Improving on the SWN SSOE Wi-Fi network around the school

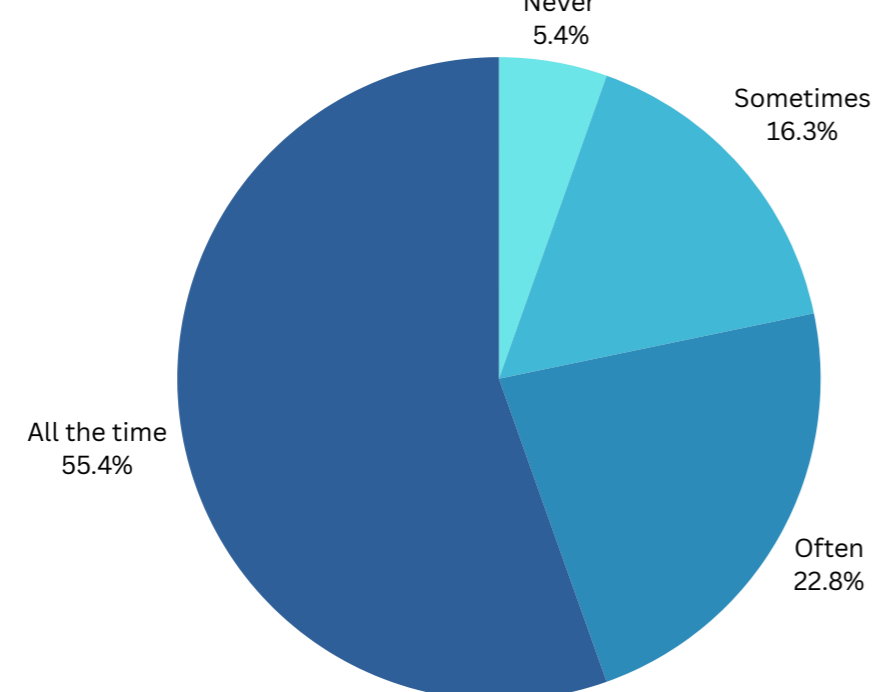Gladys Chow, Hannah Yeo, Ajay Koumar

Problem statement: The SWN SSOE Wi-Fi network in school is slow and unreliable, affecting learning in school
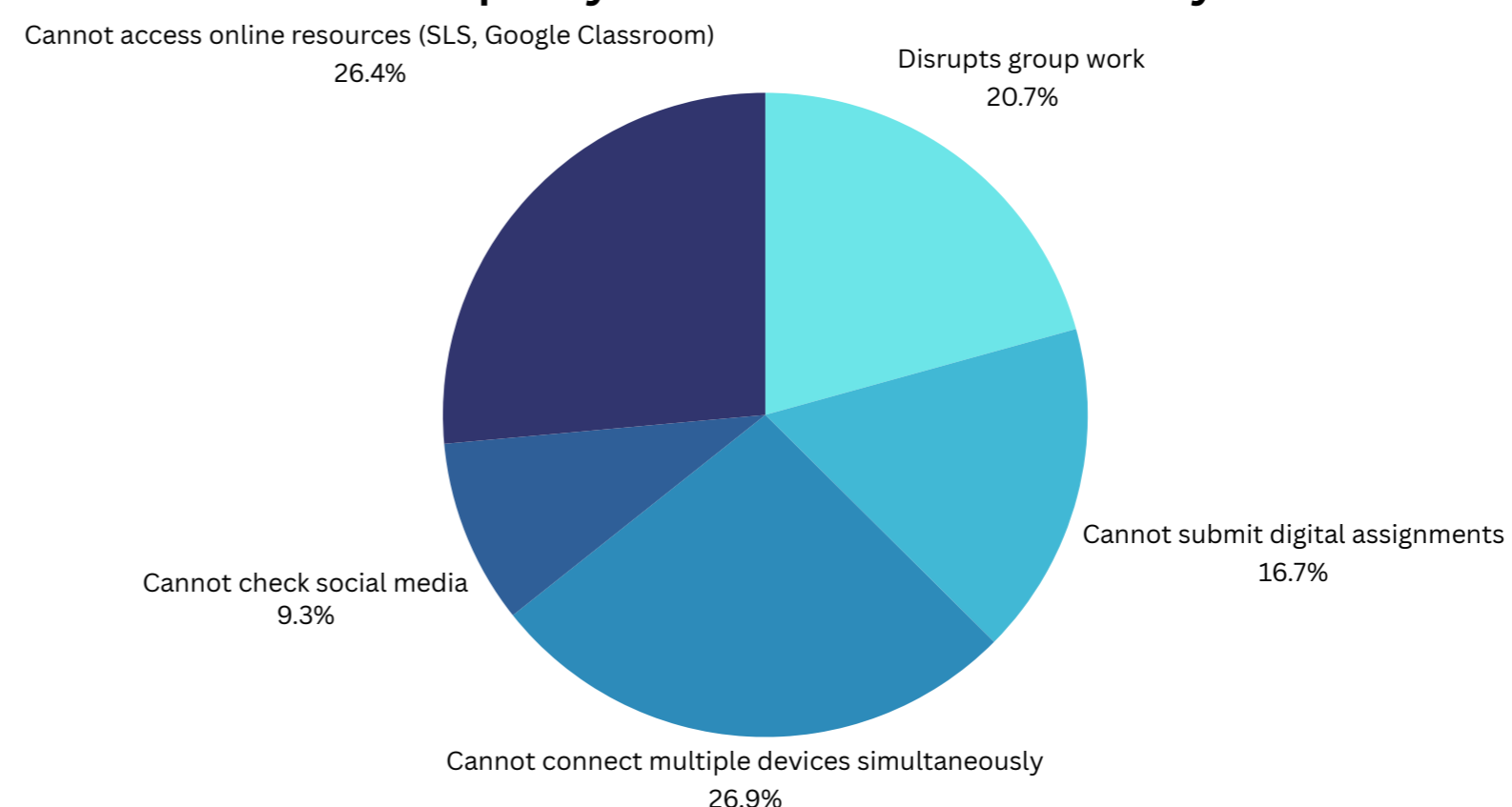
Students require the Wi-Fi network to access online resources for lessons, but the slow network speed or complete failure to load causes students to be unable to access resources. This has the potential to disrupt lessons, hence this is an important issue.

From a Google form we sent out for data collection, a large percentage (39.1%) of responders state that they get frustrated with the school Wi-Fi often or all the time, and the low quality of the Wi-Fi network mostly affects learning in the classroom


How often do you get frustrated with the school Wi-Fi?
- Never 5.4%
- Sometimes 16.3%
- Often 22.8%
- All the time 55.4%

How does the quality of the school's Wi-Fi affect you?
- Cannot access online resources (SLS, Google Classroom) 26.4%
- Disrupts group work 20.7%
- Cannot submit digital assignments 16.7%
- Cannot connect multiple devices simultaneously 26.9%
- Cannot check social media 9.3%

Methodology

1. A Google form was sent out to collect data that was analysed using orange. Using relative coordinates of the NJC map obtained from Tracker, we used a scatter plot to construct a visual representation of how affected students are in different areas of the school by letting the axes be the latitude and longitude of the view of NJC and varying the size of the points based on number of responses. The more the responses, the bigger the size of the point.

2. Next, we made use of the k-means clustering widget in the Orange software to find out where the regions of the school had the Wi-fi that affected the students most. the different clusters were denoted with a different colour each.

3. By clustering the responses together, we were able to tell which of the portions of the school would require improvements to the Wi-fi, and the central points of each cluster would be able to show us the place where a new router should be placed

4. In order to corroborate our conclusion about the quality of the school's Wi-Fi, we also used orange to construct a box and whisker diagram, which further proved that the W-Fi in near the JH1, 2 and 4 classrooms had the most negative impacts on students, and should be the priority in making improvements.

k-means clustering for latitude of school

k-means clustering for longitude of school
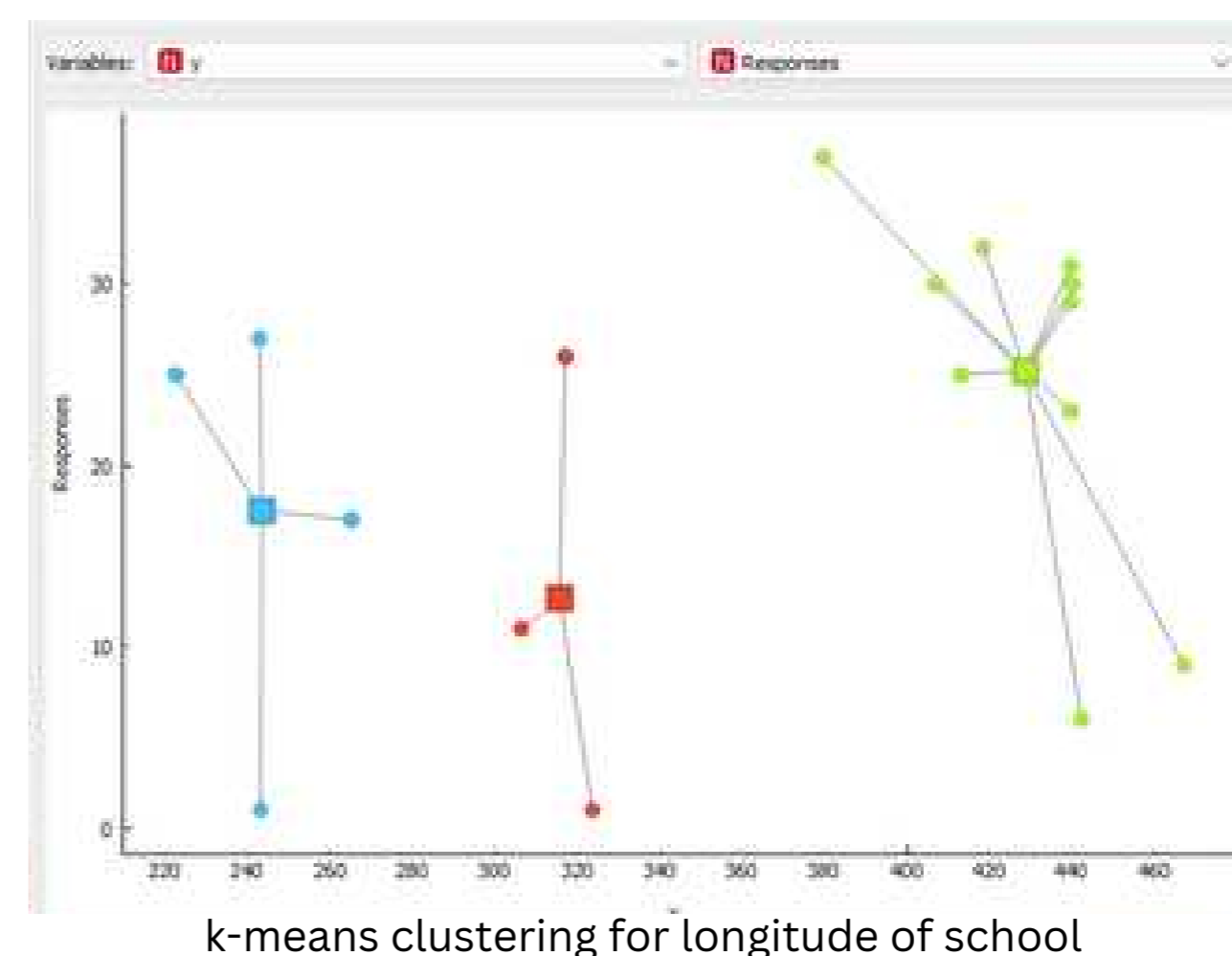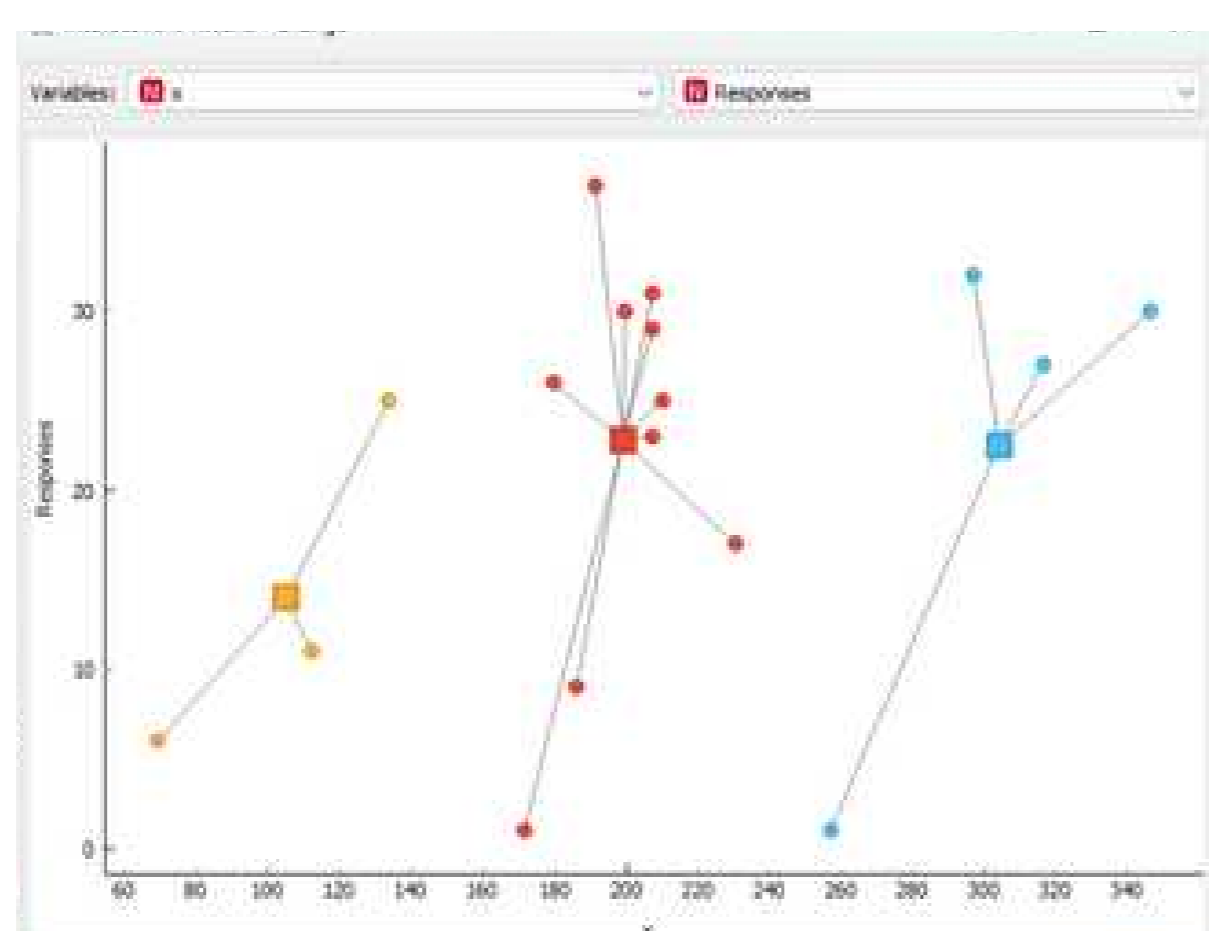
Reflection

While the model makes it easy to visualize where in the school the Wi-Fi affects students the most, the results at such a large scale are predictable since most of the clusters were at areas with classrooms. We could collect data on a smaller scale from individual classrooms rather than by blocks to more clearly see where the most affected areas are. The dataset we used generated by data collected from the survey was also too small for us to make accurate predictions on a large scale. We could have used multiple methods of data collection that would also corroborate our conclusion. From this project, we learnt how to use orange and the fundamentals of data mining, and realized that data mining can be very useful and is a powerful tool with the potential to greatly improve the quality of the environment around us.