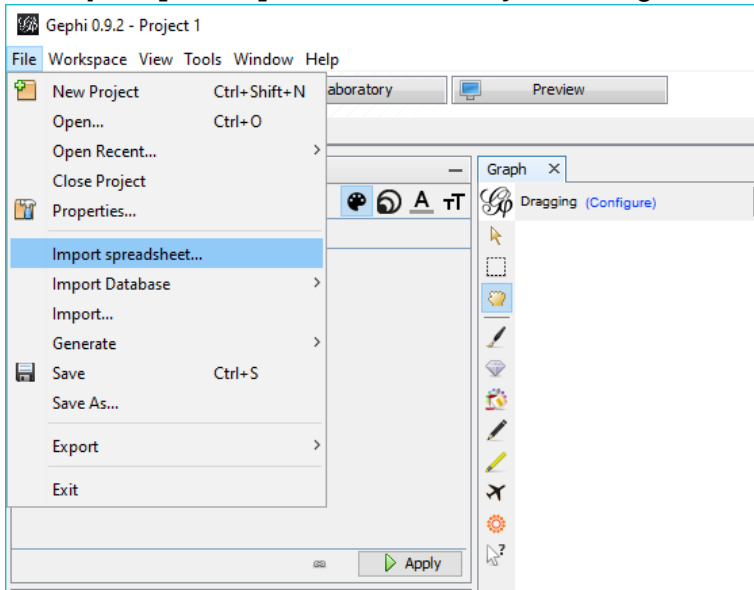## ACTIVITY ONE – EXPERIMENT WITH GEPHI VISUALISATIONS

First you will need to download and install Gephi from https://gephi.org/.

Please note there are two executable files in the download. The shortcuts on the start menu and desktop may not link to the right one. They may need to link to "C:\Program Files\Gephi-0.9.2\bin\gephi.exe" and not "C:\Program Files\Gephi-0.9.2\bin\gephi64.exe". If you are the administrator of your PC, you can change this yourself by right-clicking on the icon.   There are also sometimes errors finding Java. You may need to open the startup settings text file, and type jdkhome="C:\Program Files (x86)\Java\jre1.8.0_231" as the last line (changing the path to wherever Java is on your computer).

Once you open Gephi, click New Project, then go to file and "import spreadsheet":

Navigate to the nodes spreadsheet in the resources for this week. Click next, then finish, then ok. Go back to file, "import spreadsheet" and import the edges spreadsheet. This time, after you click finish, select "append to existing workspace" before clicking ok:
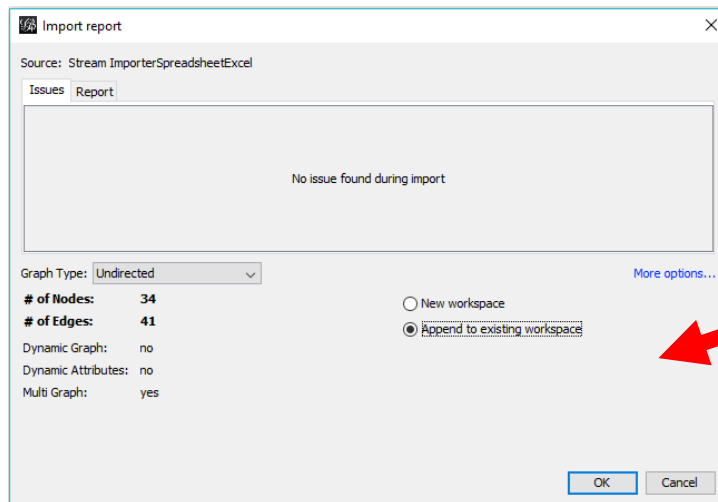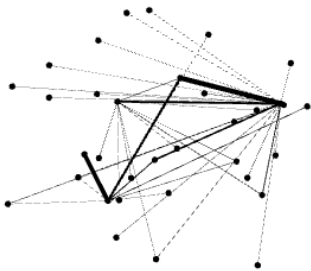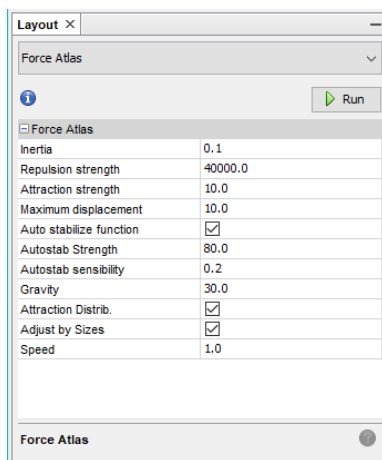
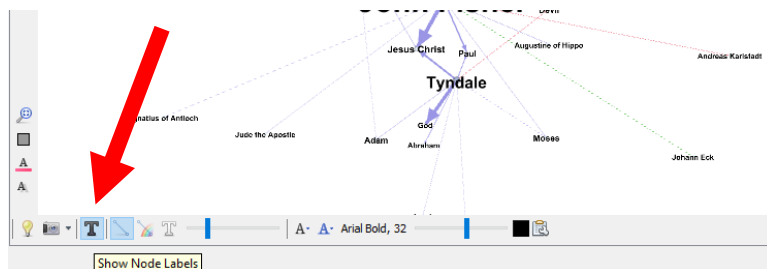You should see something like this if the overview is selected:

This is a visualisation of a sort, but we want to make it more meaningful. A tutorial on the various layouts available in Gephi is available here: https://gephi.org/tutorials/gephi-tutorial-layouts.pdf

We'll use Forceatlas, where nodes are attracted or repelled from each other by the strength of the connections.

Go to the Layout tab, bottom left, and choose "force atlas" from the drop down list. Increase the repulsion strength to 10000 and tick the boxes for attraction distribution and adjust by sizes, then click run.

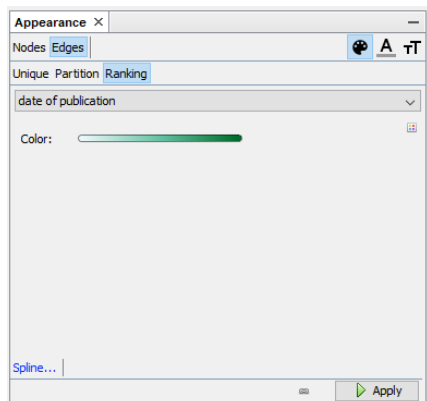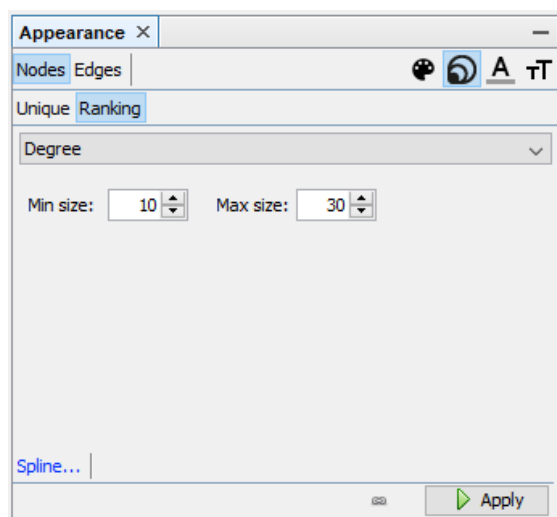In the main window, make sure the black T "Show node labels" is selected.

In the top left dialogue box, we can change the colour and size of the nodes and edges

Select "Edges" and "Ranking" and make sure the colour palette icon on the right is also selected. In the drop down list, select "date of publication". This will colour the edges according to the date of publication. Clicking on the colour squares allows you to change the colours.

Alternatively, click on "partition" and select subject. This will colour the edges according to the subject of the works. Where there are multiple edges between two nodes, you will have to decide on how to merge them. Colouring the edges by degree (number of connections), rather than one of these facets, may make more sense for this reason.

Next, stay on edges, but click the two T on the top right. Select ranking, and then select "weight" from the drop-down list. This will make the edges thicker or thinner depending on the number of connections. You can experiment with changing the minimum and maximum values.

For nodes, you may wish to make the size of the circles change. You can do this by selecting nodes, and then the circles icon on the top right. Select ranking, and then "degree" from the drop down menu. Again you can experiment with different minimum and maximum sizes.

You can also change the colour. Go to "partition" and select role. This will colour the nodes according to whether they are authors, translators or publishers, or more than one.

Hovering over a node will highlight the network relating to that node. See which publishers are publishing exclusively theology, by hovering over the publishers!

When you are happy with your visualisation, click preview. You may need to click refresh at the bottom before anything is displayed.
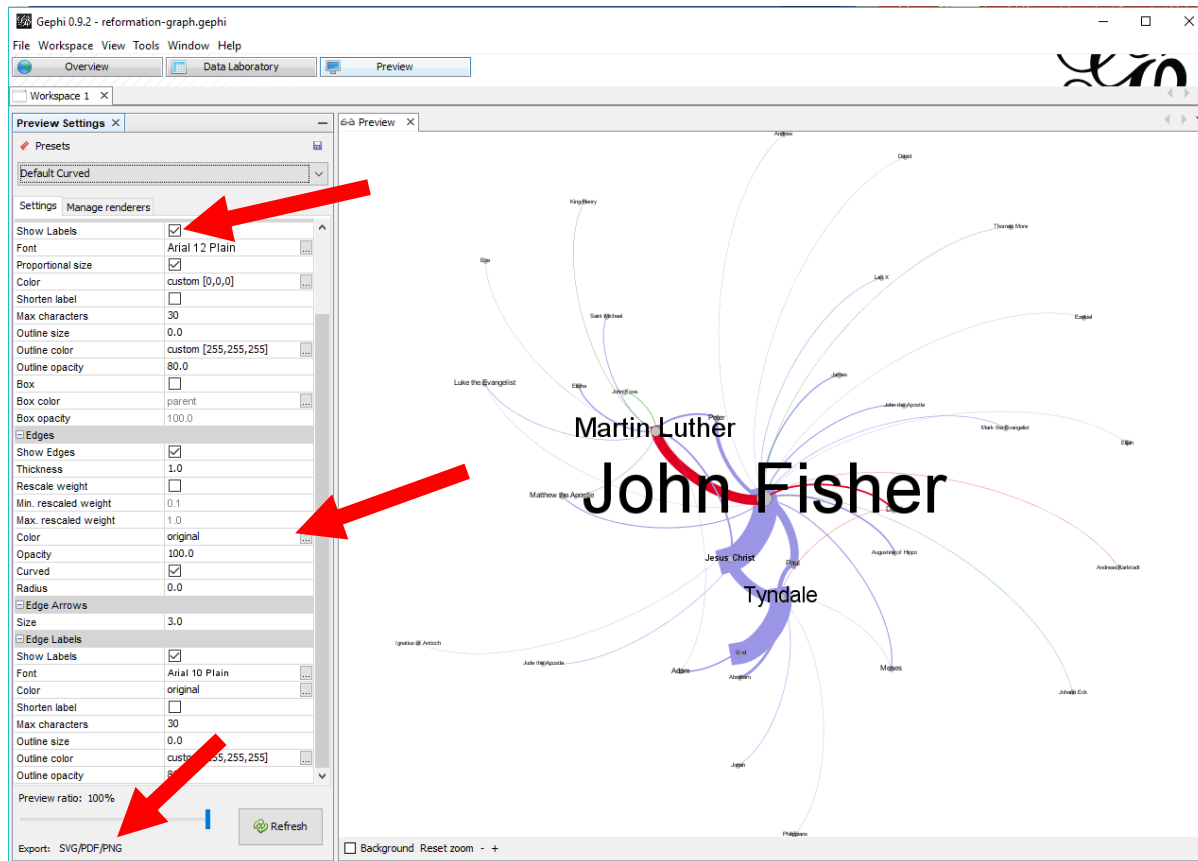
There are lots of display settings on the left. Do experiment! The one setting you will want to change is the colour of the edges, which you should set to "original" to have the colours you selected in the visualisation phase. At the very bottom is the option to export your visualisation as a pdf or image file.

ACTIVITY TWO – EXPERIMENT WITH GEPHI ANALYSIS

You will need to follow the initial steps of activity one to download Gephi. Once you have done so, instead of importing the spreadsheets, open the reformation-graph Gephi project file. This is just a shortcut – if you have done activity two it is fine to carry on with the workspace you already have. Make sure the "overview" tab is selected (top left).

In the dialogue boxes on the right, click statistics. Click "run" next to "average degree". This calculates the average number of edges linked to any one node.
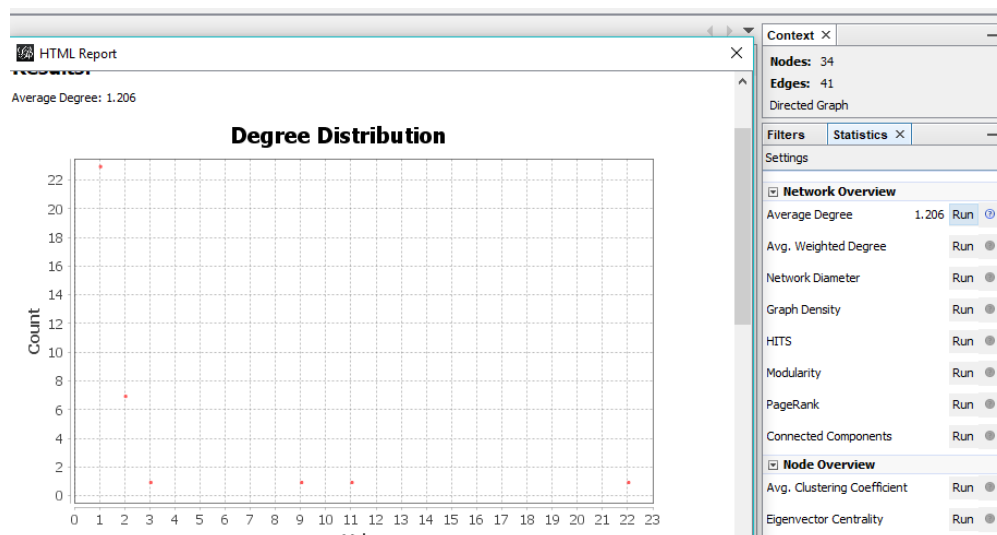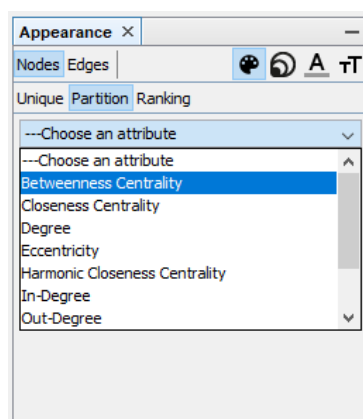
Have a go at running the various statistical calculations. The Network Diameter option calculates the betweenness centrality and closeness centrality we learned about in session 3.

Once you have made these calculations, you can use them in your visualisations.

In the Appearance dialogue, top left, you can now partition the nodes by betweenness centrality, allowing the more central nodes to be a different colour from the others.

Knowing how to interpret all of this information would need further exploration of Graph Theory!

FURTHER READING AND RESOURCES

Newman, M. E. J. *Networks : An Introduction*. Oxford: Oxford UP, 2010. Oxford Scholarship Online. Web.
http://www.sixdegreesoffrancisbacon.com/
http://republicofletters.stanford.edu/
http://15cbooktrade.ox.ac.uk/
http://podcasts.ox.ac.uk/building-and-analyzing-semantic-network
https://gephi.org/ – lots of tutorials available from the website
https://cytoscape.org/ – another popular network analysis tool

@TAYOXFORD   **EMMA.HUBER@BODLEIAN.OX.AC.UK**   **+44 1865 (2)78153**