Section A:

Topic: E-Learning and Online Education Post-COVID-19:

Experiences with remote learning and preferences for in-person vs. online education. Our main goal is to find preferences and challenges of individuals in adapting to learning online during the covid 19 pandemic . We are creating an online survey on Qualtrics to collect our data.

The COVID-19 pandemic has brought about a revolutionary shift in education worldwide, compelling educational institutions to swiftly transition from traditional in-person instruction to virtual and remote learning. Instructors, students, and institutions have to adapt to a new educational environment brought forth by lockdowns and other social distancing measures. The quality of education overall, student involvement, and instructional methodologies are all significantly impacted by this transformation. The sudden switch to online learning came with both opportunities and challenges. While it allowed for the continuation of educational activities throughout the pandemic, it also brought attention to several issues, including technological inequality, the need for effective online learning, and its impact on the social aspects of education.

Section B:

We used Option 2:

Our main goal is to explore people's experiences, preferences, and difficulties as they switched to online learning during COVID-19 epidemic.

- Understand whether individuals prefer in-person or online learning and explore the factors influencing these preferences.
- Challenges and Adaptation: Identify the challenges faced by individuals in adapting to online learning and explore the strategies employed to overcome these challenges.
- Learning Environment and Technology Use: Examine the learning environments participants engaged in and the devices and technologies used during online learning.

The survey aims to inform educators, policymakers, and institutions about the pros and cons of online learning, offering insights for future improvements toward a more efficient and inclusive educational environment.

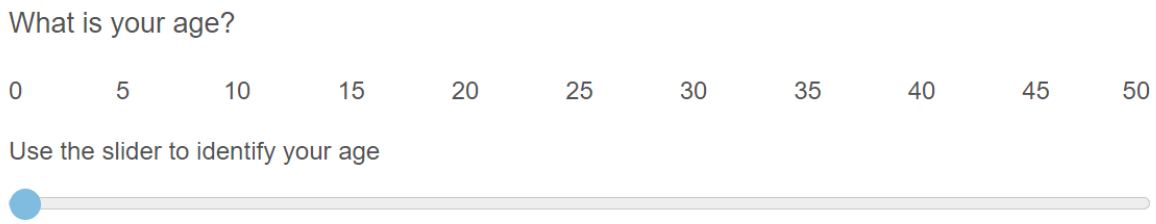
Recruitment message:

Dear University of Calgary students,

We really hope that you are doing well. We are contacting you because we need your insights to comprehend what it's like for people who switched to online learning during the pandemic.We would want you to spend between two and five minutes to complete this little survey. Your answers will be included in an insightful study that aims to improve everyone's online learning experience.

Survey link with consent form: Group 16 Consent form.pdf

Survey Questions:



Q1. The first question was asked to identify the views of each age group attempting the survey. This helped us group the data and have a clear understanding of students' views from different ages.

Q2. The second question was also asked to help us group the data after the data was collected. The question will help us interpret the different choices that different genders have about online learning.

What is your current level of education?

- Elementary School
- Middle school
- High School
- Post-Secondary Institution

Q3. We asked this question to help understand the differences in struggles of students from different levels of education. This piece of data was one of the main questions we used to analyze and compare data from different levels of education.

Did you transition to online or remote learning during the pandemic?

- Yes
- No

Q4. The fourth question is important as it helps categorise respondents based on their experiences during the pandemic. It was one of the main questions for our goal as people with an answer of “Yes” were our target participants.

Did you experience any disruptions to your education due to the COVID-19 pandemic?

Yes

Somewhat

Not at all

Q5. This question aims to understand the percentage of students that faced disruptions during the pandemic. This is a key data as it allows us to better understand the experiences of students during online learning.

Which gadgets did you use to study online? (Check all that relate.)

Laptop

Desktop PC

Tablet

Smartphone

Other

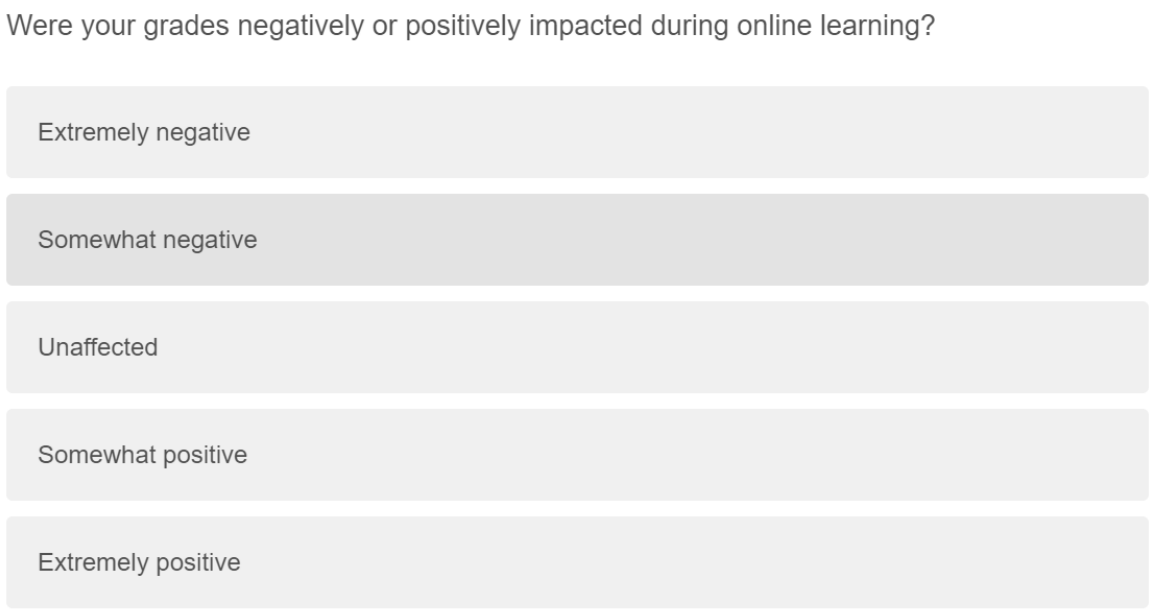
Question 6) We asked this question as its important to our goal of understanding the students preferences during online learning. It allows us to find out what gadgets were most commonly used amongst students during online learning helping us understand the technological aspect of online learning.

How would you rate the quality of your internet connection during online learning?

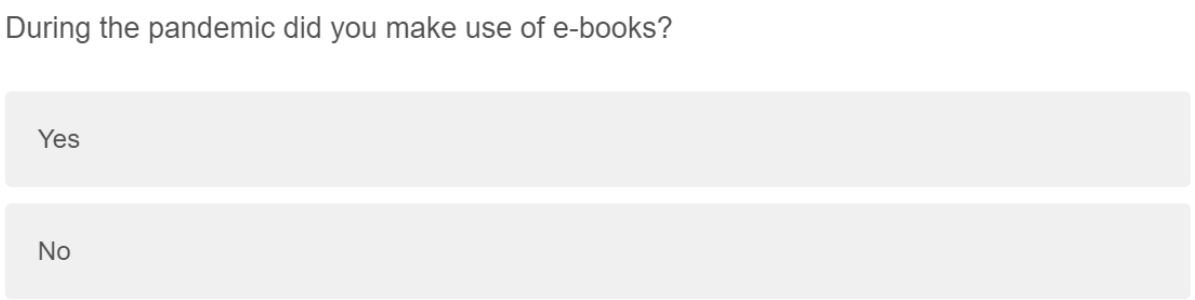
0. Poor	1	2	3	4	5. Excellent

Q7. This is a key question as internet connection plays a huge role in affecting the

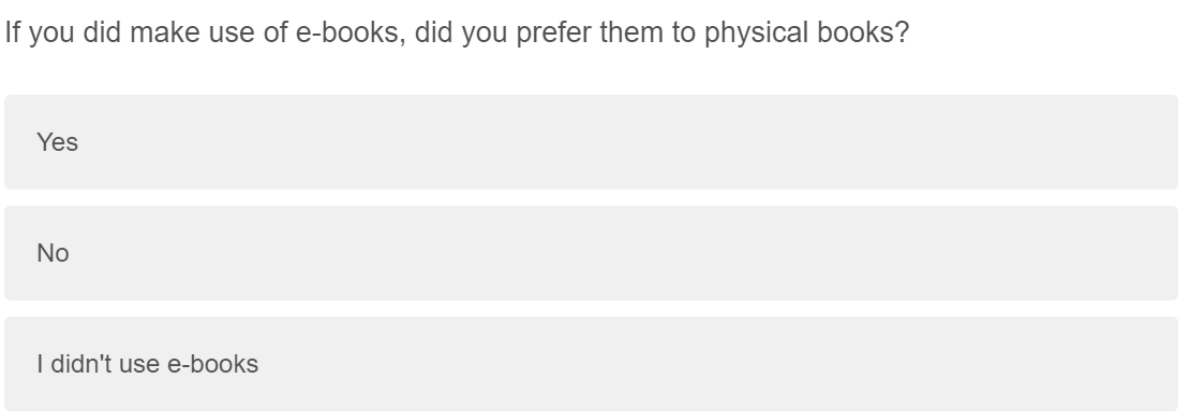
students experience during online learning. Therefore gathering this data will help us achieve our goal of understanding if internet quality was a challenge faced by students during online learning.



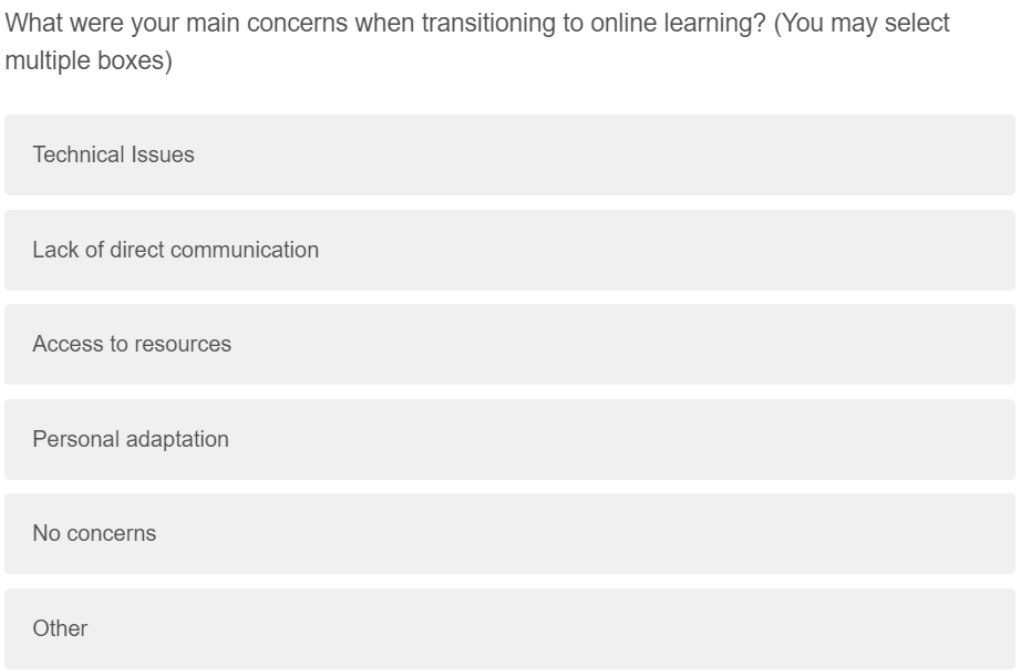
Q8. This question helped us find out the effect that the pandemic had on their grades. This question helped us create visualizations and analyze the effect on grades of students of different age groups and levels of education.



Q9. This question was used to correlate to other questions to analyze different analytical questions. The question will also help educators and institutions understand whether introducing e-books for all available books may positively impact education.

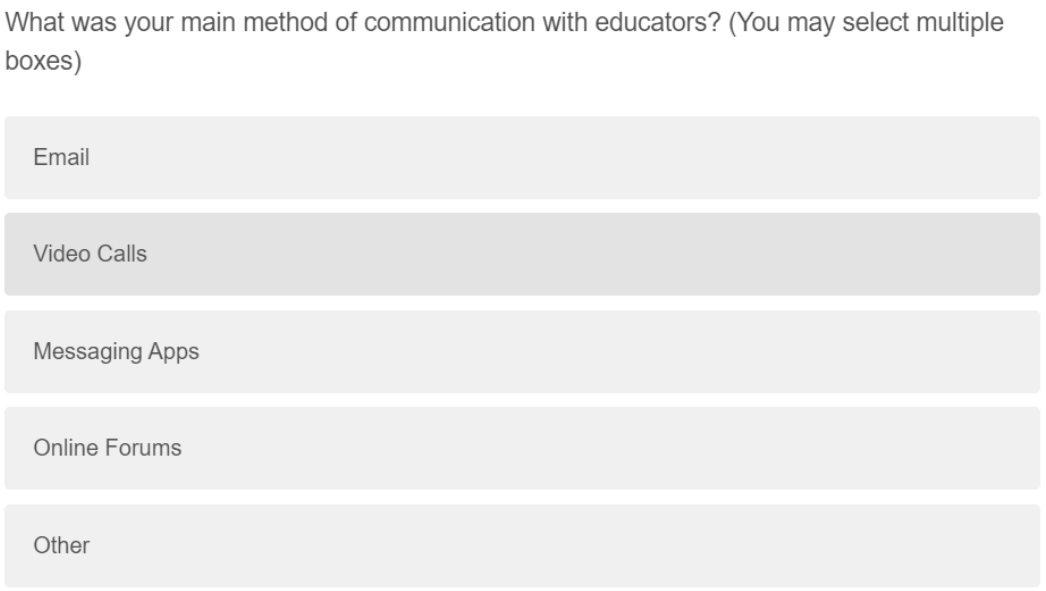


Q10. This question is a follow up question to question 9. This question will help educators learn the preferences of students with regards to the type of book that they use.

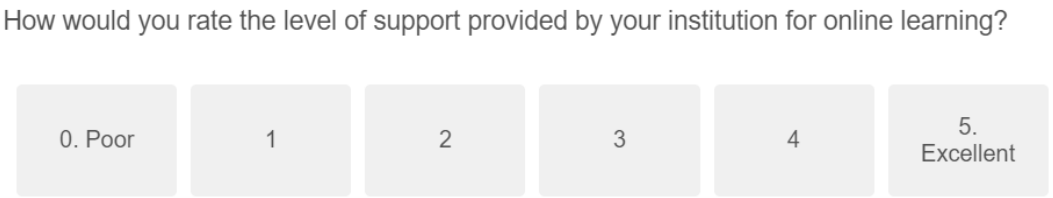


Q11. Concerns about unequal access to technology, gaps in digital literacy, issues with motivation and engagement, difficulties conducting fair assessments, the possibility of social isolation, questions about the quality of online instruction, and issues with equity, privacy, and data security were among the issues raised during the shift to online learning. Comprehending these apprehensions is crucial in order to tackle obstacles, distribute resources efficiently, formulate suitable regulations, foster fairness and inclusivity, and guarantee ongoing enhancement of virtual learning approaches.

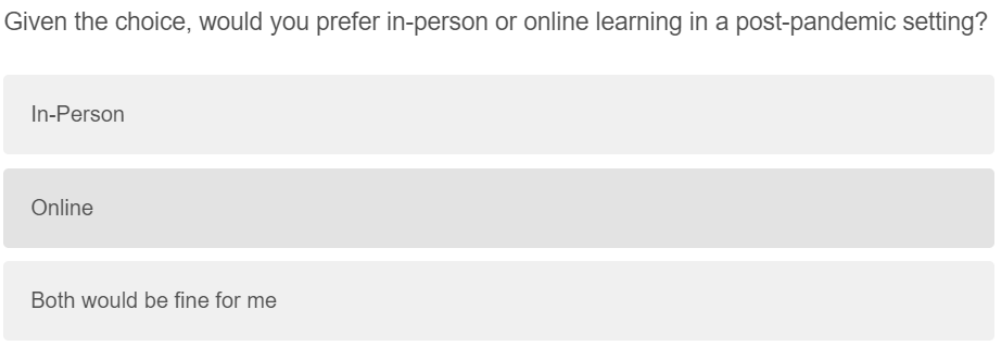
Q12. In order to promote self-reflection, give feedback to educators, highlight adaptability, guide goal setting, emphasize critical skills for employability, support ongoing enhancement of learning offerings, and enable customized learning experiences, it is crucial to know which skills were most improved by online learning.



Q13. Finding the main channels of communication in online learning: email, discussion boards, video conferencing, and collaborative tools is essential for increasing productivity, boosting interest, offering assistance, guaranteeing accessibility, addressing technological competence, encouraging ongoing development, and modifying plans to accommodate changing learning objectives.



Q14. To ensure quality, encourage student satisfaction and retention, identify obstacles, allocate resources wisely, adjust to changing needs, evaluate technology infrastructure, direct teacher professional development, advance equity and inclusion, and keep a competitive edge in the educational field, it is imperative to evaluate the degree of support offered by an institution for online learning.



Q15. In order to help institutions customize educational experiences, maximize resource allocation, foster student engagement and motivation, ensure inclusivity, adapt to changing circumstances, make informed decisions about technology integration, and facilitate a seamless transition from pandemic-induced changes, it is crucial to know whether people prefer in-person or online learning in a post-pandemic setting.

Intended target: Our data was not intended for just Canadian or UofC students and includes responses from students around the globe.

Section C:

- Did a good wifi connection correlate to a higher interest in continuing online learning?
- How did the use of E-books correlate with the effects on the students' grades?
- How were different academic groups affected by the transition to online learning?
- What were Students Concerned would affect their learning as they transitioned to online?

- What were the preferred devices to use during online learning?
- How has the level of support from institutions affected grades of Individuals?

Section D:

After collecting data from the survey, we imported it into Excel to begin the data cleaning process. The following steps were meticulously performed to ensure the integrity and usability of the dataset:

1) Remove Unnecessary Fields

Initial Data and Its Relevance

The original dataset contained various fields, including start and end dates, status, progress, recorded date, response time, and respondent ID. These fields, while potentially useful in different contexts, were identified as non-essential for the specific objectives of your study on E-Learning and Online Education Post-COVID-19.

The Process of Data Cleaning

Using Excel, you employed a straightforward yet effective method for data cleaning:

1. **Selection of Columns**: You started by identifying and selecting the columns that contained the irrelevant data. This step is critical as it involves deciding what data is not pertinent to the research objectives.
2. **Deletion of Irrelevant Data**: After careful selection, you proceeded to delete these columns directly in Excel. This action streamlined the dataset, making it more focused and manageable for subsequent analysis. This method of deletion is efficient and user-friendly, especially when dealing with large datasets.

The Importance of This Step

Removing irrelevant data is a fundamental part of data cleaning, as it:

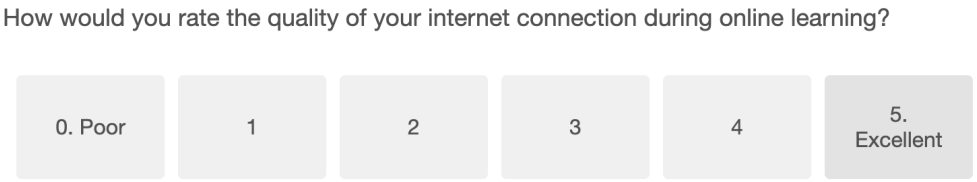
- **Enhances Focus**: By eliminating unnecessary data, you ensure that the analysis remains focused on the key aspects of E-Learning and Online Education Post-COVID-19.
- **Improves Accuracy**: Reducing the volume of irrelevant data minimizes the risk of errors or misinterpretations that could arise from extraneous information.

StartDate Start Date	EndDate End Date	Status Response T	Progress Progress	Duration (in seconds) Duration (in seconds)	Finished Finished	RecordedDate Recorded Date	ResponseId Response ID	DistributionC Distribution (	UserLangua User Langu	Q_RecaptcI Q_RecaptcI
11/21/23 19:23	11/21/23 19:23	Survey Preview	100	18	True	11/21/23 19:23	R_11jdLadMMimQNwY	preview	EN	
11/22/23 17:12	11/22/23 17:14	IP Address	100	91	True	11/22/23 17:14	R_3iXtz9Zokabd5b6	anonymous	EN	1
11/22/23 17:13	11/22/23 17:16	IP Address	100	138	True	11/22/23 17:16	R_3dXQQIJKL4bwAzk	anonymous	EN	1
11/22/23 17:16	11/22/23 17:18	IP Address	100	85	True	11/22/23 17:18	R_3RkGg1rhFYE8dke	anonymous	EN	
11/22/23 17:18	11/22/23 17:20	IP Address	100	119	True	11/22/23 17:20	R_ZaxOBGxuhcF56dr	anonymous	EN	0.8999997
11/22/23 17:22	11/22/23 17:24	IP Address	100	89	True	11/22/23 17:24	R_1C4jjZJs5rCRy5I	anonymous	EN	0.3000001

2) Remove unnecessary keywords

Initial Data and Its Relevance

The specific question under consideration was: "How would you rate the quality of your internet connection during online learning?" with the options ranging from '0. Poor' to '5. Excellent'. While these descriptive terms (Excellent, Poor) were initially included to aid respondents in understanding the scale, they introduced an element of textual data in what was essentially a numeric response scale.



The Process of Data Cleaning

To address this, we employed the SUBSTITUTE function in Excel, a powerful tool for text manipulation. This function allows for the replacement of specific text in a cell with another text or, in this case, the removal of unwanted text. The formulas used were:

1. =SUBSTITUTE(R4:R76, “Excellent”, “ ”): This formula was applied to the range of cells containing responses. It searched for the term "Excellent" and replaced it with an empty space, effectively removing it from the dataset.
2. =SUBSTITUTE(R4:R76, “Poor”, “ ”): Similarly, this formula targeted the term "Poor" and removed it from the responses.

Before:

Q7 How would you rate the quality of your interne
5. Excellent
3
4
4
4
2
4
3
4
3
5. Excellent
2
3
0. Poor
3
5. Excellent

After:

Internet Quality
5
3
4
4
4
2
4
3
4
3
5
2
3
0
3
5
4
2
3
4
2
5

The Importance of This Step

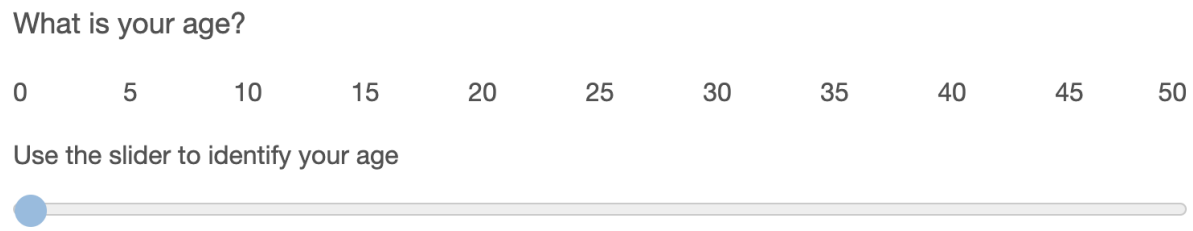
Removing these descriptive keywords served multiple purposes:

- **Standardization of Data**: It transformed all responses into a uniform numeric format, essential for quantitative analysis.
- **Improved Clarity and Precision**: The elimination of textual descriptions ensured that the data was precise and focused solely on the numeric rating, facilitating clearer data visualization and interpretation.
- **Enhanced Analytical Accuracy**: With a standardized numeric scale, statistical analysis and comparisons become more straightforward and accurate

3) Fill null values

Initial Data and Its Relevance

Handling missing data is a common challenge in data cleaning and analysis. In our case, the missing age data in the survey responses presented a gap in the dataset. To maintain the integrity of the dataset while acknowledging these gaps, we opted to label these missing values.



The Process of Data Cleaning

We used Excel's IF and ISBLANK functions to identify and label missing data:

- **Formula Used**: =IF(ISBLANK(L4:L76), "unknown", L4:L76). This formula was applied across the relevant range of cells in your dataset.
- **Functionality of the Formula**:
    - ISBLANK(L4:L76): This part of the formula checks each cell in the specified range (L4 to L76) to determine if it is blank (i.e., if the respondent left the age field empty).
    - IF: The IF function is then used to apply a condition - if the cell is blank (TRUE for ISBLANK), it labels the cell as "unknown". If the cell is not blank (FALSE for ISBLANK), it retains the original value in the cell.

Before:

L
Q1_1
What is your age? - Use the slider to identify your age
16
19
18
18
19
5
19
23
21
19
24
22
19
18
18
13

After:

A
Age
Unknown
16
Unknown
18
Unknown
18
Unknown
Unknown
19
Unknown
Unknown
5
19
Unknown
21
19
24
Unknown
Unknown
22
19
18
18
13
Unknown
22

The Importance of This Step

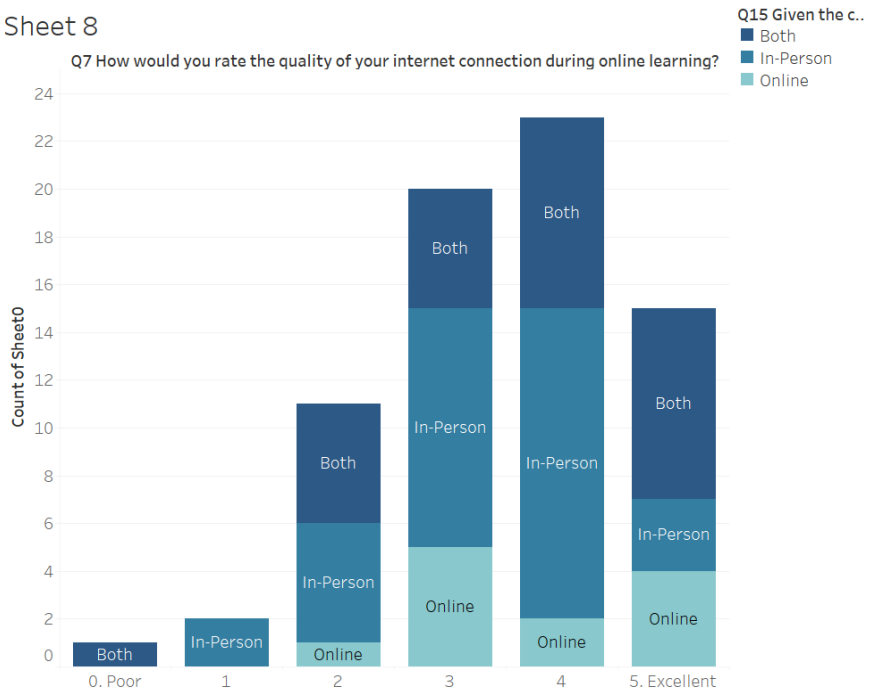
- **Maintaining Data Integrity**: By labeling missing values instead of removing them, we preserved the overall structure of the dataset.
- **Clear Identification of Missing Information**: The label “unknown” clearly indicates where data is missing, which is important for accurate interpretation and analysis.

In the final stage of organizing our data in Excel, I implemented a couple of key adjustments to enhance its presentation and usability:

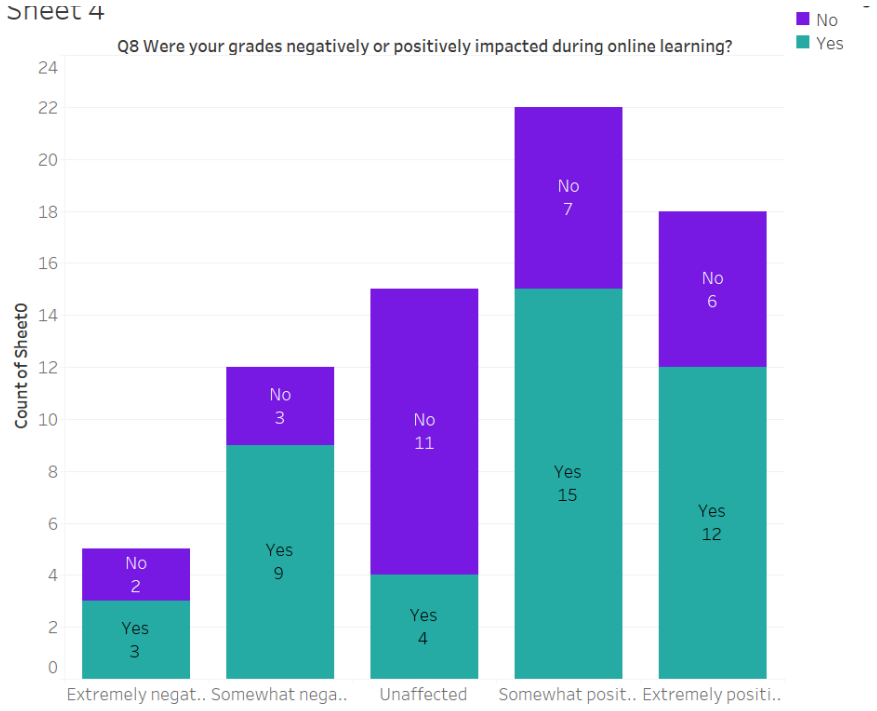
1. **Optimising Column and Row Dimensions**: I fine-tuned the widths and heights of the columns and rows, ensuring they were proportioned for optimal readability and navigation. This adjustment was essential to make the data visually accessible and straightforward to navigate.
2. **Refining Column Titles**: I revised the column names, replacing longer titles with more succinct and descriptive labels. This step was aimed at enhancing clarity, making it easier to quickly identify and understand the data each column represented.

These enhancements significantly improved the overall presentation of our data, balancing aesthetic appeal with functional clarity, thereby making the dataset not only accurate but also user-friendly for analysis.

Section E:



- Did a good wifi connection correlate to a higher interest in continuing online learning?
- Chose this visualization as it helped us understand possible reasons for satisfaction/dissatisfaction with online learning and whether internet connection qualify was a determining factor
- The graph shows a clear interest in returning to physical learning for those that described their connection as somewhere in the middle of “poor” and “Excellent” with 50% of participants saying they would prefer solely In-person learning when given the choice between the 2 or a combination. Those with an “Excellent” or near Excellent internet connection displayed more interest in a blended learning model or online compared to others.
- Supports the main goal by displaying how the better the connection of an individual the more willing they were to continue online learning while those with a poor connection did not want to continue, highlighting the challenges students faced in adapting to online learning.

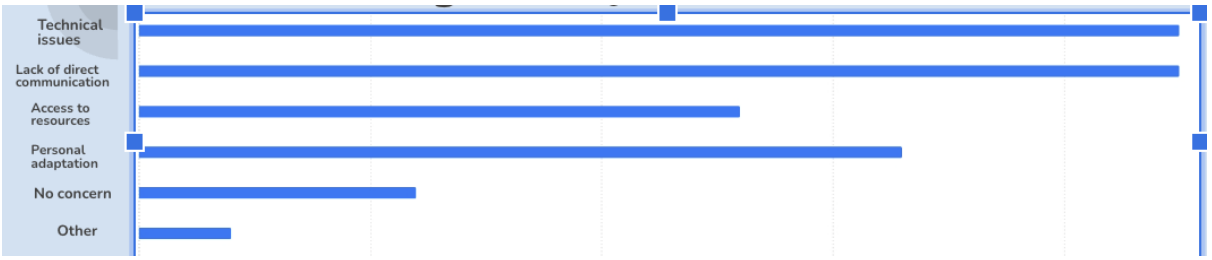


- How did the use of E-books correlate with the effects on the students' grades?
- Chose this visualization as it could help us determine if E-books assisted students in getting better grades or not with the use of a stacked bar graph helping us clearly display our findings of answers towards each segment for how grades were impacted while showing the number of yes and no answers for each segment.
- The higher the use of e-books the more positively the student's grades were impacted. While some students still experienced a negative trend in their grades despite the use of E-books which suggests that the broader environment of online learning may have caused the downward trend in grades regardless of the use of online learning resources.
- Supports the main goal by allowing us to observe how students adapted to online learning and make a conclusion that this adaptation towards the use of E-books tends to correlate to a more positive effect on grades.

Q3: What...ucation?	Extremely negative	Extremely positive	Somewhat negative
Post-Secondary Instit...	57.1%	77.8%	43.8%
High School	14.3%	16.7%	37.5%
Middle school	14.3%	0.0%	18.8%
Elementary School	14.3%	5.6%	0.0%

Somewhat positive	Unaffected
76.9%	77.8%
15.4%	5.6%
7.7%	11.1%
0.0%	5.6%

- How were different academic groups affected by the transition to online learning?
- We Chose this visualisation as it helps us observe the exact percentages of how each level of education had their grades impacted during online learning and make observation such as which group of students were impacted the most or least.
- The relationship between the effect on student grades during online learning and their level of education. The data suggests that students in higher levels of education were mostly positively impacted compared to students in lower levels of education. Overall, from the data it can be depicted that students from higher education levels were possibly more aware of technological improvements in the world which showed the positive trend for upper educational levels.
- Support the main goal by helping us understand the scale of difficulties experienced by students from different levels of education and how post-secondary high school students seemed to be the most positively affected.

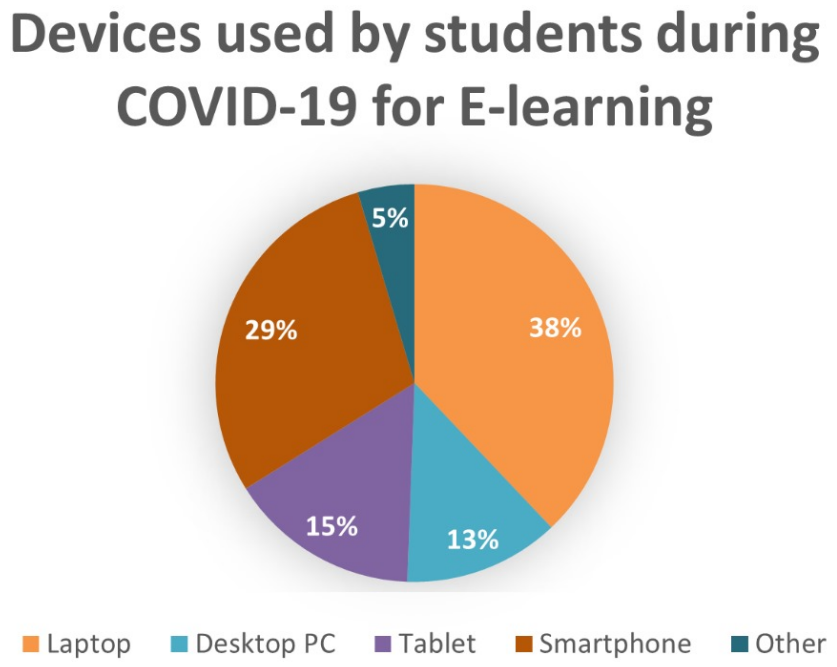


- What were Students Concerned would affect their learning as they transitioned to online?
- Chose this visualisation due to its easy to comprehend style which can clearly show the number of responses towards each answer. Helps us understand what concerns/challenges students had during online learning and displays to us some of the main issues that students experienced.

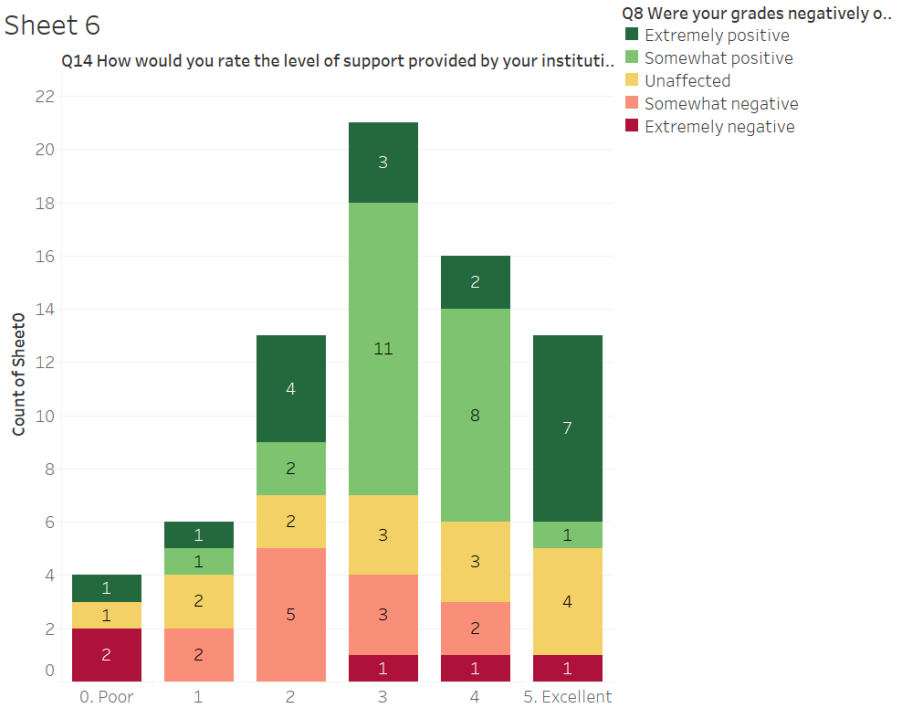
- Concerns during online learning indicates an issue with technical challenges. This finding underscores the critical need for interventions to enhance the digital learning experience, such as improved technical support and optimized online platforms. These results also suggest that direct communications with teachers was an element of physical learning that was very valuable to students. The other major concern that was

raised by students was how they would personally adapt to this new form of learning, highlighting a worry at the level of focus they would be able to place on learning when not in a physical class.

- Supports the main goal by conveying the most common challenges faced by students during online learning.



- What were the preferred devices to use during online learning?
- We chose this visualization as it helps us clearly show the level of use of various electronic devices. It can display to us which electronic devices were most used and preferred by students as they looked to prioritize the use of the best fitted devices for online learning.
- The diversity of devices utilized during online learning reveals a clear trend, with laptops emerging as the overwhelmingly favored choice among students, underscoring the central role of these versatile devices in facilitating the online educational experience. Additionally, smartphones were a majorly used device due to their easy accessibility and versatile use.
- Supports the main goal by providing us with the clear preferences of students such as laptops and smartphones for use during online learning.



- How has the level of support from institutions affected grades of Individuals?
- We chose this visualization as it can help us understand the effect of institution support on student grades, the stacked bar graph provides a clear intuitive understanding of the correlation between these 2 aspects. It provides an insight into how school support can be a determining factor for students grades and how they view their online learning experience as a whole
- The relationship between the amount of support provided by institutions and student grades reveals a noteworthy trend. It suggests that, for a majority of students, the level of support received from institutions had a direct correlation to the effect on their grades with students that received “excellent” support from their learning institution proving to also be the largest segment of students that experienced an “extremely positive” outcome on their grades.
- This insight underscores the value and effectiveness of support mechanisms, such as zoom memberships or online past exam sheets, that were implemented by educational institutions.
- This supports our main goal by assisting us in understanding the difficulties students experienced during online learning in terms of grades and how these could be a direct cause of low institution support towards students.