

## Project 2: Making of Article

### **Introduction**

My second data visualization project is about child labour in the Democratic Republic of Congo (DRC). The DRC is a very complex country. It is the richest country in the world in terms of minerals but also among the poorest. This is due to many factors such its history with colonialism, wars, political instability, and much more.

### **Concept**

For the second project having complete creative control over everything was not as easy as I thought it would be. From the beginning I really struggled when it came to choose a topic. Other topics I considered were “The effects of private jets on the environment” and “Women in Sport”. I had interest for both of these topics but decided on child labour in the DRC because it holds a personal importance for me. I was born and raised in the DRC. Despite being from there, it wasn’t until I moved to the U.S that I started to learn a lot more about what’s actually happening in the country. The DRC is the second largest country in Africa and because the country lacks fundamental structures, especially back then, it was hard to know what was happening in another province. For example, I grew up knowing there was an ongoing conflict in the Eastern regions but never knew the extent of it. This is also the same when it came to the topics of child labour, which is why I wanted to make my infographic on it. I’m from the Haut-Katanga province, which is the 5<sup>th</sup> province with the highest child labour and this is a fact I learned while working on this project.

### **Resources and Data**

Finding resources on child labour in the DRC was not as challenging as I thought it would be. There were many reports, research from nonprofit organizations, grass root organizations and articles written about it from reputable sources such as UNICEF, Wilson Center, Financial Times, Amnesty International and more. Compressing the data and choosing which topics to focus on was hard because there was so much to work with.

Some of the sources used:



Link: <https://www.wilsoncenter.org/blog-post/drc-mining-industry-child-labor-and-formalization-small-scale-mining>



## Democratic Republic of Congo: “This is what we die for”: Human rights abuses in the Democratic Republic of the Congo power the global trade in cobalt

This report documents the hazardous conditions in which artisanal miners, including thousands of children, mine cobalt in the Democratic Republic of the Congo. It goes on to trace how this cobalt is used to power mobile phones, laptop computers, and other portable electronic devices. Using basic hand tools, miners dig out rocks from tunnels deep underground, and accidents are common. Despite the potentially fatal health effects of prolonged exposure to cobalt, adult and child miners work without even the most basic protective equipment. This report is the first comprehensive account of how cobalt enters the supply chain of many of the world's leading brands.

Link: <https://www.amnesty.org/en/documents/afr62/3183/2016/en/>

Premium Insights | Updated April 26, 2024

# The world's ten largest cobalt mines

Brought to you by [GlobalData](#).

Cobalt

Share

According to GlobalData, there are more than 91 cobalt mines in operation globally. GlobalData tracks and profiles over 33,000 mines and projects from early exploration to closure, across more than 150 countries and more than 100 commodities. [Buy the latest mine-site profiles here.](#)

The following are the ten largest cobalt mines by production across the world in 2022, according to

Link: <https://www.mining-technology.com/data-insights/ten-largest-cobalts-mines/?cf-view&cf-closed>

HUMAN RIGHTS | AFRICA

## Child labor on the rise, ILO says

Abu-Bakarr Jalloh  
06/12/2023

Some 160 million children worldwide are still being put to work, according to the International Labour Organization. It estimates that in sub-Saharan Africa alone, 72 million children are affected.



Link: <https://www.dw.com/en/child-labor-on-the-rise-ilo-says/a-65894251>



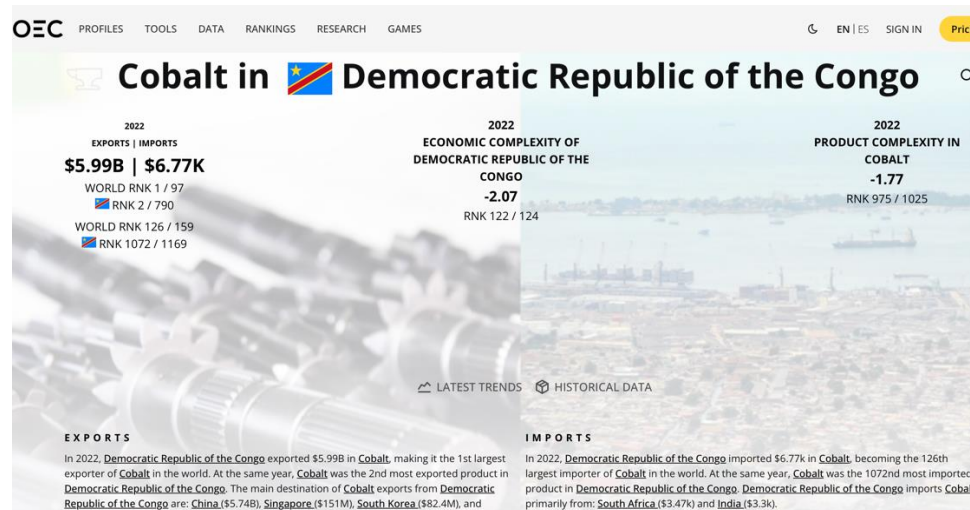
## Educational Challenges in the Republic Democratic of Congo

Written by Esther Musau Tshimanga

Background

The Democratic Republic of Congo is the largest sovereign nation in the African continent with a population of over 84 million inhabitants. The DRC is

Link: <https://brokenchalk.org/educational-challenges-in-the-republic-democratic-of-congo/>



Link: <https://oec.world/en/profile/bilateral-product/cobalt/reporter/cod>

Additionally, I used excel to produce the different datasheets I needed to upload into Flourish to create some of my graphs.

A	B	C
	Child labour by gender	
Age	Boys	Girls
5-17 years	11.2	7.8
5-11 years	10.9	8.4
12-14 years	11	7.5
15-17 years	12.2	6.6

AutoSave Child labour by Region

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A	B	C	D	E	F
Year	Asia and the Pacific	Latin America and Caribbean	Sub-Saharan Africa		
2008	113.6	14.1	65.1		
2012	77.7	12.5	59		
2016	62.1	10.5	70		
2020	48.7	8.2	86.6		

AutoSave Child labour per provinces(DRC)

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A	B	C	D	E	F	G	H	I
Name	2007	2013-2014						
Bas-Uele	40.9	74.9						
Equateur	74.3	43.2						
Haut-Katanga	39.3	64.1						
Haut-Lomami	39.3	64.1						
Haut-Uele	40.9	74.9						
Ituri	40.9	74.9						
Kasai	66.3	42.4						
Kasai-Central	66.3	42.2						
Kasai-Oriental	71.4	42.4						
Kinshasa	66.6	19.4						
Kongo-Central	77.2	47.8						
Kwango	75.8	35.2						
Kwilu	75.8	35.2						
Lomami	39.3	64.1						
Luatalaba	39.3	64.1						
Maï-Ndombe	75.8	35.2						
Maniema	46.7	66.7						
Mongala	74.3	43.2						
Nord-Kivu	28	80.9						
Nord-Ubangi	74.3	43.2						
Sankuru	71.4	42.4						
Sud-Kivu	45	66.8						
Sud-Ubangi	74.3	43.2						
Tanganyika	39.3	64.1						
Tshopo	40.9	74.9						
Tshuapa	74.3	43.2						

Year	Worldwide Price of Cobalt 2019 - 2023
Aug. 2019	32,235
Sept. 2019	35,552
Oct. 2019	35,598
Nov. 2019	35,384
Dec. 2019	32,366
Jan. 2020	34,637.50
Feb. 2020	33,156.50
Mar. 2020	29,630.50
Apr. 2020	29,637
May. 2020	29,652
Jun. 2020	28,481
Jul. 2020	29,000
Aug. 2020	33,042.50
Sep. 2020	33,971.50
Oct. 2020	32,538
Nov. 2020	32,041
Dec. 2020	32,031.80
Jan. 2021	41,243
Feb. 2021	51,953
Mar. 2021	50,069
Apr. 2021	45,165
May. 2021	43,615
Jun. 2021	49,618
Jul. 2021	52,426
Aug. 2021	50,121.50
Sep. 2021	53,091
Oct. 2021	56,340
Nov. 2021	65,530
Dec. 2021	70,232
Jan. 2022	70,764
Feb. 2022	73,767
Mar. 2022	81,860
Apr. 2022	81,767
Jun. 2022	70,098
Jul. 2022	50,097
Aug. 2022	51,595
Sep. 2022	51,603
Oct. 2022	51,577.50
Nov. 2022	51,584
Dec. 2022	51,591
Jan. 2023	48,652
Feb. 2023	33,814.50
Mar. 2023	34,579
Apr. 2023	34,582
May. 2023	29,165
Jun. 2023	33,074
Jul. 2023	33,049.50
Aug. 2023	33,055.50

A	B
Main sectors of child labour	
Sectors	Percentages
Agricultural	70
Services	19.7
Industry	10.3

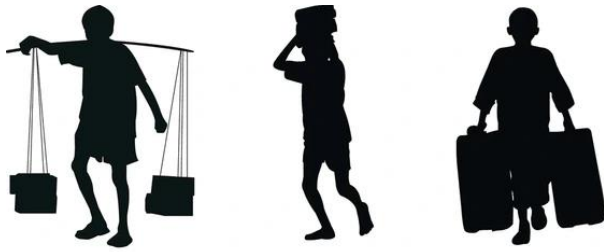


## Sketch, Design, Drafts and Critiques

Sketching and designing this project was the hardest part. I didn't realize how hard it can be to have complete creative control. Project 1 seems easier because there were set of rules and a guideline to follow. Even though the some of the same rules of data visualization still applied, for the most part it was on me to figure out how this project would look like.

I wanted to experiment and try different concepts we had learn in class and be as creative as possible. I can't draw so I took inspiration from different images I found on google and used the pen tool to try and recreate them





Drafts:

In this project I had the opposite issue I faced from my first project. In the first project finding the data was the most challenging part while in this one creating my illustrations and graphs were my biggest challenge. I wanted to try so many new and different things and realize the visualization I had in mind that I struggled to produced complete drafts as seen below.

Draft 1:



The Democratic Republic of Congo (DRC) is the second largest country by land area in Africa. The DRC is mainly known for its rich and natural resources such as copper, gold, cobalt, and others, and is also considered the wealthiest country in natural resources, with its untapped raw minerals estimated at \$24 trillion. However, the DRC has been facing a long-term conflict in the world, and the Congolese population among the poorest. The nation has experienced more than two decades of war, which has caused the death of millions of people and has affected the growth and development of the country.

The Congolese government has failed to take active measures to eliminate the conflict in the country. According to the UNICEF, the U.S. Department of Labor reported that about 25,000 children are working in cobalt mines in the DRC. More than half of the world's cobalt mining occurs there. Cobalt is an essential raw mineral used by large tech companies for rechargeable lithium-ion batteries.

By 2025, the cobalt demand is predicted to grow by 60% due to increased technology-driven usage, which will significantly elevate the demand for the DRC's cobalt. The DRC cannot fail to adapt and enforce stricter strategies.

The Democratic Republic of Congo (DRC) is the second largest country by land area in Africa. The DRC is mainly known for its rich and natural resources such as copper, gold, cobalt, and coltan, and is also known for its rain forest, which is home to the world's largest Amazon. It is also considered the wealthiest country in natural resources, with its untapped raw minerals estimated at \$24 trillion. However, the DRC is also one of the poorest countries in the world, and the Congolese population among the poorest. The nation has experienced more than two decades of war and political instability, which has led to a significant decline in the growth and development of the country.

The Congolese government has failed to take active measures to protect the environment, and the DRC has been ranked as the most corrupt country in 2023. The U.S. Department of Labor reported that about 25,000 children are working in cobalt mines in the DRC, and about one-half of the world's cobalt mining occurs there. Cobalt is an essential raw mineral used by large tech companies for rechargeable lithium-ion batteries.

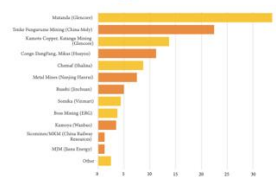
By 2025, the cobalt demand is predicted to grow by 60% due to increased technology-driven usage, which will significantly fuel the demand for cobalt. The DRC country is well placed to elude the demand and enforce stricter regulations.

PERCENTAGE  
OF CHILDREN  
ENGAGE IN  
CHILD LABOR

COUNTRY MAP  
(Still Working on it)

Companies extracting the most cobalt in the DRC  
Chinese companies own 80% of DRC's cobalt output  
Tonnes (tn) produced

Chinese owned mines



CHILDREN WORKING IN  
MINES ILLUSTRATION  
(Still Working on it)

The Democratic Republic of Congo (DRC) is the second-largest country by land area in Africa. The DRC is mainly known for its rich and natural resources such as copper, gold, cobalt, cobalt, and diamonds, and has the earth's second-largest forest after the Amazon. It is also considered the wealthiest country in natural resources, with its untapped raw minerals estimated at \$24 trillion.

Despite its wealth, Congo is one of the least developed countries in the world, and the Congolese population among the poorest. The nation has experienced more than two decades of war and conflict, political instability and corruption, which have affected the growth and development of the country.

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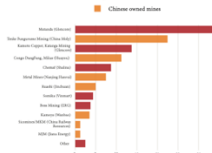
PERCENTAGE  
OF CHILDREN  
ENGAGE IN  
CHILD LABOR

The Congolese government has failed to take active measures to eliminate child labor practices in mines for years. In November 2013, the US Department of Labor reported that at least 25,000 children are working in cobalt mines in the DRC. More than half of the world's cobalt resources are located in the DRC, and over 70% of the world's cobalt mining occurs there. Cobalt is an essential raw mineral used by large tech companies for rechargeable lithium-ion batteries, electronic devices, and electric cars.

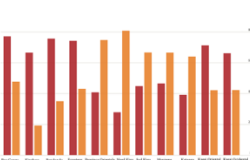
By 2025, the cobalt demand is projected to grow by 60% due to increased technology-driven surge, which will significantly elevate child labor practices in mines, if the DRC continue to fail to adopt and enforce stricter regulations.

CHILDREN WORKING IN  
MINES ILLUSTRATION  
(Still Working on it)

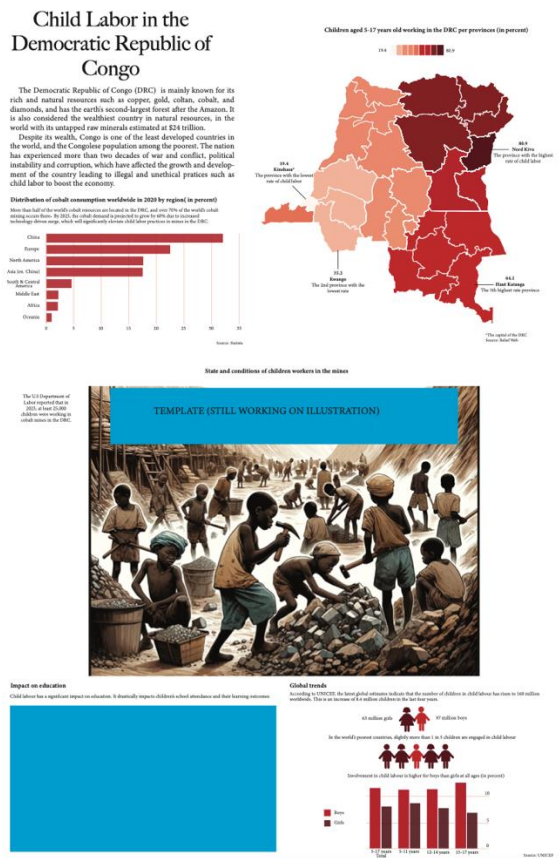
Companies extracting the most cobalt in the DRC  
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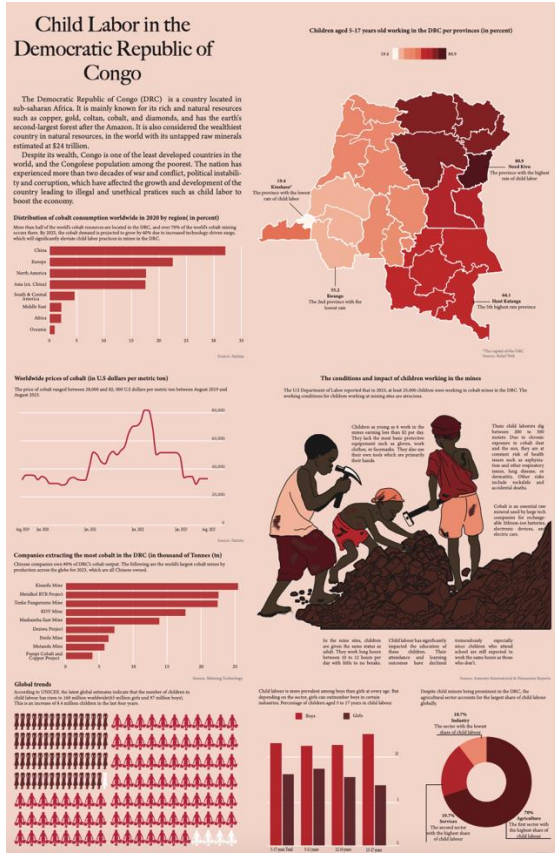
Children aged 5-17 years old working in the DRC per provinces (in percent)



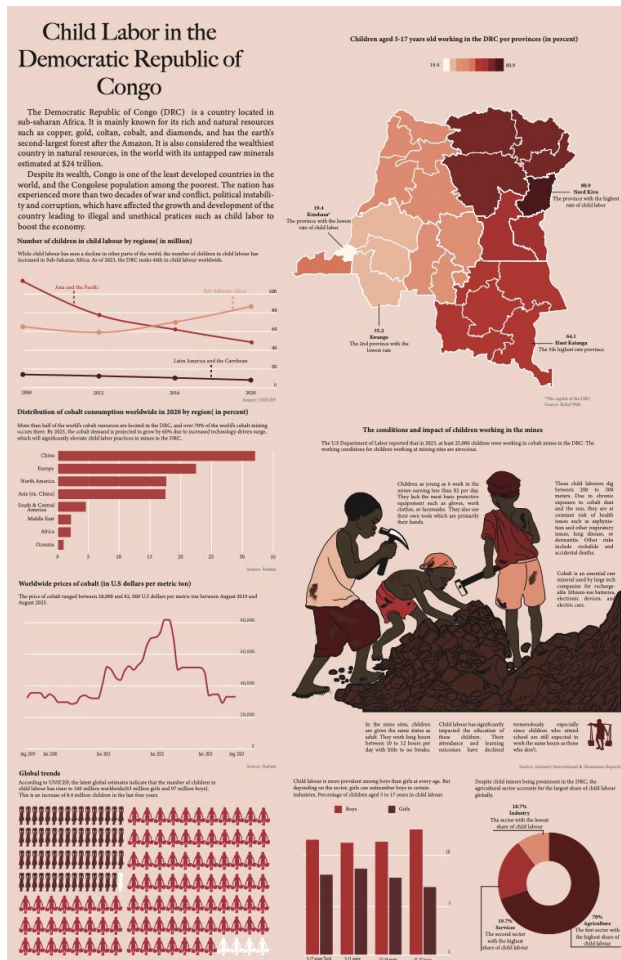
Draft 3:



Draft 4:

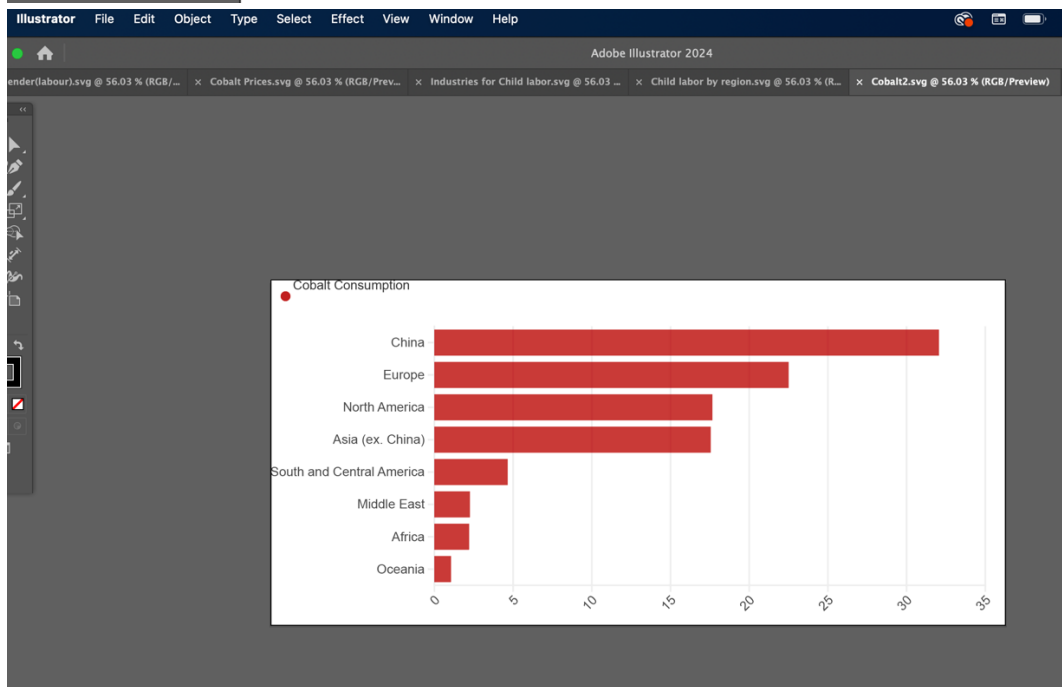
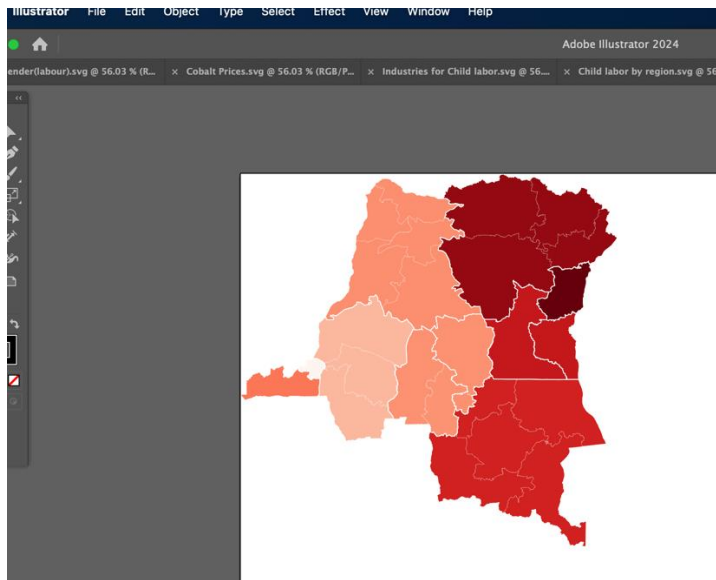


Final:

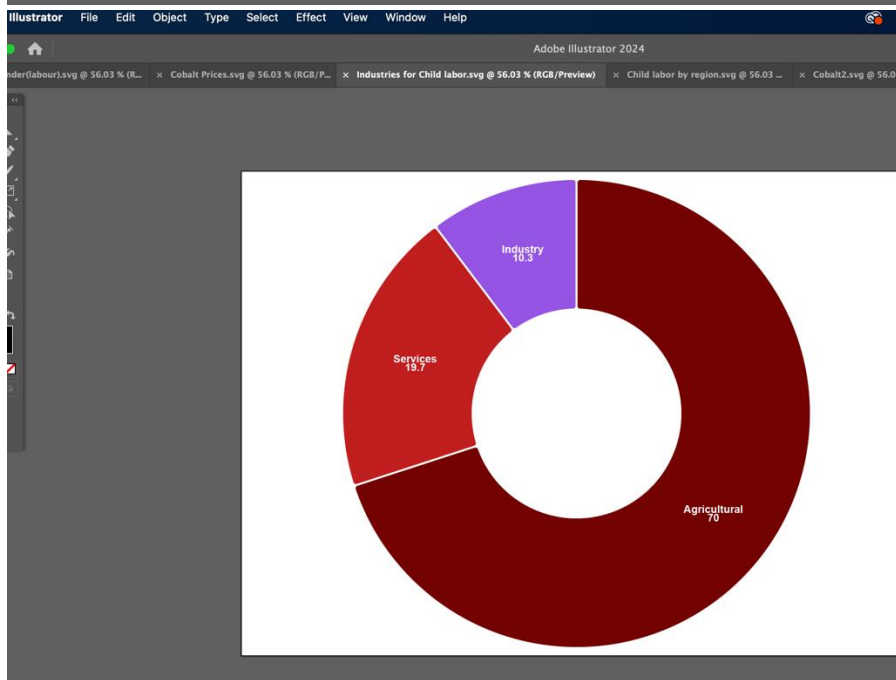
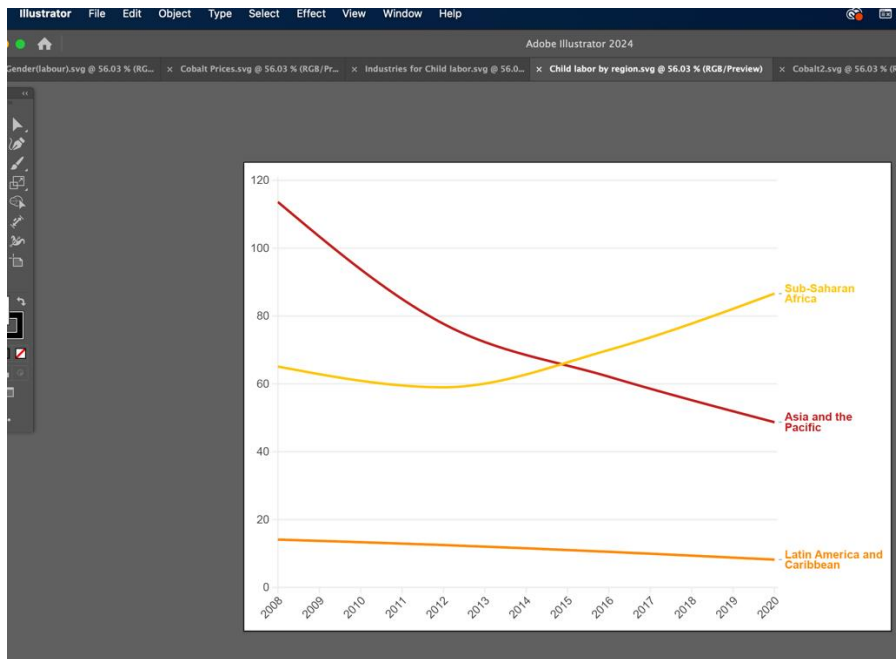


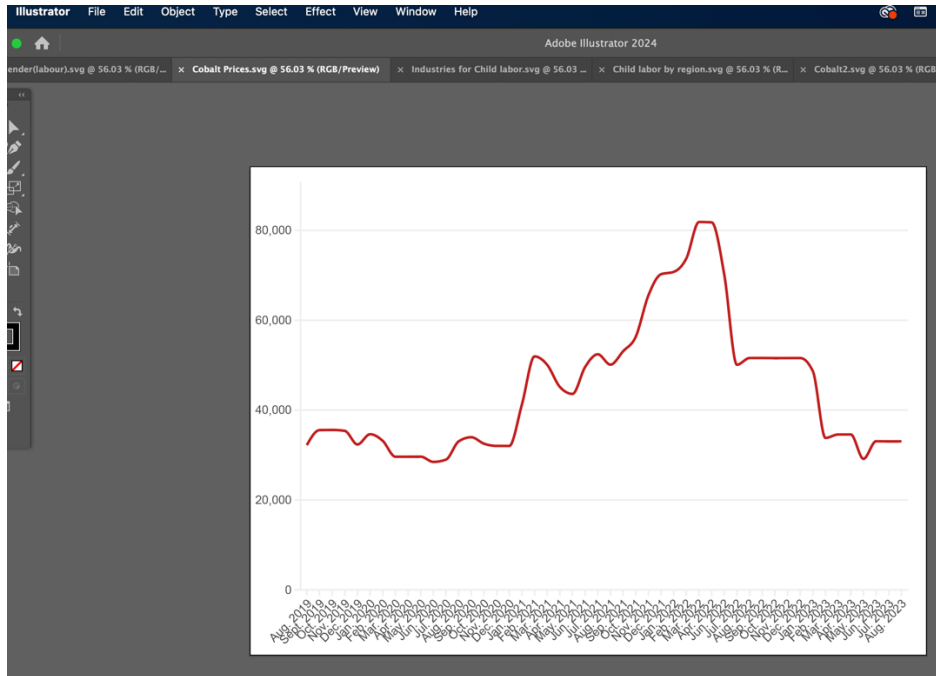
Graphs created from Flourish before using Adobe Illustrator:

Some of the graphs from my project were created using Flourish. I uploaded the data, produced the graph and then spent most of the time in illustrator modifying them. Changing the color shades to make sure the hues matched the theme, scale the graphs to fit the sizes I wanted, and adding text, and changing fonts to produce a cohesive infographic.



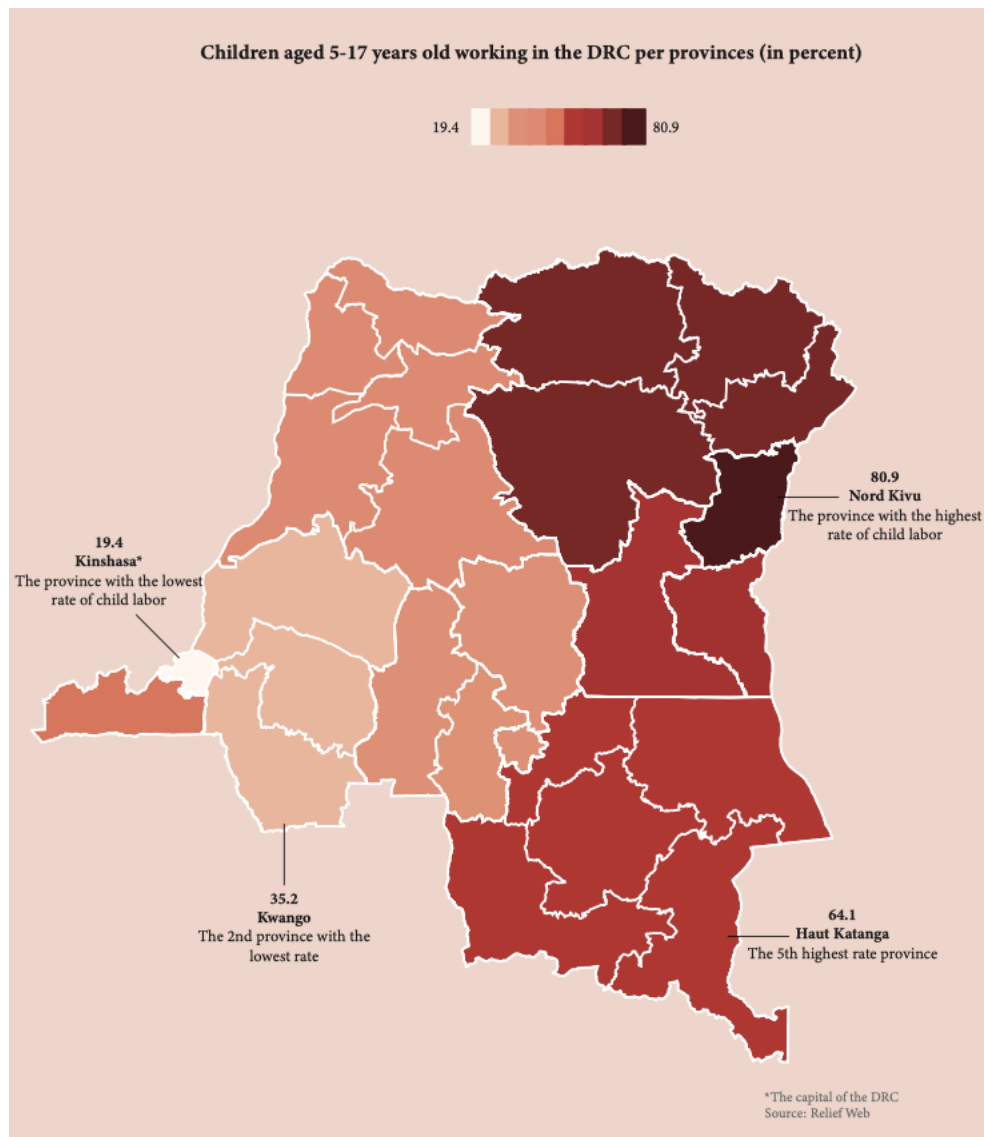






## Choice of Graphs

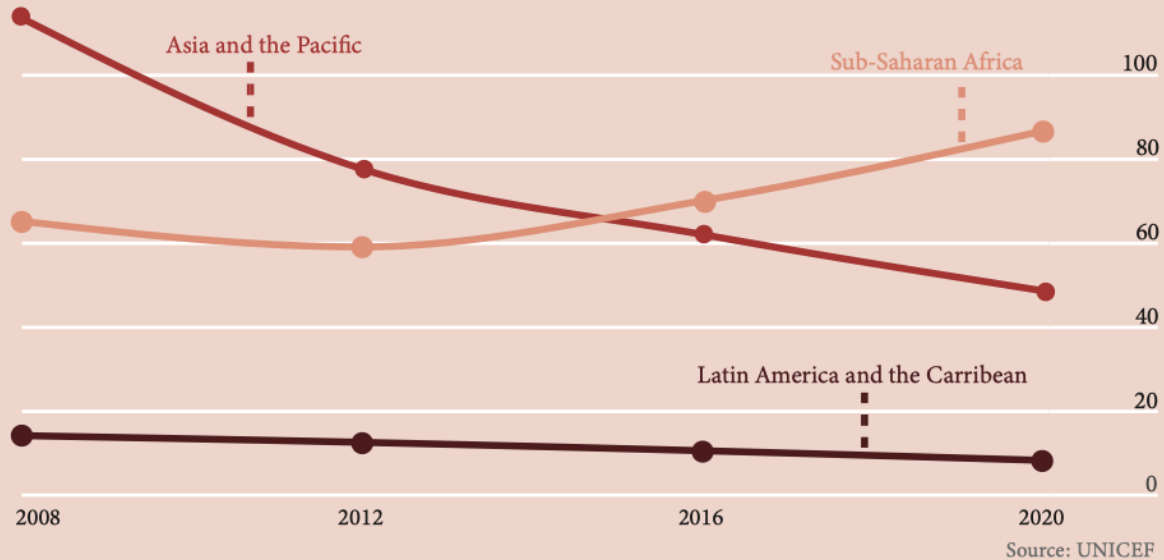
For my first graph I created the map of the DRC because I wanted people looking at this infographic to have an idea of what the country being discussed looked like geographically and also learn from looking and reading about the information provided on the map. The readings have explained the importance maps represents in portraying spatial data. Looking at the map below, people would be able to not only see what the country looks like but also learn that the country has 26 provinces, and which of the provinces have the highest rate of child labour by looking at the different color shades of red, as well as reading the description provided.



My second graph is a line graph. This graph shows the number of children in child labour globally. I chose a line graph because I wanted people to be able to see how child labour has impacted the three different regions. The data for this graph showed change over time, in this case the course of three different years. As seen in the data while child labour has decreased in Asia and the Pacific or Latin America and the Caribbean, in Sub-Saharan Africa, the region where the DRC is located has increased. Since these three regions represent different data, making sure the color hues differentiate was crucial to facilitate the understanding of the data. Each dot represents the number of children in million and without such encoding for the line graph, the readers would have no idea about the exact number the graph reflects.

### Number of children in child labour by regions( in million)

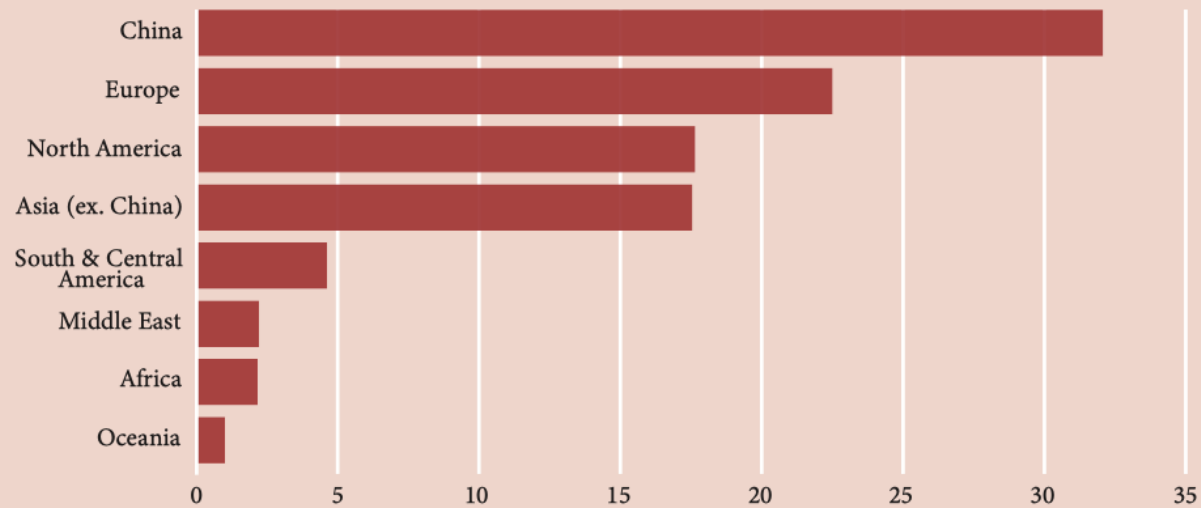
While child labour has seen a decline in other parts of the world, the number of children in child labour has increased in Sub-Saharan Africa. As of 2023, the DRC ranks 44th in child labour worldwide.



My third graph is a bar graph showing the distribution of cobalt consumption in the world. I used a bar graph because I wanted to show comparison using the encoding of length so the reader could see a country such as China compares to complete continents in its consumption of cobalt.

### Distribution of cobalt consumption worldwide in 2020 by region( in percent)

More than half of the world's cobalt resources are located in the DRC, and over 70% of the world's cobalt mining occurs there. By 2025, the cobalt demand is projected to grow by 60% due to increased technology-driven surge, which will significantly elevate child labor practices in mines in the DRC.



Source: Statista

For my fourth chart I used a line graph again because of the extensive data I had. This line chart is also comparing change over time but this time for the prices of cobalt from August 2019 to August 2023. Unlike my other line graph, I did not choose to use the encoding of dots to represent where the specific prices of cobalt were because that was not my intention with this graph. The point was to show how the price fluctuate over the years and if I had added the dots, the focus would have been more on the prices. The readings discuss the importance of not only knowing which graph to choose but which encoding to apply as well to make sure your reader will receive the information being portrayed.



### Worldwide prices of cobalt (in U.S dollars per metric ton)

The price of cobalt ranged between 28,000 and 82,000 U.S dollars per metric ton between August 2019 and August 2023.

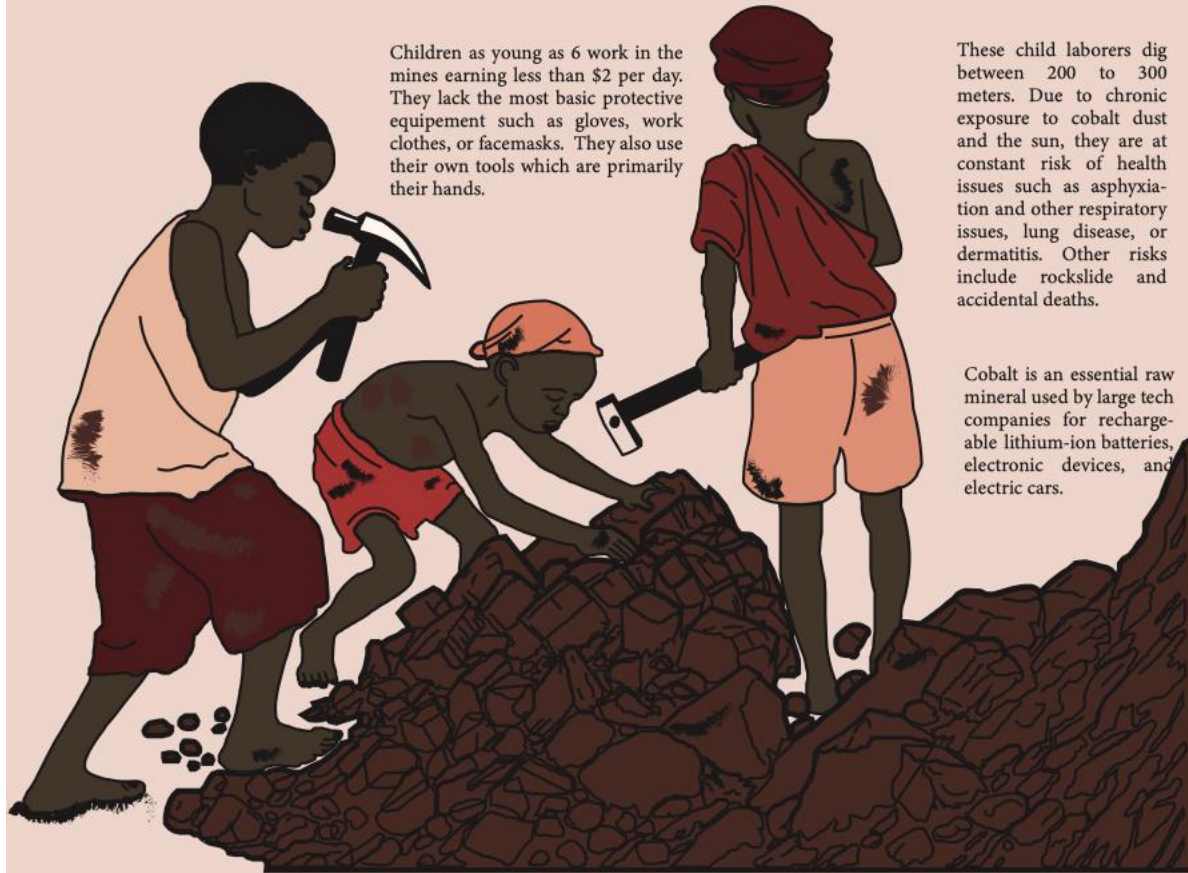


Source: Statista

My fifth graph is an illustration. The most challenging one to make. From the very beginning of this project after selecting my topic I knew I wanted to incorporate an illustration of children working in mines for the part where I discuss the condition and state children working in mines have to handle. As we've learned in class, the illustration needs to serve a purpose. It can't just be an image that take up space. The readings mentions how a visualization is an argument and its purpose is insight. There were so many details I had to consider when producing this illustration. I can't draw and even though when using the pen tool I'm technically tracing over an image, it still required a lot of attention to detail. From the readings, we learn that good data visualization has to also be beautiful on top of making sure the reader understands the meaning of the data. Using encodings such as color hue was very important for this graph. The different colors bring to life this illustration. Without even reading the text of the working conditions children face on the mine sites, one can tell from the illustration how atrocious it might be. To be able to convey that hardship to the readers with just the illustration before actually reading the text.

### The conditions and impact of children working in the mines

The U.S Department of Labor reported that in 2023, at least 25,000 children were working in cobalt mines in the DRC. The working conditions for children working at mining sites are atrocious.



Children as young as 6 work in the mines earning less than \$2 per day. They lack the most basic protective equipment such as gloves, work clothes, or facemasks. They also use their own tools which are primarily their hands.

These child laborers dig between 200 to 300 meters. Due to chronic exposure to cobalt dust and the sun, they are at constant risk of health issues such as asphyxiation and other respiratory issues, lung disease, or dermatitis. Other risks include rockslide and accidental deaths.

Cobalt is an essential raw mineral used by large tech companies for rechargeable lithium-ion batteries, electronic devices, and electric cars.

In the mine sites, children are given the same status as adult. They work long hours between 10 to 12 hours per day with little to no breaks.

Child labour has significantly impacted the education of these children. Their attendance and learning outcomes have declined

tremendously especially since children who attend school are still expected to work the same hours as those who don't.

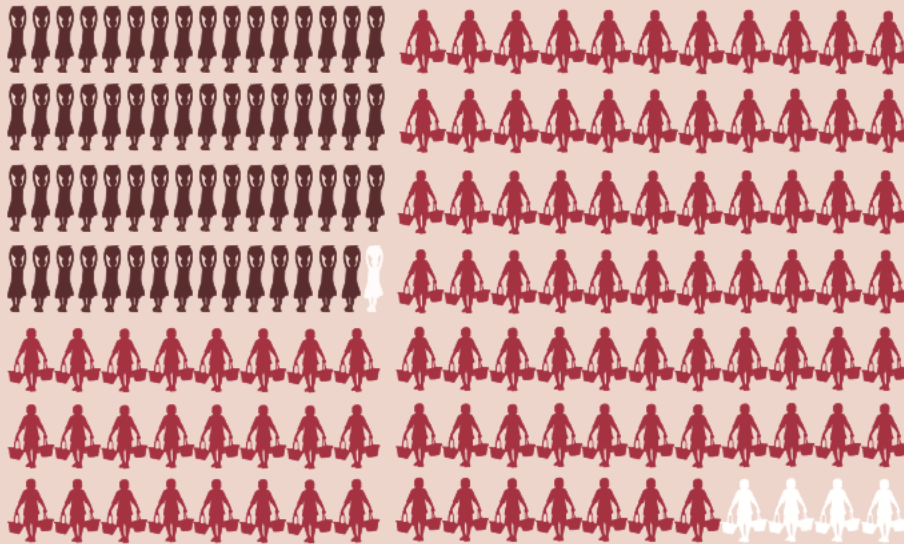


Source: Amnesty International & Humanion Reports

My sixth graph is also an illustration I made to portray the latest global estimates of how child labour has risen to 160 million with 63 million being girls and 97 million being boys. I created an silhouette of a girl and a boy working to represent child labour, then I made 63 silhouette of the girl and 97 of the boy to represent the total 160 million children around the world in child labour. The silhouette in white just fill the page to make the illustration look more complete without unnecessary spacing. I also used the different colors to differentiate between the genders.

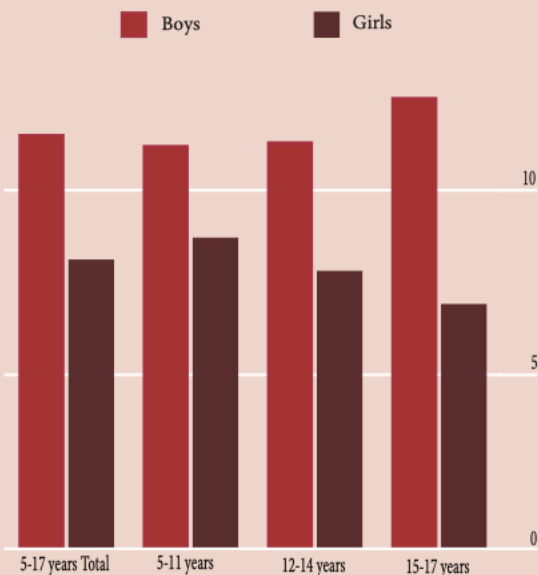
### Global trends

According to UNICEF, the latest global estimates indicate that the number of children in child labour has risen to 160 million worldwide (63 million girls and 97 million boys). This is an increase of 8.4 million children in the last four years.

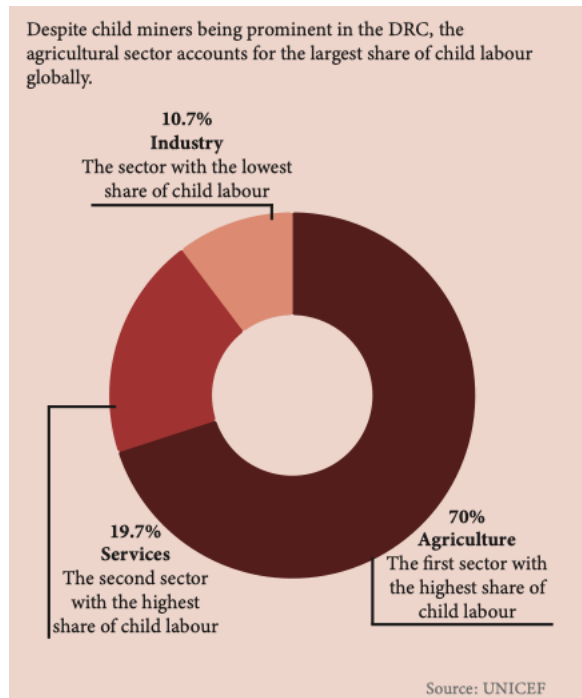


My seven graph is a bar/column graph that compares which gender between boys and girls aged 5 to 17 years old are more prevalent in child labor. The encodings of length to show which has the higher percentage and color hue to differentiate between the genders was crucial for this graph. Also, making sure to include a legend which shows which color represents what gender is important. The readings explain how important it is for data visualization to incorporate clear text explanation.

Child labour is more prevalent among boys than girls at every age. But depending on the sector, girls can outnumber boys in certain industries. Percentage of children aged 5 to 17 years in child labour.



My last graph is a pie chart. I used a pie chart because the data represented in this graph, which shows which sector globally accounts for child labour amount to 100 percent. Pie chart are typically used to show percentage or numerical proportion so I knew this would be the right fit for this data.



## Reflection

### 1. Be realistic:

- One of the biggest lessons I have learned during this project is learning how to be more realistic with my expectations and skills. I had plenty of ideas of different illustrations I wanted to do but I'm also still learning so much. I restarted so many different illustrations because I didn't like how it turned out and I had to remind myself that I'm still learning to be more comfortable with the pen tool. It's great to think big, but there are deadlines to the project, so it is important to manage expectations to avoid falling behind.

### 2. Embrace change:

- The idea I had at the start of the project is not what I ended up with especially in terms of my illustration. I am pretty pleased with how the project turned out now but it's been a journey as seen from my drafts. I wanted a huge illustration that would represent children working in the mines in order to further discuss the state and conditions they work in. I was so caught up in trying to make the image I had in my mind come to fruition that I was unable to present a concrete illustration in my draft

submission. Even though I'm happy with my final version, that's something I could have benefitted more feedback on.