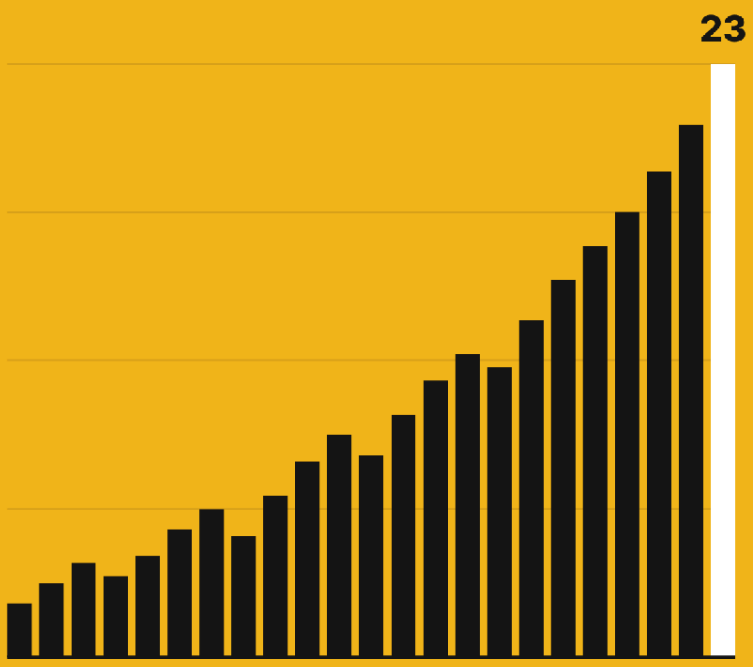
23 Lessons at 23

Breaking into Data from Africa



ELVIS KWABENA ASARE NKRUMAH

Breaking into Data from Africa

23 Lessons at 23

A practical, story-driven guide for young Africans who want a career in data

By Elvis Kwabena Asare Nkrumah

Free ebook. Launch edition, 22 November 2026.

What Early Readers Say

> *"Breaking into Data from Africa is a warm, practical guide that treats a beginner's real constraints, such as limited access to mentors, as part of the plan rather than an afterthought. Each lesson ends with something the reader can do that same day, which is what separates it from most career advice. For anyone starting in data, especially in Africa, it is a useful and encouraging first map."*

Mr. Wonder Bediako, Data Science Lecturer, SIIMT University College, Accra

> *"As a student in AI and Big Data, I know how valuable it is to have guidance when trying to find your way into the data field. What I appreciate about Breaking into Data from Africa is how it combines real-life experiences with practical advice, making the journey feel more accessible for young Africans who want to get started in data. I believe this book can be a valuable resource for anyone looking for direction, encouragement, and practical steps to build their own path in this field."*

Cynthia Djuikem, Master's Student in Artificial Intelligence and Big Data, Cheikh Anta Diop University (UCAD), Senegal

> *"As someone working across AI, software engineering, and data analytics in Africa, I know how rare it is to find a resource that truly reflects our local reality. What I appreciate most about Breaking into Data from Africa is its authenticity and clear structure, every lesson builds naturally and ends with actionable steps like 'try this today'. By vividly capturing real experiences, from navigating data bundles and power cuts to overcoming geographical barriers, this book paints an honest picture and serves as an engaging, practical guide for anyone looking to build a career in data from Africa."*

Godfred Awudi, Data Analyst and Software Engineer

Dedication

For every young African who opens a laptop with more questions than answers, and keeps going anyway.

For the mentors who replied to the message.

And for anyone hoping to begin their journey in data from Africa: this book is for you.

Disclaimer

This book shares my personal experience and opinions. It is written to inform and encourage you, and it is not a substitute for professional advice.

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- **Links and AI tools.** I am not responsible for the content of external websites, and links may change or break. If you use AI tools while learning, as discussed in Lesson 23, check their answers and never share private data with them.

How to Use This Book

This book is short on purpose. You can read it in a weekend, but it is built to be used over a few months.

There are 23 lessons. Each one teaches a single idea. Every lesson follows the same simple shape, so you always know where you are:

- **A story** to open, taken from my journey or from someone I know.
- **The lesson**, written as one bold sentence you can remember.
- **Why it matters, especially from Africa**, because our road has its own potholes and its own shortcuts.
- **A framework**, a named idea you can carry in your head.
- **Evidence or an example**, so you can see it work.
- **Try this today**, one action that takes less than 30 minutes.
- **A recap** of three points.

You can read the book in order, since the parts follow the natural arc of a data career: begin with purpose, build skills, prove what you can do, get noticed and hired, then stay in the game. You can also jump to the lesson you need this week. If you are stuck on interviews, go to Lesson 18. If you keep quitting courses, start with Lesson 5. At the back of the book you will also find an Opportunities Directory, a Resource List, and a Sources section, all with clickable links in the digital versions.

One request: do not just read. Do the “Try this today” action at the end of each lesson. A book like this works only if something changes in your week.

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Introduction: Why I Wrote This at 23

I did not start with data analytics. I started with an interest in data engineering.

In my early days as an undergraduate, the thing that pulled me in was pipelines: how raw, messy information moves from one place to another and arrives clean enough for someone to use. I liked the idea of building the plumbing. Then, in my second and third year, my coursework in computer science and statistics and the opportunities around me pushed me toward data analytics. I learned to ask questions of data and to tell stories with dashboards. By my fourth year, I had moved into data science, and today I am going deeper into AI and more into AI for health and climate with another interest in Neuro-AI.

If that sounds like a straight line, it was not. It felt like a series of small turns, each one made because I was curious, or because my workload demanded it, or because a person I trusted pointed at a door and said, “Try that one.”

Along the way, something unexpected happened. I became a community person.

In 2024, I was the only Tableau Ambassador from Ghana. I became a co-organizer for a Google Developer Group on campus at the University of Ghana. In 2025, I became a Zindi Ambassador. This year, I am a Tableau Ambassador again. Between those titles, I have spoken at tech events, organized workshops, and won hackathons. I have sat in interview rooms for over twenty data opportunities, including graduate school interviews, and I have heard “no” far more often than “yes.”

None of that came from being the smartest person in the room. Most of it came from a handful of decisions, repeated over time. This book is those decisions.

What I Wish Someone Had Told Me

When I started, nobody gave me a map. I found pieces of one in YouTube videos, in LinkedIn posts, in conversations after conferences, and in the kind

replies of people who did not owe me their time. I wasted months on things that did not matter and ignored things that did.

I wish someone had told me:

- You do not need to learn everything. You need to learn the next right thing.
- Certificates open conversations, but projects win them.
- The people around you will shape your career more than the tools you learn.
- Rejection is not a verdict. It is data.
- Being from Africa is not a disadvantage to apologize for. It is a perspective the world needs in its datasets.

Why 23 Lessons

I wrote these lessons around my 23rd birthday. That is not a coincidence. I wanted to capture what I have learned while the memories are fresh, while I still remember how confusing it felt at the start, and while I am still close enough to the beginning to remember what a beginner needs. I am also writing to give back for all what people have done for me in my data journey.

I am not writing as an old expert looking back. I am writing as a fellow traveler who is a few steps ahead, turning around to say: the path is real, here is where it gets muddy, and here is where I found water.

A note on transparency.

I am a Tableau Ambassador and a Zindi Ambassador, and I co-organize a Google Developer Group on campus. These communities shaped my journey, which is why they appear often in this book. No one paid me to mention them.

What You Will Gain

By the end of this book, you will be able to:

- Decide which data career to pursue first, and stop feeling guilty about not learning everything.

- Learn on a budget, with a plan that fits your time, your laptop, and your data bundle.
- Build projects that prove your skill, using problems and datasets that matter to our continent.
- Share your work so that opportunities find you.
- Build a network, find mentors, and prepare for interviews.
- Compare local, remote, and global roles with open eyes.
- Keep going when imposter syndrome whispers that you do not belong.

Each lesson is short on purpose. The goal is not to impress you. The goal is to move you.

Let us begin.

> ***Try this today:*** *Open a note on your phone and write one sentence that finishes this thought: "I want a career in data because…" Keep it. You will use it in Lesson 1.*

PART 1

Begin with Purpose

Before the tools, before the courses, before the laptop upgrade, there is a quieter question: why are you doing this, and what path will you take? These five lessons help you start with a clear head and a plan you can actually keep.

Lesson 1: Look Beyond the Numbers, Salaries, and First Test

Around 2022, ALX Africa opened its data analytics, data science, software engineering and cloud computing courses for free to learners. The response was huge. Group chats filled up in days. People posted their enrolment screenshots with fire emojis. Everyone was going to become a data analyst, data scientist, software engineer or the like and everyone was going to do it fast.

For the data analytics course, the content started to get real. SQL joins. Spreadsheet formulas that refused to behave. Statistics that moved beyond the mean and mode and median people knew. Week by week, the groups got quieter and the numbers that visited the hubs reduced. The same few names kept submitting work, and the rest slowly disappeared.

I watched this happen, and I do not judge anyone who left. The desire was real. They truly wanted the career. But desire is only the starting gun. What was missing was the unglamorous, daily work and effort.

> **THE LESSON: Fall in love with the work, not the salary headline, because excitement gets you to the starting line and only effort gets you through the first test.**

Why It Matters, Especially from Africa

If you are reading this from Accra, Lagos, Nairobi, or Kigali, you have probably seen the posts. “I switched to data and now earn $5,000 a month remotely.” Those stories can be true. They can also be selective, because nobody posts about the six months of confusion before the first offer.

For us, the pull of big numbers is stronger. Exchange rates make dollar salaries feel life changing. Family expectations can be heavy. Data bundles are expensive and power cuts are real, so we want our effort to pay off

quickly. All of this makes it easy to chase the headline and quit when the first hard topic arrives.

Online courses are known for low completion rates. One widely cited study of 221 online courses found a median completion rate of 12.6 percent (Jordan, 2015). In the group chats I watched, the numbers dropped week by week. The ones who finish are rarely the most gifted. They are the ones who kept showing up on the boring days.

There is also something I want to say with love, and a little bit of jollof rivalry. I have noticed that many of my Nigerian peers do something powerful: teach them one thing and they are building a whole product with it. They do not wait to feel ready. They learn a small piece, use it immediately, and build. That energy is worth copying. Learning something and using it on the same day is the fastest way to make it stick.

The Framework: The Three Dips

Every learner meets the same three dips. If you know them in advance, they stop feeling personal.

1. The Boredom Dip (week 2 to 4). The excitement fades. The tutorials feel repetitive. You are not yet good enough to enjoy it.

The fix: shrink the task. Aim for 20 focused minutes, not a perfect study session.

2. The Confusion Dip (the first hard topic). This is the "first test" in the title of this lesson. For most people it arrives with SQL joins, pivot tables, or their first statistics concept. You feel stupid. You are not. You are just at the edge of what you know.

The fix: go back one step, find a second explanation in a different format (video, article, or a friend), and try again the next day.

3. The Comparison Dip (any time). You see someone your age with a bigger title, a cleaner portfolio, or an offer letter.

The fix: mute the noise and compare yourself to who you were last month. We will go deeper on this in Lesson 20.

Notice that none of these dips are about intelligence. They are about energy, clarity, and attention. Those can all be managed.

Evidence and Example

Look at any large free course and you will see the shape clearly: a wave of sign-ups, a steep drop in the first month, then a small, steady group that carries on. Those who carry on do not have special powers. They usually have three things in common:

- They had a reason that was bigger than a salary.
- They worked in small, regular sessions rather than rare marathons.
- They had at least one other person who knew they were learning, and who would ask, “Did you do your lesson today?”

A salary is a result. It cannot be the reason you get up on a Tuesday to study after a long day. Your reason has to be something you can feel, like solving a problem in your community, building a career that supports your family, or proving to yourself that you can finish hard things.

Try This Today

You wrote a sentence at the end of the Introduction: “I want a career in data because…” Take it out now. Read it. Is the reason bigger than money? If not, ask yourself “and why does that matter?” until you reach something that makes your chest tighten a little. Write that final version on a sticky note and put it where you study.

Then set a 20-minute timer and complete one beginner SQL or Excel exercise. Just one. The goal today is not to learn a lot. The goal is to prove you can start.

Lesson Recap

- Desire starts the journey, but daily effort finishes it.
- Expect three dips (boredom, confusion, comparison) and plan for each one.
- Choose a reason that is bigger than a salary, and write it down.

Lesson 2: Create a Path and Choose a Lane That Work for You

Two of the most inspiring people I know in data started in very different places.

Eric Ayitey is a friend of mine and one of the best data educators in Ghana. His bachelor's degree was in biochemistry. He did not study computer science. He did not start with code. Today, he is a senior data scientist and QA engineer. His story proves that you can walk into data through the door of the field you already know.

Then there is Vincent from Ishango AI. His bachelor's degree is in statistics, which gave him a strong technical foundation. Today he works in data engineering, building the systems that move and store data at scale. Where Eric entered through a domain, Vincent entered through a technical skill and kept climbing deeper into the machinery.

Two people. Two starting points. Same destination: a thriving data career.

> **The lesson: There is no single "correct" entry into data, so start from who you already are, then choose a lane so your learning has a direction instead of a pile of random skills.**

Why It Matters, Especially from Africa

Many young Africans think they are disqualified before they begin. "I did not study computer science." "I studied agriculture." "I studied nursing." "I am an accountant." Or the reverse: "I studied computer science, but my school never taught me anything practical."

Both groups carry a quiet fear that they are on the wrong road. They are not. Africa's biggest data problems sit inside health, agriculture, finance, energy, education, and public services. People who understand those fields from the inside are exactly who the industry needs. At the same time, people with

strong technical foundations are needed to build the systems that make the data usable at all.

Whatever you studied, there is a route that fits.

But a route is not the same as a direction.

A beginner who says “I can do everything” sounds like every other beginner. A beginner who says “I use SQL and Power BI to analyze retail data” or “I analyze agricultural data with Python” sounds like someone with a direction.

This matters even more in our markets, where many organizations are small, and the best hires are people who can quickly solve a specific problem. A clear lane makes you easy to recommend. When someone in your network hears of an opening, they should be able to complete this sentence about you: “You should talk to _____, they do _____.”

So this lesson has two steps. First, choose how you enter data: your door. Then choose what you want to be known for: your lane.

The Framework: The Three Doors

Think of data as one large house with three doors.

The Domain Door. You enter through knowledge of a field, such as biochemistry, banking, public health, farming, or marketing. You then add data skills like Excel, SQL, visualization, and basic statistics. Your advantage is that you understand the problem, the context, and the people. You will often ask better questions than someone who knows only tools.

The Technical Door. You enter through a technical skill, such as statistics, mathematics, computer science, or engineering. You then add depth in data systems, cloud, pipelines, or modeling. Your advantage is that you can build and scale things, and you are comfortable with the formal methods behind the numbers. If you start here, internships and projects can help you build the domain knowledge you are missing.

Eric walked in through the Domain Door and kept stacking technical skill until he became a senior data scientist. Vincent walked in through the Technical Door and moved toward engineering.

There is also a quiet third entry for working professionals who do not want to start over. Call it **the Side Door**. You stay in your current job and bring data into it: automate a report, build a dashboard for your team, clean a messy spreadsheet. Your workplace becomes your first portfolio, and your first data role can be an internal move.

Evidence and Example

Here is how the Three Doors can look for different backgrounds:

Your background	Likely door	A strong first move
Biochemistry, biology, public health	Domain	Learn SQL and statistics; work with health or lab datasets
Agriculture, environmental science	Domain	Analyze crop, weather, or price data; learn visualization
Accounting, finance, economics	Domain	Master Excel and SQL; build finance and risk dashboards
Statistics, mathematics	Technical	Add Python, SQL, and cloud basics; try data engineering or science
Computer science, IT	Technical	Add statistics and a domain interest; build end-to-end projects
Marketing, business, social science	Domain	Learn analytics and dashboards; study customer data
Working in any field, and want to stay	Side	Bring data into your current job: automate a report or build a team dashboard

This table is a starting point, not a rule. Plenty of statisticians become analysts and plenty of biologists become engineers. The point is simply that your background is an asset. Do not hide it.

I also want to be honest about something. The path you pick is not a life sentence. My own journey moved from data engineering interest to analytics to data science. You can change direction, and the skills you pick up on the way will not be wasted.

Next, Choose Your Lane

A door gets you into the house. A lane tells people what you do once you are inside. Your door and your lane do not have to match: someone who walks in through the Domain Door can still choose the Tool Lane.

During one of my virtual Zindi events I organized, I hosted Cecilia Gichohi, a data and analytics expert at Bosch. The audience was full of learners who all had the same hidden question: "Where do I put my energy?"

Cecilia laid out two ways people grow in data. Some people become strong in a particular tool or technology. Others become strong in a particular domain, an industry or field. She spoke to the tool-focused learners in the room and explained how to choose tools wisely and how to leverage them. Then she showed practical ways, through internships and projects, that anyone can build domain knowledge.

I left the session thinking that most of us are quietly picking one of these paths without knowing it.

The Tool Lane. You become known for deep skill in a set of tools, such as Power BI, Tableau, SQL, Python, a cloud platform, or machine learning libraries.

Best for: people who love building, who want flexibility across industries, or who enjoy mastering technical craft.

The Domain Lane. You become known for understanding a field, such as health, agriculture, fintech, education, or supply chain, and you use data to solve its problems.

Best for: people with a background or passion in a field, who enjoy understanding why the numbers matter.

The T. Over time, the strongest people have both. They have broad basics across data (the top of the T) and deep strength in one lane (the stem). Start in one lane, then add the other as you grow. Eric started in a domain and added tools. Vincent started with technical skill and moved deeper into the engineering stack.

Look at the people you admire in the data community. You will often notice that they can be described in one line: “the health data person,” “the Power BI person,” “the data engineering person,” “the fintech analytics person.” That clarity did not come from knowing everything. It came from choosing a lane and getting known for it.

How to Choose Your Lane

Ask yourself three questions:

1. **Which do I love talking about more: a field, or a tool?** Notice what you read for fun.
2. **What access do I have?** Do you have a degree, a workplace, or a community connected to a domain? Or do you have a mentor or course that pushes you toward a tool stack?
3. **What does my market need?** Look at job ads near you. Which tools and industries appear again and again?

If you are torn, choose the lane that gives you the fastest first project.

Building the Missing Lane

If you are in the Tool Lane and need domain knowledge, follow the practical routes Cecilia pointed to:

- **Internships and volunteering.** Even a short placement in a bank, a hospital, a logistics company, or an NGO will teach you how data lives in that world.
- **Domain projects.** Pick a dataset from one field and treat it as a client brief. Learn the vocabulary. Read two or three industry reports. Interview someone who works there.
- **Community.** Join groups where practitioners from a field gather, and listen to their problems.

If you are in the Domain Lane and need tools, pick one tool that fits your field and use it on real problems. A health worker can learn SQL and dashboards. A teacher can learn Excel and statistics. An agriculture graduate can learn Python for crop and weather data.

Try This Today

Take 15 minutes and do an **Asset Audit**. On a piece of paper, make three columns:

- **What I know** (my degree, my work, my hobbies, the problems I understand well)
- **What I can do** (skills I already have, even small ones like Excel, writing, or math)
- **Who I know** (people who work with data or in a field I care about)

Circle the one item in each column you are proudest of. Your path starts at the intersection of those three circles.

Then, in 10 minutes, complete this sentence and write three versions:

"I want to be known for using _____ (tools) to solve _____ (type of problem) in _____ (field)."

Pick the version that excites you most. Then search for one project idea that fits it and bookmark it. You will use it in Lesson 8.

Lesson Recap

- You can enter data through a domain you know, a technical skill you have, or the job you already do.
- Your background is an advantage. Name it and use it.
- Choose a lane so your learning has direction. Your first path is not permanent, and strong careers grow into a T.

Lesson 3: Choose One Data Career First: Analyst, Engineer, or Scientist

At almost every workshop I run, someone eventually puts up their hand and says, “I want to learn everything. Data analysis, data science, machine learning, data engineering. All of it.”

I understand the feeling. They have watched six different YouTube roadmaps, bought a couple of courses, and installed every tool in sight. They are learning everything and finishing nothing.

If that sounds like you, take a breath. I did a version of this too.

> **The lesson: Choose one data career to pursue first, because depth in one role beats shallow knowledge of all of them.**

Why It Matters, Especially from Africa

When your time, data bundle, and energy are limited, focus is not a nice-to-have. It is survival. If you try to learn Python, Spark, Tableau, deep learning, Power BI, Kubernetes, and R in the same six months, you will end up with a long list of half-started courses and nothing you can show.

Choosing one role does not trap you. It gives you a launch pad. Most skills overlap between roles, so what you learn for one will carry over to the others. You are not saying “never.” You are saying “first.”

The Framework: The Delivery Startup Test

Let me explain the major data roles with one story.

Take a food delivery startup like Night Market App in Accra. Customers order through an app, pay with mobile money, and riders deliver the food. Thousands of orders flow in every week.

The Data Engineer builds the pipes and the warehouse. Orders, payments, rider locations, and customer ratings are all created in different systems. The engineer builds the pipelines that collect this data, clean it, and store it in one reliable place. If the pipes break, nobody downstream can work.

Think: *plumber and architect of the data house.*

The Data Analyst answers questions about what happened. The owner asks, "Why are Friday orders from East Legon dropping?" The analyst digs into the data, builds a dashboard, and explains what is going on and what to do about it.

Think: *detective and storyteller.*

The Data Scientist predicts what will happen next. "How many orders will we get next weekend? Which customers are about to stop ordering? What is the best price for a delivery?" The scientist builds models to forecast and recommend.

Think: *forecaster and experimenter.*

There are also neighbors in this family, such as the **BI Developer** (builds and maintains dashboards), the **Analytics Engineer** (shapes clean, analysis-ready data), and the **Machine Learning Engineer** (puts models into real products). You can learn about them later.

Same Job, Different Names (Especially in Africa)

Here is something nobody warns you about. Job titles in Africa can be confusing. Companies are often small, so one person may wear several hats, and the same work can be called different things. When you search for jobs, watch for titles like these:

If you want…	Look for titles like…
Data analysis	Data Analyst, Business Analyst, Reporting Analyst, Insights Analyst, Product Analyst, Research Analyst, Credit or Risk Analyst, MEL (Monitoring, Evaluation and Learning) Officer, Data Officer

If you want…	Look for titles like…
Data engineering	Data Engineer, Database Administrator, ETL Developer, Data Platform Engineer, Analytics Engineer
Data science	Data Scientist, Machine Learning Engineer, Statistician, Quantitative Analyst, AI Engineer

Banks, telecoms, fintechs, NGOs, hospitals, and government agencies often hire data people under titles that never say "data." If the job description talks about reports, dashboards, SQL, forecasting, or surveys, you may be looking at a data role in disguise.

A Quick Exercise: What Fits You?

Read each pair and choose the one that sounds more like you. Be honest, not ambitious.

1. I enjoy **(A)** finding the story behind a chart, or **(B)** making a system run smoothly, or **(C)** figuring out how to predict something?
2. When something is broken, I **(A)** investigate what changed, **(B)** fix the process behind it, or **(C)** wonder if a pattern could have warned us?
3. I would rather spend a day **(A)** presenting findings to a team, **(B)** building and testing something technical, or **(C)** experimenting with ideas and models?
4. My favorite school subject felt like **(A)** economics, business, or social science, **(B)** computer science or engineering, or **(C)** mathematics or statistics?
5. I get most energy from **(A)** helping people make decisions, **(B)** making things reliable and fast, or **(C)** discovering something new?

Count your letters. Mostly A's point toward **analyst**. Mostly B's point toward **engineer**. Mostly C's point toward **scientist**. A tie is fine. Pick the one you would be willing to be bad at for three months.

Try This Today

Choose your **first** role. Write it at the top of a page: "For the next 90 days, I am learning to become a _____." Underneath, list the three tools you will focus on. Then close every other tab, course, and roadmap that does not serve that line. You can open them again later. Today, you narrow.

Lesson Recap

- The analyst explains what happened, the engineer builds the pipes, and the scientist predicts what comes next.
- African job titles are inconsistent, so read job descriptions, not just titles.
- Choose one role for the next 90 days. Focus is a strategy, not a limitation.

Lesson 4: Learn on a Budget: Data Costs, Laptops, and Free Resources

The first question many beginners ask me is some version of: "Do I need to get a MacBook for data science?" The second is about data bundles. The third is about whether they should pay for a course.

All three are fair questions. They are also the questions that quietly stop people before they begin. Waiting for the perfect machine, the perfect course, and the perfect internet connection is one of the most expensive habits a learner can have. You do not need the best equipment to learn data. You need to know where the free doors are.

> **THE LESSON: Learn on a budget by picking one free or low-cost path that fits your time and data bundle, then build projects, because tools and certificates mean little without proof you can use them.**

Why It Matters, Especially from Africa

Learning costs more for us than the course price suggests. Add data bundles, electricity, laptop repairs, and the cost of lost working hours. The good news is that the best resources in data are astonishingly cheap or free, and many of them are designed to work on modest machines.

Your laptop. A laptop with 8GB of RAM can handle analytics learning, SQL, and light Python. 16GB is more comfortable. If your machine is slow, use **Google Colab** or **Kaggle Notebooks**, which run Python in the cloud for free. Your laptop only needs to run a browser.

Your data bundle. Download videos when you are on affordable Wi-Fi or during cheap night bundles, so you can learn offline. Many platforms have mobile apps with download options. Use the transcripts of lectures to review without streaming.

Your power supply. Charge everything when you can. Keep an offline task list for when the lights go off: reading notes, solving problems on paper, or sketching a dashboard layout.

Free learning spaces. Universities, libraries, and tech hubs often have Wi-Fi and power. Many hubs run free study sessions.

The Framework: Two Learning Paths

There are two big ways to learn data, and neither is better in every case.

Path A: Self-Guided Learning. You use platforms like Coursera, DataCamp, freeCodeCamp, Kaggle Learn, Microsoft Learn, and YouTube. You set your own schedule and pace.

- *Advantages:* cheap or free; flexible; wide choice; you can start tonight.
- *Disadvantages:* no one checks on you; easy to quit; you can fall into "tutorial hell" where you watch but never build; it is hard to know what to learn next.

Path B: Guided or Structured Programs. You join a cohort-based or personalized training program. Examples include ALX data programs and training hubs in Ghana such as Blossom Academy, Generation Ghana, Only Quality Data, Festman Hub, and Azubi Africa. There are others, so ask around in your local community. For a longer list of free and funded programmes, see the Opportunities Directory at the end of the book.

- *Advantages:* structure and deadlines; mentors and feedback; a peer group; sometimes career support.
- *Disadvantages:* can cost money, although some funders offer scholarships to learners; they may require a fixed time commitment; the pace may not match yours; everyone in the cohort often builds the same projects (we will fix that in Lesson 11).

Choose using your availability.

- *If you are a student or have lots of free time:* start self-guided for four weeks to test your interest, then consider a structured program if you need accountability.

- *If you are a working professional with limited time:* a structured program may save you time, because the roadmap is done for you. Or use a self-guided path with a fixed weekly schedule, like two evenings and one Saturday morning.
- *If you cannot afford a program:* combine free courses with a study buddy, so you copy the benefits of a cohort.

Whichever path you choose, the engine is the same: project-based learning. After every module, build something small with it. A mini-analysis of your own spending. A dashboard of football results. A cleaned dataset of local market prices. Projects turn knowledge into skill.

Certifications: What Is Recognised?

Certificates will not replace projects, but they can help you pass a screening filter and give you structure. Some widely recognised ones include:

- **Analytics:** Google Data Analytics Professional Certificate, IBM Data Analyst, Microsoft Power BI Data Analyst (PL-300), Tableau Desktop Specialist or Certified Data Analyst.
- **Engineering:** AWS Certified Data Engineer Associate, Google Cloud Professional Data Engineer, Databricks Data Engineer Associate, and Microsoft Fabric data engineering certifications.
- **Data science and AI:** IBM Data Science, university-backed machine learning specializations, and cloud machine learning certifications.

Certificates and exam details change, so check the official provider page before you pay. Coursera offers **financial aid** on many courses, and some vendors run student or event discounts, so ask before you spend.

Try This Today

Do a 20-minute **Learning Budget Check**.

1. Write down how many hours you can truly give each week.
2. Pick Path A or Path B based on the guide above.

3. Choose one free course to begin: Google Data Analytics on Coursera (apply for financial aid), Kaggle Learn "Intro to SQL," or a beginner Excel course.
4. Name one tiny project you will build from it.

Then open the first lesson and complete it.

Lesson Recap

- You do not need a powerful laptop or big money. Use free cloud tools and plan around data and power.
- Self-guided and structured programs both work. Choose based on your time, money, and need for accountability.
- Certificates help, but projects prove. Learn by building.

Lesson 5: Take One Step at a Time: Consistency Is Key

Since 2022, Emmanuel Dodoo has been one of my biggest inspirations in tech. He was a classmate from senior high school, a close friend, and a curious learner who wanted to be a software engineer as early as his first year of undergraduate studies. He did not have a fancy plan. He picked a course, Dr. Angela Yu's web development course on Udemy, and made a deal with himself: one video or topic per day. Not five. One.

Some days he was tired. Some days he did not feel like it. Some days life got in the way. But he kept going, built projects as he learned, and slowly the small days added up. He went from a few internships in his second year to remote software engineering roles by the second semester of that same year. Today he is a full-stack developer, and he is doing very well. He has worked with several companies and startups on projects, built systems for schools, hospitals and some fintechs.

When I asked him about his secret, he did not mention talent or a special trick. He talked about a rule that changed my own habits.

> **The lesson: Consistency is not never missing a day. It is never missing the day after.**

Why It Matters, Especially from Africa

Our lives are interrupted by things that learners in other places rarely face: power cuts, network downtime, family responsibilities, exams, transport struggles, and sudden costs. A perfect streak is unrealistic. If you believe that consistency means "never miss," the first interruption will make you feel like a failure, and the guilt will push you to quit.

A better definition of consistency is one that leaves room for real life. It is a rule you can keep when things get messy.

The Framework: The Day After Rule

Here it is:

Miss a day if you must. Never miss the day after.

One missed day is an accident. Two in a row is the beginning of a new habit, and it is not the one you want. The rule works because it gives you permission to be human while still protecting your momentum.

Pair it with two smaller tools:

The Minimum Day. Decide in advance what "counts" on a bad day. Maybe it is five minutes, one practice question, or reading a single page of notes. On a Minimum Day, you do the smallest version and move on. You still showed up.

The Visible Streak. Put a calendar on your wall, or use a simple tracker on your phone, and mark an X every day you did something. Do not aim for a perfect chain. Aim to avoid two empty boxes in a row.

Together, these make a system. The Day After Rule keeps you from spiraling. The Minimum Day makes it possible. The Visible Streak makes your progress real.

Evidence and Example

Emmanuel's story is the Day After Rule in action. One topic a day does not sound impressive. But in a month, it is thirty topics. In a year, it is hundreds of topics and dozens of small projects. His progress did not come from heroic weekends. It came from a quiet daily habit that he protected.

There is solid thinking behind this. Many people find that small, repeatable actions beat occasional bursts of effort, because small actions are easy to start and hard to argue with. When a task takes five minutes, your brain has no excuse to negotiate. And once you start, you often keep going.

I use this myself when school gets heavy and my energy is low. Even then, I try to do a short data task most days: a SQL question, a chart, a paragraph of notes. It is never impressive. But my skills stay warm, and I can return to full speed quickly when the busy season ends.

Compare this with the typical bootcamp rush: a six-hour Saturday session, followed by a week of nothing. The knowledge fades, and each return feels like starting over.

A Gentle Warning

Consistency does not mean working without rest. Rest days are part of the plan. Decide your rest days in advance, so they are choices rather than slips. The Day After Rule applies to the days you have chosen to work.

Try This Today

Set up your system in 10 minutes:

1. **Choose your daily action.** Make it small enough that you could do it on your worst day. (Example: one lesson, one query, or one chart.)
2. **Define your Minimum Day.** Write it on a sticky note: "On a bad day, I will at least _____."
3. **Pick your tracker.** A paper calendar is perfect.
4. **Tell one person.** Send a message to a friend: "I am doing one data task a day. Ask me about it on Friday."

Then do today's task and mark your first X.

Lesson Recap

- Real-life consistency means never missing twice in a row.
- Define a Minimum Day so a bad day still counts.
- Small daily steps compound faster than occasional marathons.

PART 2

Build Skills, Not Just Credentials

A certificate says you attended. A skill says you can do. These four lessons are about becoming someone who can actually solve problems: the fundamentals, the math nobody brags about, the projects you build, and the habit of keeping a record of it all.

Lesson 6: Master the Fundamentals First

I have lost count of the messages that start the same way. “Hi Elvis, which deep learning course should I take?” or “Please, how do I start machine learning?”

When I ask, “Can you write a SQL query that joins two tables and counts rows by group?” the replies often go quiet.

Nobody is at fault here. Machine learning looks exciting. It is the part of data that gets talked about on stages and in headlines. But it sits on top of a stack of simpler skills, and skipping those skills is like trying to build the second floor of a house before pouring the foundation.

> **The lesson: Master the boring fundamentals first, because every advanced skill in data stands on them.**

Why It Matters, Especially from Africa

Most entry-level data jobs in our markets are not about neural networks. They are about cleaning messy spreadsheets, pulling numbers out of databases, building reports, and explaining what the numbers mean. Banks, telecoms, NGOs, retailers, and startups all need these skills first.

If you spend six months chasing advanced machine learning and then fail a basic SQL test in an interview, the six months did not help you. If you spend those months mastering the fundamentals and building small projects, you become useful quickly, and useful people get hired.

There is also a trap I want to warn you about: **jack of all trades, master of none.** When bundles are expensive and time is short, spreading yourself across ten tools gives you a shallow knowledge of everything. Employers can feel it in the first ten minutes of an interview.

The Framework: The Foundation Ladder

Climb one rung at a time. Do not skip rungs.

Rung 1: Spreadsheets and logic. Learn Excel or Google Sheets properly: formulas, lookups, pivot tables, charts, and data cleaning. It also teaches you to think in rows, columns, and conditions.

Rung 2: SQL. This is the language of data. Learn to select, filter, group, join, and aggregate. Then learn window functions. If you can write good SQL, you can survive in most data jobs.

Rung 3: Visualization and reporting. Learn one tool well, such as Tableau, Power BI, or Looker Studio. Practise building a dashboard that answers a clear question. I know Tableau best, but Power BI is the tool many local employers ask for. Check three job ads for the role you want, and learn the tool they name.

Rung 4: Basic programming for data. Start with Python or R, one at a time.

- *Python:* start with pandas for tables, NumPy for numbers, and Matplotlib or Seaborn for charts.
- *R:* start with the tidyverse, especially dplyr for data wrangling and ggplot2 for charts.

Rung 5: Your specialization. Only now do you go deeper: machine learning for the scientist, pipelines and cloud for the engineer, advanced analytics and storytelling for the analyst.

The Same Rule for Every Path

The ladder bends a little depending on the role you chose in Lesson 3, but the principle is the same: learn the basics of your path first.

If you chose…	Your fundamentals first	Then go deeper into…
Data analyst	Excel, SQL, one BI tool, basic statistics	Python or R for analysis, advanced dashboards

If you chose…	Your fundamentals first	Then go deeper into…
Data engineer	SQL, Python, Linux command line, Git	Pipelines, orchestration, cloud, data modeling
Data scientist	Statistics, SQL, Python or R, data cleaning	Machine learning, experimentation, deployment

Notice that SQL appears in all three rows. If you are unsure where to begin, begin there.

Evidence and Example

Do a quick experiment. Open any job board and look at ten entry-level data postings. Count how many mention SQL. Count how many mention Excel. Count how many mention "deep learning." You will quickly see where the demand actually sits.

Another example comes from learners I have talked with. The ones who do well in their first interviews are rarely the ones who know the most tools. They are the ones who can say, "Here is a messy dataset I cleaned, here is the query I wrote, here is the chart I built, and here is what I learned." That is the language of fundamentals.

One Small Rule: One Thing at a Time

When you learn a new skill, learn **one tool and one concept at a time**. If you are learning SQL, do not also start Python and Power BI this week. Finish a block of SQL practice, then move on. Depth builds confidence, and confidence builds speed.

Try This Today

Do a **Job Ad Scan** in 20 minutes:

1. Find three job ads for the role you chose in Lesson 3.
2. Copy every skill and tool they list into a note.
3. Circle the ones that appear in at least two ads.
4. Rank the circled items by the Foundation Ladder.

The first item on that list is your next study topic. Write it down and begin a tutorial on it today.

Lesson Recap

- Fundamentals like Excel, SQL, and basic Python or R matter more than advanced topics at the start.
- Climb the ladder rung by rung, and learn one tool at a time.
- Use real job ads to decide what to learn next.

Lesson 7: Learn the Skill Nobody Brags About: Statistics and Math

In my Statistical Inference 1 class, my lecturer Dr. Issah Seidu told us about something he had seen at a conference. Someone had built a model with a huge number of predictors. The R-squared was high. The person was proud, and the room was ready to believe it was a great model.

But Dr. Seidu paused on it. A high R-squared by itself does not make a model good. Pile enough predictors into a regression and R-squared will climb, even if many of those predictors are noise. The number looked impressive, but it did not mean the model would work on new data, and it did not explain anything useful.

I never forgot that story. It taught me that the real danger in data is not ignorance of tools. It is believing a number you do not understand.

> **The lesson: Learn to interpret the numbers, because understanding what a metric really means is what turns analysis into business decisions.**

Why It Matters, Especially from Africa

Anyone can run a function and get a result. Tools like pandas, scikit-learn, and AutoML make it easy to produce a model in a few lines. What they cannot do is tell you whether the result is meaningful.

Think about the decisions that data can influence in our context: whether a health clinic should stock a drug, which farmers should get a loan, where a school should be built, or which customers are risky. If the people analyzing the data cannot interpret metrics correctly, bad decisions get a fancy chart as cover.

Statistics and math are not just academic subjects. They are your protection against being impressive and wrong.

The Framework: The Three Questions

For any number, metric, or chart, ask three questions before you trust it:

1. **What does it measure?** (Be precise. Average of what? Accuracy of what?)
2. **What does it hide?** (Outliers, imbalance, missing data, or a bad sample.)
3. **What decision does it change?** (If the answer is "nothing," it may not matter.)

Let me show you how this works with two common examples.

Example 1: R-squared. R-squared measures how much of the variation in your outcome the model explains. What it hides: it never goes down when you add predictors, even useless ones. That is why we also look at **adjusted R-squared**, which penalizes unnecessary predictors, and why we test the model on data it has not seen. If a model has a high R-squared but performs badly on new data, it has memorized rather than learned. This is called **overfitting**.

Example 2: Accuracy. Take the kind of problem OnionGuard works on (Lesson 13): detecting disease in onion plants. Suppose that, in a test set of 1,000 plant images, only 50 show disease. (These are illustrative numbers, not OnionGuard's results.) A lazy model that says "healthy" every time gets 95 percent accuracy. It sounds excellent. But it catches zero diseased plants, which was the whole point. What the number hides is **class imbalance**. This is why we also check **precision** (when the model says "diseased," how often is it right?) and **recall** (of all the truly diseased plants, how many did it catch?).

One idea, two examples, and both teach the same lesson: a metric is only as good as your understanding of it.

Mean, Median, and Mode: Which One Should You Trust?

These three numbers all try to describe the "typical" value in a dataset, but they answer different questions, and choosing the wrong one is one of the easiest ways to mislead people.

- **Mean (the average):** add up all the values and divide by how many there are. It uses every value, which also makes it sensitive to extreme ones.
- **Median:** sort the values and take the middle one (or the average of the two middle ones). Extreme values barely move it.
- **Mode:** the value that appears most often. It is the only one of the three that works for categories, such as the most common payment method.

Here is a small worked example. Six people in a small business earn these monthly salaries, in cedis: 1,500, 1,600, 1,700, 1,800, 1,900, and 20,000 (the owner). The numbers are for illustration.

- **Mean:** (1,500 + 1,600 + 1,700 + 1,800 + 1,900 + 20,000) ÷ 6 = 28,500 ÷ 6 = **GH¢4,750**
- **Median:** the middle two values are 1,700 and 1,800, so (1,700 + 1,800) ÷ 2 = **GH¢1,750**

If a manager says "the average salary here is GH¢4,750," five of the six people actually earn less than half of that. One extreme value pulled the mean up. The median describes the typical worker far better, which is why incomes, house prices, and delivery times are usually reported with the median. This is the second of the Three Questions at work: what does the number hide? The mean hid the owner's salary.

For the mode, imagine a shoe shop that sold these sizes in a day: 40, 41, 41, 42, 42, 42, 43, 44. The mode is **42**, which tells the owner which size to stock most. For categories such as "MoMo, cash, card," the mode is the only one of the three you can compute.

Measure	Use it when	Watch out for
Mean	The data is fairly symmetric, with no extreme values	Outliers pull it up or down
Median	The data is skewed or has outliers (incomes, prices)	It ignores how large the extreme values are
Mode	You have categories, or want the most common value	There may be no mode, or several

In practice, report the mean and the median together. If they are far apart, your data is skewed, and that gap is a finding in itself. In Excel, the formulas are `=AVERAGE()`, `=MEDIAN()`, and `=MODE.SNGL()`.

The Stats Starter Pack

You do not need a PhD. You need a solid grasp of these ideas:

- **Descriptive statistics:** mean, median, mode, variance, standard deviation, and when each one misleads you (see the section above).
- **Distributions:** what normal, skewed, and long-tailed data look like, and why income data rarely looks "normal."
- **Sampling and bias:** who is in your data and who is missing.
- **Correlation versus causation:** two things moving together does not mean one causes the other.
- **Hypothesis testing and p-values:** what "statistically significant" does and does not mean.
- **Confidence intervals:** a range of plausible values, not a single magic number.
- **Regression:** what coefficients mean, what R-squared and adjusted R-squared mean, and when assumptions fail.
- **Train/test splits and overfitting:** how to check that a model works on new data.
- **Classification metrics:** confusion matrix, precision, recall, and F1.

On the math side, aim for comfortable basics in algebra, probability, and a little linear algebra and calculus. The goal is to understand what the code is doing, not to prove theorems.

Evidence and Example

Here is a mini experiment you can try in Python or R. Create a small dataset with an outcome and a few real predictors. Fit a regression and note the R-squared. Now add twenty columns of pure random noise and refit. Watch what happens: R-squared goes up, even though the new columns mean nothing. Then compare adjusted R-squared and test on held-out data. You will feel the lesson instead of only reading it.

This kind of understanding also changes how you speak in interviews. Instead of saying, "My model had 92 percent accuracy," you can say, "Accuracy was 92 percent, but because the classes were imbalanced, I checked recall and found the model was missing too many positive cases, so I adjusted the threshold." That one sentence signals real competence.

Free Places to Learn It

- Khan Academy for statistics and probability basics.
- StatQuest videos on YouTube for clear explanations of regression, p-values, and machine learning ideas.
- Seeing Theory, a visual introduction to probability and statistics.
- Your own university's lecture notes. Ask lecturers, as I did, because many of them love explaining this.

Try This Today

Pick one metric you have used or seen recently (accuracy, R-squared, average, anything). Spend 15 minutes answering the Three Questions about it: what it measures, what it hides, and what decision it changes. Write your answer in three sentences. Then watch one StatQuest video on that metric.

Lesson Recap

- Tools produce numbers. Statistics tells you whether to trust them.
- Ask three questions of every metric: what it measures, what it hides, and what decision it changes.
- Understanding R-squared, overfitting, and class imbalance will separate you from learners who only run code.

Lesson 8: Build Projects Instead of Only Watching Tutorials

I have been through more than twenty data interviews. Applications, internships, programs, fellowships, even graduate school interviews in data science. The questions vary, but one has appeared almost every time:

"Take me through a project you worked on."

Sometimes it comes in the first five minutes. Sometimes it is the whole interview. It never changes. Interviewers do not ask, "Which tutorials did you watch?" They ask what you built, why you built it, and what you learned.

If you cannot answer that question with confidence, you will feel it.

> **The lesson: Build real projects, because tutorials teach you what others did, and projects prove what you can do.**

Why It Matters, Especially from Africa

Many of us do not have the advantage of well-known schools, famous employers, or warm introductions. A project can stand in for all of that. It is proof you can do the work, and it can be shared with anyone, anywhere, for free.

Projects also solve a practical problem: your first job is hard to get because you have no experience, and you cannot get experience without a job. A project is experience you can create on your own.

The Framework: The 5-Part Project Story

Whatever you build, be able to tell it in five parts. This is also the structure of an excellent interview answer.

1. **Problem.** What question or need did this project address? Why does it matter?

2. **Data.** Where did the data come from? How messy was it? What did you do to clean it?
3. **Method.** What tools and techniques did you use, and why did you choose them over the alternatives?
4. **Result.** What did you find or build? Use numbers or a clear before-and-after.
5. **Lesson.** What would you do differently? What did you learn?

Practise saying it in two minutes. If you can, you are ready for "Take me through a project you worked on."

Choosing Projects Based on Your Path

Remember the lane you chose in Lesson 2. Your projects should match it.

If you are in the Domain Lane, build projects within your field.

- *Health:* analyze clinic visit data and find seasonal patterns in malaria or respiratory cases.
- *Agriculture:* analyze rainfall and crop yield data for a region.
- *Finance:* analyze mobile money transaction trends or build a loan risk dashboard.
- *Education:* study exam performance across schools and identify factors that matter.

If you are in the Tool Lane, go deep with your tools.

- *BI:* build an interactive dashboard with filters and a clear story, and publish it.
- *Engineering:* build a pipeline that pulls data from a public API, cleans it, stores it in a database, and runs on a schedule.
- *Data science:* train a prediction model, evaluate it honestly, and explain its limits.
- *Cloud:* deploy a small analytics workflow on a free-tier cloud account.

And by role:

Role	A strong first project
Analyst	A dashboard answering a real business question, with written insights
Engineer	An automated ETL pipeline with documentation and a diagram
Scientist	A predictive model with proper train/test evaluation and an explanation of metrics

What Makes a Good Project

- **It starts with a question,** not a dataset.
- **The data is messy,** and you show how you cleaned it.
- **It ends with a recommendation** that a non-technical person could act on.
- **It is documented:** a README explaining the problem, data source, steps, and results.
- **It is public:** on GitHub, Tableau Public, a blog, or your portfolio site.

Avoid the trap of only using the most popular beginner datasets, like Titanic or Iris, and avoid copying a tutorial line by line. Those projects look the same on every CV. Take a tutorial as a starting point, then change the dataset, the question, or the method until it becomes yours.

Evidence and Example

Here is a contrast I have lived. Anyone can say, "I completed three courses and earned two certificates." Compare that with what I can say about OnionGuard: "My team built an AI-powered tool that detects diseases in onions, and here is how we did it and what we learned." Or about the Galamsey Data Visualisation hackathon, where I looked at a dataset and told a clear story with it in a single Saturday. Sentences like those give an interviewer something to ask about, something to remember, and something to evaluate. That is the power of a project.

Try This Today

Pick one project idea in 20 minutes:

1. Take your lane from Lesson 2.
2. Write three questions you could answer with data in that lane.
3. Choose the one that interests you most.
4. Search for a dataset that could answer it.
5. Create a new folder or GitHub repository with the project name.

Then give yourself two weeks to finish it, using the 5-Part Project Story as your outline.

Lesson Recap

- Interviewers keep asking about your projects, so build them.
- Tell every project in five parts: problem, data, method, result, lesson.
- Match your projects to your lane and make them public and documented.

Lesson 9: Document Your Journey and Keep Your Learnings

There are two kinds of people in data.

The first kind writes things down. The second kind says, "Don't worry, I'll remember how this works," and then opens the same file three months later like it was written by a stranger.

You know the file. It is called something like *analysis_final_v3_REAL_final_USE-THIS-ONE.xlsx*. You open it. You have no idea what the formulas do. You stare at your own work like a detective at a crime scene, except you are both the detective and the suspect.

I have been the second person. Documentation is the cure, and not only for messy spreadsheets. It can change a career.

> **The lesson: Document what you learn as you learn it, because your notes become your memory, your proof, and one day your content.**

Why It Matters, Especially from Africa

When you write about your learning, three good things happen.

You learn better. Explaining an idea in your own words forces you to understand it. If you cannot write it simply, you have found a gap, and now you can fix it.

You leave a trail. Anyone who looks at your blog or notes can see that you are growing. A trail of consistent writing says more about your discipline than a certificate ever could.

You create raw material. A year of notes can become talks, workshops, tutorials, and even a book. This book exists partly because I kept documenting my journey. Many chapters began as scribbles, project write-ups, and talk outlines.

In our context, there is another benefit. Many resources for data learners are written from a Western viewpoint. When you document your experience, with local datasets, local data costs, and local problems, you create something that other African learners need and rarely find.

The Framework: Learn It, Note It, Post It

Think of documentation as three layers. You can start at the first one today.

Layer 1: Learn It, Note It (daily, private). Keep a simple learning log in Notion, Google Docs, a notebook, or a GitHub repository. Each day, write:

- What I learned.
- What confused me.
- One thing I want to try next.

This takes five minutes. Do not worry about quality. This layer is for you.

Layer 2: Project Write-Ups (weekly or monthly). When you finish a project or a chunk of learning, write it up using the 5-Part Project Story from Lesson 8. This becomes your portfolio material.

Layer 3: Post It (regularly, public). Turn selected notes into blog posts or articles. Even a short post is valuable.

Good beginner post ideas:

- **Today I Learned:** a short explanation of one concept in plain language.
- **Mistake of the Week:** something that went wrong, why, and how you fixed it.
- **How I Solved It:** a walkthrough of a problem, with code or screenshots.
- **The Beginner's Guide I Wish I Had:** explain a topic the way you wish someone had explained it to you.
- **Local Angle:** how a tool or technique works with African data or in an African context.

Where to Publish

Choose one place and stay there for a while:

- A personal blog or portfolio site.
- Medium, Hashnode, or Substack, which are free to start.
- LinkedIn articles or posts.
- A GitHub repository with good README files.
- A public Notion page.

The best platform is the one you will actually use. We will talk more about sharing in public in Lesson 12. For now, the goal is simple: get the words out of your head and onto a page.

Evidence and Example

Look at the people in the data world you most respect. Many of them have a trail of writing: tutorials, project notes, lessons learned. That trail is often what first made people notice them. It acted like a quiet, always-on introduction.

For me, the notes I kept over the years turned into talks, workshop slides, and eventually the structure of this book. I did not plan it that way. I simply wrote things down. Later I discovered I had been building a library.

Try This Today

Open a document or notebook and create your **Learning Log**. Write today's date, then three lines: what you learned today, what confused you, and what you will try tomorrow. If you want a challenge, turn the first line into a three-sentence "Today I Learned" post and publish it on LinkedIn or your blog.

And please, name your next file something sensible.

Lesson Recap

- Documenting helps you learn, builds proof, and creates material for talks, posts, and books.
- Use three layers: a private daily log, project write-ups, and public posts.

- Start small. Five minutes a day of notes beats a perfect blog you never publish.

PART 3

Prove What You Can Do

Skills that nobody can see are easy to ignore. This part is about turning what you know into evidence: a portfolio that speaks for you, projects that solve real African problems, public posts that attract attention, competitions that stretch you, and the ability to explain your work so that anyone can understand it.

Lesson 10: Let Your Portfolio Become Your CV

Some of the best opportunities I have received did not come from a job application. They came from a website.

When I built my portfolio site, I thought of it as a personal project, a place to put my work and interestingly, I launched it on my birthday last year. Then something surprising started happening. People began reaching out to me on LinkedIn from different parts of the world. They had seen my projects, read my write-ups, and wanted to talk. Nobody had asked for a CV. They had found proof.

A projects section on a CV can only hold a few lines. A portfolio can hold the whole story.

> **The lesson: Let your portfolio do the talking, because a well-documented body of work says more than any line on a CV.**

Why It Matters, Especially from Africa

A hiring manager in another country may never have heard of your university, your hub, or your city. They do not know the weight of your certificate. What they can judge in five minutes is a clear, well-explained project.

A portfolio gives you a global shop window with a local cost, which is close to zero. It does not care where you live. It does not need a visa. It works at 3 a.m. while you sleep, showing your work to someone in a different time zone.

There is also a very practical benefit. Many programs, fellowships, and jobs ask for a **one-page CV**. That page cannot hold your projects in detail. A portfolio link solves that. The CV becomes the trailer, and the portfolio becomes the film.

I experienced this directly. I applied to TReND-CaMinA, a highly competitive summer school that required a CV of only one page. Because my portfolio held the details, my one page could stay sharp and focused while still pointing to a deep body of work. I was accepted and attended in 2026. The process showed me the value of having everything documented in one place.

The Framework: The Project Card

Every project in your portfolio should be presented as a **Project Card**, a small, consistent summary that a busy reader can scan in thirty seconds. Each card includes:

1. **Title.** Clear and specific. "Predicting Maize Yield in Northern Ghana" beats "ML Project 2."
2. **One-line summary.** What you did and why.
3. **The problem.** The question or need, in two or three sentences.
4. **Tools and skills.** The stack you used (SQL, Python, Tableau, and so on).
5. **Key takeaways.** What you found or built, with numbers where possible.
6. **Data source.** Where the data came from, with a link or citation.
7. **Links.** To the live dashboard, code, or write-up.

This format makes your work easy to compare, easy to read, and easy to turn into a CV bullet. It also acts as a **cheat sheet** for opportunities that limit your CV to one page: copy the one-line summary and key takeaways, and link to the rest.

What to Put on a Portfolio Site

Keep it simple. A good portfolio has:

- **Home:** who you are, your lane (from Lesson 2), and what you are looking for, in two sentences.
- **Projects:** three to five Project Cards. Quality over quantity.
- **Writing:** links to your blog posts or articles (Lesson 9).
- **About:** a short story and a photo. People hire humans.

- **Contact:** your email and LinkedIn.
- **CV:** a downloadable one-page PDF.

You can build it with GitHub Pages, Netlify, Vercel, Carrd, Wix, or Notion. If you are not ready for a website, a well-organized GitHub profile plus a Tableau Public profile is a decent start. Choose a simple tool and avoid spending weeks on design. A clean page with great projects beats a beautiful page with nothing in it.

Evidence and Example

Think about how recruiters and collaborators discover people. They search on LinkedIn, they read posts, and they click links. Every link that leads to a clear portfolio gives them a reason to start a conversation. In my case, the portfolio became a quiet recruiter. Messages arrived from people I had never met, in places I had never visited.

Compare this to a CV that says, “Built a sales dashboard.” The portfolio shows the dashboard, the question it answers, the data behind it, and what the business could do with it. One is a claim. The other is evidence.

A Note on Quality

Do not wait for perfection. Publish a first version with two projects. Improve it as you learn. A living portfolio that grows beats a perfect one that never launches.

Try This Today

Create your first **Project Card** in 25 minutes. Pick your best or most recent project and write the seven fields above in a document. If you have no finished project yet, use your project plan from Lesson 8 and fill in what you know. Then decide where your portfolio will live (a GitHub Pages site, a Notion page, or Tableau Public) and create the empty page today.

Lesson Recap

- A portfolio shows your work to the world, and it can create opportunities beyond what a CV allows.

- Present every project as a Project Card: title, summary, problem, tools, takeaways, data source, links.
- Keep your CV to one page and let the portfolio carry the depth.

Lesson 11: Solve African Problems with African Data

JESUS said in the gospels that, “Many are called, but few are chosen.” And this profound statement explains so many occurrences and scenarios of our world.

It describes training programs well. Hundreds of people join a cohort. They watch the same lectures, follow the same instructions, and finish with the same capstone projects. When graduation comes, many of their portfolios look nearly identical. The same dataset. The same charts. The same conclusions.

The same is true for learners who follow popular Coursera and YouTube projects. A recruiter who has seen the same project forty times will not be impressed by the forty-first.

So what makes someone chosen? Often, it is the project they did that nobody told them to do.

> **The lesson: Start a project nobody assigned you, built on a problem you can see around you, because personal initiative is what makes you stand out.**

Why It Matters, Especially from Africa

There is a hidden advantage in being African in data. Our continent has real problems and a shortage of people applying data to them. Crop disease, urban traffic, malaria, school dropout, mobile money fraud, flooding, waste collection, food prices, language technology. Almost every one of these is underexplored.

Global datasets often hide Africa or represent it poorly. When you work with local data, you add something rare to your portfolio: **context**. You can explain why a pattern appears, because you live near it.

And when a project is rooted in a real problem, something else can happen. People start asking, "Can this be a product?" Some projects have grown into startups and community tools because someone took a small idea seriously. You do not need to plan a company. But you should know it is possible.

The Framework: Problem First, Data Second

Most beginners start with a dataset. Instead, flip the order.

1. **Look around.** Write down five problems you notice in your community, school, family business, or workplace.
2. **Turn one into a question.** "Why is tomato price so unstable in my local market?" is a question. "Agriculture" is only a topic.
3. **Ask what data could answer it.** Prices, weather, transport costs, surveys.
4. **Find or collect the data.** Search first. Collect your own if you have to.
5. **Build, document, and explain.** Use the 5-Part Project Story from Lesson 8.

Keep the focus on **solving a problem**, not on showing off techniques. A simple analysis that answers a real question beats a complicated model that answers nothing.

Where to Find African Datasets

Here are good places to start. Always check each source's licence and terms before use.

- **Zindi:** competitions with African datasets across health, agriculture, finance, and language.
- **Kaggle:** search for African countries, cities, or topics, and see what others have shared.
- **Humanitarian Data Exchange (HDX):** datasets on health, food security, and displacement.
- **World Bank Open Data and the African Development Bank data portal:** economic and development indicators by country.

- **National statistics offices and open data portals:** for example the Ghana Statistical Service, Ghana's open data portal, and Kenya's open data portal.
- **The DHS Program:** Demographic and Health Surveys covering many African countries.
- **FAOSTAT:** agriculture and food data.
- **Masakhane:** community-driven datasets for African languages.
- **OpenStreetMap:** maps, roads, and facilities.
- **Climate and satellite sources:** rainfall and temperature datasets from NASA, Copernicus, and others.
- **Your own collection:** a short survey in Google Forms, price records you gather yourself, or public information you gather responsibly.

If you collect data about people, think about privacy and consent before anything else. Remove names and any detail that could identify someone. Ethical habits are part of being a trusted data professional.

Document as You Go

A good African-data project can still be ignored if it is hard to understand. Write a clear README: the problem, why it matters, the data source, your method, your findings, the limits, and what someone could do next. Be honest about weaknesses. Messy, small, or incomplete data is normal here. Saying so, and explaining how you handled it, shows maturity.

Evidence and Example

Here is how this has played out for me. Many capstone projects look alike, but OnionGuard, the tool my team built to detect onion diseases (Lesson 13), gave me a story to tell in interviews and applications because it started from a real agricultural problem rather than a course exercise. Interviewers have not heard that exact project forty times, so it gives them something to ask about and something to remember.

The difference is not talent. It is initiative.

Try This Today

Spend 20 minutes on a **Five Problems List**:

1. Write five problems you notice in your community, school, workplace, or family.
2. Beside each one, write the data that could help answer it.
3. Search for that data using the sources above. Mark which ones are easy to find.
4. Circle the one with the best mix of interest and available data.

That circled line is your next project.

Lesson Recap

- Cohort and tutorial projects look alike, so projects you initiate yourself are what stand out.
- Start with a real problem, then find the data. African problems and African data are an advantage.
- Document well, respect privacy, and focus on solving the problem, not on showing off technique.

Lesson 12: Share What You Learn in Public

In 2024, I reposted a Tableau dashboard on LinkedIn as part of my initiatives as an ambassador to talk about some principles of dashboard design. It was not planned as a big move. I saw something I thought was good, and I shared it.

Some time later, a message appeared in my DMs. It was from Francis Umude, a Senior Vice President for Global Capital Markets at Bank of America. He reached out about a freelance dashboard design role using Tableau.

I have thought about that moment many times. I did not apply for anything. I did not send a cold email. A simple, public act of sharing, in a place where the right person happened to be looking, opened a door I did not know existed.

I should tell you how it ended. We met a few times to talk through the project. In the end, it turned out to need advanced analytics, and I did not get the final contract. I do not count it as a loss. A public post had put me in conversation with a senior person at one of the world's biggest banks, and the project showed me which skills to build next. A door opening is not the same as a contract being signed, and that is fine. The point of sharing in public is to get the conversations started.

> **The lesson: Share your learning and your work in public, because visibility creates opportunities that applications alone cannot.**

Why It Matters, Especially from Africa

Opportunities in data travel through attention. A recruiter, a hiring manager, a conference organizer, or a future mentor can only reach out to people they

can see. If your work lives in a folder on your laptop, it does not exist for them.

For Africans, public sharing is especially powerful. Geography often limits who can walk into our rooms, but it does not limit who can read our posts. A good post can travel across continents in a day. It can put your work next to people at the biggest organizations in the world without a plane ticket.

I will be honest about luck. One repost reaching a senior banker is not something you can order on demand. But visibility works like a lottery that you can enter every day for free. The more good work you share, the more tickets you hold.

The Framework: The Four-Line Post

Many beginners do not post because they do not know what to say. Use this structure for almost any project or lesson:

1. **The hook.** One line that makes someone stop. A question, a surprising number, or a clear promise.
2. **What I built or learned.** One or two lines in plain language.
3. **What I found.** The insight, with a number or a visual.
4. **The ask or invitation.** A question, a link to the full project, or a request for feedback.

Here is the template, with a prompt for each line:

> *Hook: [A question your project answers, or a surprising number]*
>
> *What I built: [One sentence on the project, the tool, and the data source]*
>
> *What I found: [Your main insight, with one number or one chart]*
>
> *The ask: [A link to the full project, and a question for your readers]*

Always add a visual: a screenshot, a short screen recording, or a carousel. Posts with a clear image are easier to understand and easier to remember.

How to Present Projects on LinkedIn and Beyond

- **Carousels:** turn your Project Card (Lesson 10) into a slide deck exported as a PDF. Each slide holds one idea.
- **Short walkthrough videos:** a 60-second screen recording of a dashboard shows how you think.
- **The Featured section:** pin your best projects and your portfolio link to the top of your profile.
- **Tableau Public, GitHub, and your blog:** link to them so people can go deeper.
- **Weekly or monthly series:** for example, "One chart a week about African data."

Be Intentional

Do not post randomly. Decide:

- **Your two or three themes** (for example: health data, Tableau tips, career lessons for beginners).
- **Your rhythm.** One post a week is better than ten posts in one week and none for a month.
- **Your engagement habit.** Spend ten minutes a day commenting thoughtfully on other people's posts. Comments build relationships faster than broadcasts.

And a few ground rules:

- **Give credit.** If you reshare or build on someone's work, tag them and say what you added.
- **Do not overclaim.** Say what you actually did. Trust is your most valuable asset.
- **Share the process, not only the polish.** Posts about mistakes and lessons often connect more than perfect results.
- **Avoid certificate-only posting.** A certificate says you attended. A project says you can do.

What Recruiters Notice

Recruiters and hiring managers search by skills and keywords, look at recent activity, and scan profiles quickly. A steady record of clear, relevant posts tells them four things: you are active, you can communicate, you have real work, and you are learning. That combination is hard to see on a CV.

Try This Today

Draft your first Four-Line Post in 25 minutes. Use the project from Lesson 8 or a small thing you learned this week. Write the hook, the build, the finding, and the ask. Add one screenshot or chart. Read it out loud once, then post it. If publishing feels scary, save it as a draft and schedule it for tomorrow morning. Then spend ten minutes commenting on three posts from people in your lane.

Lesson Recap

- Opportunities follow visibility. If nobody sees your work, nobody can reach you.
- Use the Four-Line Post: hook, what I built, what I found, the ask.
- Be intentional, credit others, stay honest, and keep a steady rhythm.

Lesson 13: Compete, Collaborate, and Grow Through Challenges

One Saturday, I left my house and went to the ALX hub in Accra. I could have stayed home. It was the weekend, and rest was an option. But there was the Galamsey Data Visualisation hackathon by Open Data Bank Ghana, a hackathon on data visualization, and something told me to go.

I sat with strangers, looked at a dataset, and tried to tell a clear story with it. By the end of the day, I was walking home with first place, some cash, a certificate and a handful of new connections.

That Saturday taught me that the best opportunities often come disguised as inconvenient weekends.

> **THE LESSON: Step into competitions and team challenges, because they sharpen your skills, build your portfolio, and connect you to people.**

Why It Matters, Especially from Africa

Competitions give you three things that are hard to get otherwise.

A real deadline and a real problem. Courses let you go at your own pace. Competitions force you to deliver. That pressure builds speed and judgment.

Proof that others can verify. A rank on a leaderboard or a hackathon win is hard to fake. It tells a stranger you can perform against other people.

A network. Teammates, organizers, judges, and sponsors all become part of your circle.

And some competitions pay. Platforms like Zindi host data science challenges with African datasets, and participants have won prize money through them. Even when you do not win, your submission, your notebook, and the leaderboard experience become material for your portfolio.

The Framework: Show Up, Team Up, Ship It

Show up. Say yes before you feel ready. Start with low-risk challenges: beginner competitions, knowledge competitions, or local hackathons. You will learn more in one weekend of struggle than in a month of passive study.

Team up. Most hackathons and real projects are team sports. A good team has different strengths:

- A **data wrangler** who cleans and organizes the data.
- A **modeler or analyst** who finds the answers.
- A **storyteller or designer** who makes it clear and visual.
- A **domain thinker** who understands the problem.
- A **presenter** who can pitch it.

You can wear more than one hat, but knowing the roles helps you divide work and learn from the people around you.

Ship it. Finish something, even a small version. A working, simple solution beats a brilliant half-built one. In the last hours of any hackathon, cut features, polish the story, and rehearse the presentation.

A Team That Opened Doors: OnionGuard

When I was admitted to the University of Ghana Nkabom Honours Scholars programme, I worked with a diverse team of people from different backgrounds. Together, we built **OnionGuard**, an AI-powered tool for detecting onion diseases.

That project taught me how much stronger a solution becomes when people with different strengths work on it. It also gave me a story to tell in interviews and applications, a concrete example of using AI for a real agricultural problem. It opened doors for me. This is what collaboration does: it multiplies what any one person can do alone.

Where to Compete

- **Zindi:** African data science competitions, community, and learning resources.

- **Kaggle:** global competitions, datasets, and notebooks. Start with learning competitions.
- **Tableau and Power BI community challenges:** weekly data visualization challenges, such as Makeover Monday, are great for building a dashboard habit.
- **Local hackathons:** organized by hubs, universities, GDG chapters, and developer communities.
- **Pitch and innovation competitions:** these train your communication, which we cover in Lesson 14.

Follow the organizers of these communities on LinkedIn and X so you hear about events early.

How to Get the Most Out of a Challenge

1. **Read the problem twice** before touching data.
2. **Set a simple baseline first.** Then improve it.
3. **Document as you go,** so you can turn the work into a portfolio piece.
4. **Learn from the winners.** After a competition, read the top solutions and write down what they did differently.
5. **Write a recap post.** Share what you built and learned, whether you won or not.
6. **Keep in touch** with the teammates and people you met.

Evidence and Example

My first-place finish was nice. The cash was nice too. But the real return was the people I met and the confidence I gained. The next time I faced a deadline, a new dataset, or a room full of strangers, it was not new anymore. I had done it before.

Try This Today

Search for one challenge you can join in the next 30 days. It can be a Zindi competition, a Kaggle learning competition, a weekly dataviz challenge, or a

local hackathon. Put the date in your calendar. Then message one friend and ask, “Do you want to team up?”

Lesson Recap

- Competitions bring deadlines, verifiable proof, and a network. Some even pay.
- Show up, team up, ship it. Diverse teams build stronger solutions.
- Write up every challenge, win or lose, and keep in touch with the people you meet.

Lesson 14: Explain Your Work to Non-Technical Audiences

When I joined GETA Solutions as a data science intern, one of my regular tasks was presenting in team meetings. I made slides, walked colleagues through the work, and answered questions from people who did not live in code all day.

At first, it felt like a side task. Looking back, it was one of the most valuable parts of the internship. It taught me that the best analysis in the world is useless if nobody understands it.

Later, that same skill won me pitch competitions. I will confess something: in some of them, I was not even fully convinced by my own solution. I won because I could explain the problem clearly, tell a good story, and show why it mattered. That is how powerful communication is.

> **The lesson: Learn to explain your work in plain language, because decisions are made by people who need to understand you, not by people who read your code.**

Why It Matters, Especially from Africa

Most of the people who will use your analysis are not data people. They are managers, doctors, farmers, loan officers, teachers, and government officials. They are smart, but they are busy and they do not speak "data." If you can bridge that gap, you become the person who turns numbers into action.

In smaller organizations, this is even more important. You may be the only data person in the building. If you cannot explain your work, nobody can use it, and nobody will know it was good.

Communication also grows your career directly. When I hosted workshops as an ambassador for some of the top data and AI communities, I practised explaining complex ideas to mixed audiences again and again. That regular

practice sharpened my speaking, my slides, and my confidence. Today, it is a key part of my data portfolio.

The Framework: Headline, Proof, Next Step

Every explanation of your work can follow this three-part shape.

Headline. State the main finding in one sentence, first, in plain words. "Our sales fall every Friday because delivery times double." Do not build up to it. Lead with it.

Proof. Show the one or two pieces of evidence that support the headline. One clear chart is better than five complicated ones. Explain what the audience should look at.

Next Step. Say what should happen now. "We should add two riders on Fridays and test it for a month." Decision makers want a recommendation, not just information.

If your audience remembers only one sentence, make sure it is the headline.

Translate Tool Talk into Human Talk

Learn to translate. Here are a few examples:

Instead of saying…	Try saying…
"The model has an AUC of 0.87."	"If we pick one risky customer and one safe customer, the model ranks them correctly about 87 times out of 100."
"The result is statistically significant at p less than 0.05."	"If there were truly no difference, a gap this large would be rare."
"I imputed the missing values."	"Some records had gaps, so I filled them using typical values and checked that it did not change the answer."
"There is multicollinearity."	"Two of these factors move together so closely that we cannot tell which one matters more."
"I built an ETL pipeline."	"I set up an automatic process that collects the data each night and gets it ready for the team."

A simple test: could you explain this to a smart friend who works in a different field? If yes, you are ready.

Slides and Dashboards That Work

- **One message per slide.** Make the title the message, such as "Fridays are our weakest sales day."
- **Fewer words, bigger visuals.** If people are reading, they are not listening.
- **Use analogies from daily life.** A pipeline is like water pipes. A model is like an experienced shopkeeper who has seen thousands of customers.
- **Start with the audience's question,** not your method.
- **Keep the technical details in an appendix** for people who ask.

How to Practise

- Present your projects to a friend who is not in tech and ask, "What did you understand?"
- Record yourself explaining a project in two minutes.
- Volunteer to present at team meetings, class, and community events.
- Host or co-host a small workshop. Teaching is the fastest way to sharpen explanation.
- Join a public speaking or pitch group at your school or community.

A Warning

Communication can make a weak idea look strong. Do not let that be your plan. The goal is not to be convincing. The goal is to be clear about something worth believing in. Do the careful analysis first. Then use your communication skills to make the truth easy to understand. When your solution is good and your explanation is clear, that is when you become unstoppable.

Try This Today

Take one project and write a **three-sentence summary** in plain language using Headline, Proof, Next Step. Then say it out loud to someone, or record it on your phone. Ask them to repeat back what they heard. If they cannot, simplify and try again.

Lesson Recap

- Good analysis only matters if people understand it and act on it.
- Use Headline, Proof, Next Step to explain any piece of work.
- Practise often, and never let polish replace substance.

PART 4

Get Noticed and Get Hired

Skill and proof are the engine. People are the road. This part covers the human side of a data career: the network you build before you need it, the mentors who shorten your journey, a LinkedIn profile that works while you sleep, interviews you learn from, and the choice between local, remote, and global roles.

Lesson 15: Build Your Network Before You Need It

In September 2024, I was at PyCon Africa in Accra. I was not a famous speaker or an industry insider. I was a student in a crowd, volunteering at the registration desk and trying to learn as much as I could.

At some point, I met Herve Aniglo, a software developer and a speaker for the event. He had come from the USA to present at the event. We had a brief introduction, and I asked for a selfie, which felt a little bold at the time. Later, I sent him a direct message. I did not ask for a job. I asked about mentorship and how he might be able to help me grow.

That short message changed everything.

Herve became my first mentor in the tech community, and he has been instrumental in my journey ever since. He connected me to many opportunities, and through him, I have spoken at over twenty tech events. It all started with a brief hello, a selfie, and a message.

> **The lesson: Build relationships before you need anything, because people open doors for the ones they know and trust.**

Why It Matters, Especially from Africa

Many of the best opportunities in tech never appear on a job board. Speaking slots, internships, fellowships, ambassador programs, and referrals travel through people. In small ecosystems like ours, a recommendation from someone who knows your work can matter more than a perfect CV.

The people who struggle most with networking are often those who treat it as a transaction: they appear only when they need something. The people who thrive treat it as a long game. They show up, help, learn, and stay in touch, long before they ask for anything.

You do not need to be extroverted. You need to be intentional.

The Framework: Meet, Message, Maintain

Meet. Be present where your people gather: conferences, meetups, workshops, online communities. When you meet someone you admire, keep it simple. A brief introduction. A genuine question. A selfie if the moment allows it. The selfie is not vanity. It is a memory hook that helps both of you recall the moment.

Message. Within 48 hours, send a short, specific follow-up on LinkedIn or another platform. A good message has four parts:

1. Who you are, in one line.
2. Where you met.
3. One specific thing you appreciated.
4. One small, clear ask.

For example: “Hi [Name], I am a student in Accra, and we met at [event]. I really valued your thoughts on [topic]. I would love to learn from you. Would you be open to a 20-minute conversation about your path?”

Notice what this message avoids: it is not long, it does not demand a job, and it is easy to answer.

Maintain. A relationship is not one message. Follow up every few months with an update: what you built, what you learned, a thank-you, or a relevant resource that you think they would like. Report back on the advice they gave you. People love to see that their guidance mattered.

Give Before You Ask

You are never too new to offer value. You can:

- Share someone’s post and add a thoughtful comment.
- Volunteer at their event or community.
- Send a useful link or resource.
- Thank them publicly when they help you.
- Introduce two people who should know each other.

Annual Tech Conferences: Your Networking Playground

Conferences compress months of networking into a few days. The full list of events and communities is in Lesson 21. Here, focus on how to use them. Dates and locations change each year, so always check the official websites.

- **PyCon Africa and PyCon Ghana:** Python communities with strong volunteer cultures. PyCon Africa 2024 was held in Accra, and PyCon Ghana returns each year.
- **Deep Learning Indaba:** Africa's flagship machine learning and AI gathering, held in a different African country each year. The 2026 edition was held in Lagos.
- **AMLD Africa (Applied Machine Learning Days):** A pan-African conference on applied AI and machine learning, founded by African students and alumni of EPFL. It has moved between countries (Tunisia, Morocco, Kenya, and South Africa so far) and runs with student ambassadors and local community groups across the continent.
- **Data Science Africa:** a long-running annual event with workshops and summer schools.
- **DevFest (Google Developer Groups):** held in cities across Africa each year, including Accra.
- **AWS Community Days and user group events:** strong for cloud and data engineering.
- **Tableau and other data community events:** good for analytics and visualization.

Three ways to leverage a conference:

1. **Volunteer.** You get access, a team, and a reason to talk to organizers and speakers. This is how I met Herve.
2. **Present.** Submit a lightning talk, a poster, or a workshop idea. Speaking makes you memorable and gives people a reason to approach you.
3. **Write about it.** Post a recap with what you learned, and tag the speakers and organizers. They will notice.

In Lesson 21, we will go much deeper on how to use these events.

Evidence and Example

Herve's story is mine, but the pattern is common. Think about how many people you admire got their first big break through an introduction, a recommendation, or a conversation at an event. Behind almost every "overnight success" is a quiet network that was built over years.

And remember, over twenty speaking opportunities started with a selfie and a short message. You never know which small action will become the hinge of your story.

Try This Today

Pick one person you admire in data, ideally someone you have met or whose work you know. Spend 15 minutes writing a four-part message using the Meet, Message, Maintain pattern. Send it. If you have not met anyone yet, find one upcoming data event this quarter and register or apply to volunteer.

Lesson Recap

- Opportunities travel through people, so build relationships before you need them.
- Use Meet, Message, Maintain: show up, follow up within 48 hours, and keep in touch.
- Conferences are the best place to network. Volunteer, present, and write about them.

Lesson 16: Find Mentors, and Become One Early

Before Herve, there was Kingsley Abru.

I found Kingsley on LinkedIn and reached out. He was one of the few data engineers from Ghana, and I was a student trying to understand where to start. I expected a polite, short reply, maybe a link to a course. Instead, Kingsley took his time. He agreed to a meeting, walked me through resources, and explained how to begin my journey in data engineering.

That meeting did something for me that no tutorial had done. It made the path feel real. Someone who had walked it was telling me, "You can do this, and here is how."

Then life complicated my plan. My coursework in computer science and statistics was heavy, so I took a pause. Data science and analytics connected directly to what I was already studying. So I switched my focus, even though Kingsley had pointed me toward engineering. I may still go into data engineering one day. But that early conversation did what a good mentor does: it gave me clarity and confidence, and then trusted me to make my own choices.

> **The lesson: Find mentors who are a few steps ahead, learn from their journey without copying it, and start mentoring others as early as you can.**

Why It Matters, Especially from Africa

A good mentor can save you months of confusion. They can tell you which skills are worth your time, which opportunities are real, and which mistakes to avoid. In a world where good guidance is scarce and expensive, this is a huge advantage.

Many young Africans assume mentors are too busy or too famous to help. In my experience, many are willing. They remember what it was like to start,

and they often had someone help them. The trick is to ask well and to make helping you easy.

Notice also how I have used the word "mentor" in two ways in this book. Herve became my first mentor in the broader tech community, the person who opened doors and connected me to opportunities. Kingsley became my first mentor in data, the person who helped me understand the field. You may need different mentors for different parts of your growth, and that is healthy.

The Framework: Find, Reach, Agree, Check In

1. Find. Look for people one to three steps ahead of you, not only the famous ones. Someone who started two years ago remembers your problems better than a director who started twenty years ago. Where to search:

- LinkedIn: search for people in your target role, your university's alumni, and speakers at events you attended.
- Communities: Tableau, Zindi, GDG, PyCon, and local data groups.
- Conferences and workshops: the people on stage and the people who volunteer.
- Your school: lecturers, teaching assistants, and senior students.

2. Reach. Send a short, respectful message. Be specific about why you chose them and what you are asking for. Do not begin with "Will you be my mentor?" Begin with a smaller request: a 20-minute conversation, or one question about their path. Here is a template:

> *Hi [Name], I am [one line about you]. I came across your work on [specific thing] and really admired [specific detail]. I am trying to grow as a [role] and would value 20 minutes of your time to ask a few questions about how you got started. If your schedule allows, I would be grateful. Thank you for considering it.*

3. Agree. After a first good conversation, you can ask directly: "Would you be open to a short check-in every month or two?" Let them say yes or no. If they say no, thank them warmly and stay in touch. Mentorship should be a clear agreement, even if informal.

4. Check In. Schedule regular calls. Treat them seriously:

- Send a short update before each call: what you did, what you tried, where you are stuck.
- Bring two or three specific questions.
- Take notes, and act on the advice.
- Report back next time on what happened.
- Say thank you, and show that their time mattered.

How to Be a Good Mentee

- **Do your homework first.** Ask questions that only they can answer, not ones you can Google.
- **Respect their time.** Be on time, be brief, and end when you said you would.
- **Own your decisions.** A mentor gives perspective. You make the choice. My switch from engineering to analytics is an example: I listened, I weighed my situation, and I chose.
- **Give back.** Offer help, share their work, and thank them publicly when it is appropriate.

Become a Mentor Early

You do not need to be an expert to mentor. You need to be one step ahead of someone. If you have been learning SQL for six months, you can help a person who is starting. If you survived a hard interview, you can guide a friend who is facing one.

Why start early?

- Teaching deepens your own understanding.
- You become known as a helpful person.
- You build a community that grows with you.
- It trains the exact skills that mentors have: listening, explaining, and encouraging.

Begin small. Start a study group. Answer questions in a community chat. Offer to review a junior's CV. Host a small workshop. You are never too new to share what you know.

The Women in My Data Science Life

I would be telling you half the story if I only named the men who mentored me. Some of the people who shaped my data journey most are women, and they are a reminder that mentors come in many forms.

Mrs. Emefa Duah gave me early exposure in data analytics, and she has supported me with guidance and recommendations since. **Cecilia Gichohi**, whom you met in Lesson 2, showed a room full of learners how to choose between the tool lane and the domain lane. **Deborah Arthur**, Executive Director of Divas in AI, has also helped me with guidance and recommendations along the way.

If you are a young woman starting in data, the road can feel lonelier. You may often be the only woman in the room, and that is exactly when the right community matters most. Look for women-led communities such as WiMLDS (including WiMLDS Accra), Women in Data Science (WiDS), R-Ladies, and Divas in AI. Ask women who are a few steps ahead to share their story. And if you are a man reading this, make sure the women around you are invited, heard, and credited.

If you can, find a mentor who has walked your road. If you cannot, build a circle of peers who will walk it with you.

Try This Today

Do two things in 25 minutes.

1. **Find your mentor.** Make a list of three people one to three steps ahead of you. Send a message to the first one using the template above.
2. **Find your mentee.** Think of one person who is a step behind you, and offer them one specific piece of help this week, such as a resource, a review, or a short call.

Lesson Recap

- Look for mentors a few steps ahead, and start with a small, specific request.

- Follow the cycle: find, reach, agree, check in. Be prepared and own your decisions.
- Mentor someone early. Being one step ahead is enough.

Lesson 17: Make LinkedIn Work for You

My LinkedIn inbox tells a story. People message me asking for mentorship, advice, or side jobs. Many of them found me because of a project I shared, a post I wrote, or a community I belong to.

I did not set out to build that. But I have come to see LinkedIn as the main marketplace for ideas and opportunities in data. It is where recruiters look, where communities share openings, and where conversations start.

I even believe LinkedIn played a part in my becoming a Zindi Ambassador. The right people saw my work, understood what I did, and trusted me enough to invite me in.

> **THE LESSON: Treat LinkedIn as your global shop window, and use it to position yourself for opportunities beyond your city and country.**

Why It Matters, Especially from Africa

LinkedIn lets a student in Accra be seen by a hiring manager in Nairobi, London, or Toronto. It turns distance into a smaller problem. For many global roles, remote jobs, fellowships, conferences, and mentorships, LinkedIn is where the first impression happens.

A weak profile loses opportunities silently. You will never know who looked and left. A strong profile works quietly while you sleep.

The Framework: Profile, Posts, People

Profile: make it a clear landing page.

- **Photo:** a clear, friendly headshot with good light. No need for a studio.

- **Banner:** a simple image that signals your lane, such as your tools or the field you work in.
- **Headline:** do not just write "Student." Say what you do and for whom. Try: *Data Analyst | SQL, Power BI, Python | Turning health data into decisions.*
- **About section:** three short paragraphs. Who you are and your lane. Proof: one or two highlights with numbers. What you are looking for or open to.
- **Featured:** pin your best project, portfolio link, and strongest post.
- **Experience:** write results, not duties. "Built a dashboard that cut weekly reporting time from four hours to one" beats "Responsible for reports."
- **Skills:** choose the three most relevant to the roles you want and pin them. Ask colleagues and mentors to endorse them.
- **Custom URL:** make it simple, such as linkedin.com/in/yourname.
- **Open to Work:** you can set it for recruiters only if you prefer privacy.

Posts: be visible with value. Use the Four-Line Post from Lesson 12. Share projects, lessons, and event recaps. Consistency matters more than perfection.

People: build a smart network.

- Connect with a note. A one-line message about why you want to connect makes acceptance much more likely.
- Comment thoughtfully on posts from people in your field.
- Join the conversation under posts by speakers and community leaders.
- Respond to every message you receive, even if it is only a polite "thank you, I cannot help with that, but good luck."

Positioning for Global Opportunities

If you want to be considered beyond your country, make it easy for global employers to say yes.

- **Write clearly in simple English.** Avoid long, complicated sentences.
- **Show remote readiness.** Mention that you collaborate asynchronously, communicate clearly in writing, and can overlap with certain time zones.
- **Use keywords.** Recruiters search for terms like "SQL," "Power BI," "Python," and "data pipeline." Make sure your profile includes the words in the job ads you want.
- **Show proof.** Link to your portfolio and public work.
- **Follow global companies and recruiters** in your lane to understand what they ask for.

Avoid LinkedIn Pressure

LinkedIn has a dark side. You open the app and see announcements: promotions, big offers, famous fellowships, perfect posts. It can leave you feeling like everyone is ahead.

Remember: LinkedIn is a highlight reel. People post their wins, not their rejections or their confusion. Do not measure your private behind-the-scenes against their public highlights.

Here is how to protect your peace:

- **Follow people to learn, not to compare.** Choose top voices in the data space who teach and share openly.
- **Follow opportunity sharers.** Find people and pages that post conferences, fellowships, scholarships, ambassador programs, and job openings. This is one of the biggest benefits of the platform. Many of my opportunities came from simply being around these posts.
- **Mute or unfollow** accounts that make you feel behind more than they help you move forward.
- **Set time limits.** Check in with a purpose: post, comment, reply, and leave.

Evidence and Example

The pattern of my own experience is a good illustration. Projects and posts on LinkedIn drew people to my profile. Some reached out for mentorship. Some had side work. Community leaders noticed my activity, and that visibility contributed to my becoming a Zindi Ambassador. None of that required a perfect profile. It required a clear one, kept active.

Try This Today

Run a 25-minute **Profile Audit**:

1. Rewrite your headline using the formula: Role | Key tools | Who or what you help.
2. Write a three-paragraph About section, and keep each paragraph to two or three lines.
3. Pin your best project in Featured.
4. Follow five people who teach data and five pages or people who share opportunities.
5. Unfollow or mute one account that stresses you.

Lesson Recap

- LinkedIn is a global shop window. Optimize your profile, posts, and people.
- Position for global roles with clear English, strong keywords, remote readiness, and proof of work.
- Follow teachers and opportunity sharers, and protect yourself from comparison.

Lesson 18: Prepare for Interviews, Learn from Failure, and Try Again

Almost every data professional I know has a folder of rejections, even if it is only in their memory. I have mine too.

I have been through over twenty data interviews and applications, including graduate school interviews. Some ended in "no." Some ended in "yes." One of the yeses was admission to a master's programme in data science in the USA, with a graduate assistantship. Looking back, the interesting thing is not any single result. It is the pattern I noticed as I moved from one stage of the journey to another.

> **The lesson: Treat every rejection as feedback about a specific stage, then fix that stage and try again.**

Why It Matters, Especially from Africa

Competition is real. Many openings attract hundreds of applicants, and some come from all over the world. It is easy to read each rejection as a verdict on your worth or your talent. It is not. It is information about one stage in a process, and every stage can be improved.

If you understand which stage you are stuck at, you can stop guessing and start fixing.

The Framework: The Three Levels

Most candidates move through three levels. Each has a different signal and a different fix.

Level 1: Silence. You apply and get rejected before any interview, or you hear nothing at all.

What it means: your application is not getting past the first filter. The issue is usually the CV, the portfolio, the targeting, or the keywords.

How to fix it:

- Tailor your CV for every role (more on this below).
- Make sure your portfolio is easy to find and clear.
- Apply to roles that match your level, not only to dream jobs.
- Ask a mentor or friend to review your CV, or send it to a community group for feedback.
- Add referrals. A message to someone inside the organization often moves you from the pile to the shortlist.

Level 2: The Interview. You get interviews, but you are not selected.

What it means: your CV is working, and that is a good sign. Something in the conversation is not. It could be technical depth, communication, or how you explain your projects.

How to fix it:

- Practise out loud, not only in your head.
- Prepare your project walkthrough using the 5-Part Project Story (Lesson 8).
- Practise SQL and basic statistics questions on a timer.
- Do mock interviews with a friend or mentor.
- Write a short **debrief** after every interview: What went well? Where did I struggle? What question surprised me?

Level 3: The Offer. You are selected.

What it means: your story, your skills, and your communication have come together. At this level, learn to compare offers, ask questions about the team, and negotiate respectfully.

The goal is not to avoid Level 1 or Level 2. You will visit them. The goal is to move through them faster by learning from each visit.

Tailor Every CV

A single generic CV for every job is one of the most common causes of silence. For each application:

1. **Read the job description closely.** Highlight the skills, tools, and responsibilities.
2. **Mirror the language.** If the ad says "dashboard reporting" and "stakeholders," and you have done that, use those words.
3. **Reorder your content.** Put the most relevant projects and skills at the top.
4. **Add numbers.** "Reduced processing time by 30 percent" is stronger than "improved efficiency."
5. **Keep it to one page,** with a link to your portfolio for depth.
6. **Check the formatting.** Many companies use software that scans CVs. Use a simple layout, standard headings, and plain fonts.

Treat each application as a small project. Ten tailored applications often beat a hundred generic ones.

Preparing for the Interview

Most data interviews include a mix of:

- **Introduction and motivation:** "Tell me about yourself" and "Why this role?"
- **Behavioural questions:** use the **STAR** structure: Situation, Task, Action, Result.
- **Technical questions:** SQL queries, spreadsheet tasks, Python or R basics, statistics concepts, and sometimes a take-home test.
- **Project discussion:** "Take me through a project you worked on."
- **Business sense:** "How would you measure success for this?"
- **Your questions for them.** Prepare two or three about the team, the tools, and how success is measured.

A simple two-week plan: spend the first week refreshing fundamentals (SQL, statistics, your tools). In the second week, practise aloud, rehearse your projects, and do mock interviews. The day before, rest.

Keep a Rejection Log

After each rejection, spend five minutes to write down:

- The role and the stage where it ended.
- Your best guess about why.
- One action you will take as a result.

Over time, you will see patterns. Maybe your CVs are strong but your SQL is shaky. Maybe your technical skills are fine but you ramble in project explanations. That pattern is your roadmap.

The Special Page: A One-Page CV Template

Use this as a starting layout. Keep everything on a single page, in a clean font, with plenty of white space.

> **YOUR NAME**
>
> City, Country | Email | Phone | LinkedIn | Portfolio | GitHub
>
> **SUMMARY** (two lines)
>
> Data analyst skilled in SQL, Power BI, and Python. Experience turning messy data into clear recommendations in [your field]. Looking for [role] to help [type of team] make better decisions.
>
> **SKILLS**
>
> Tools: SQL, Excel, Power BI, Python (pandas, Matplotlib)
> Concepts: data cleaning, dashboards, statistics, A/B testing, storytelling
>
> **PROJECTS** (your strongest section when you are starting)
>
> *Project title* | Tools | Link
> Problem solved in one line. Result with a number. What the audience could do with it.
>
> *Project title* | Tools | Link
> Problem solved in one line. Result with a number. What the audience could do with it.
>
> **EXPERIENCE** (internships, volunteering, and part-time work count)
>
> *Role, Organization* | Dates
> Accomplished [result] by doing [action], measured by [number]. Use this formula for every bullet.
>
> **EDUCATION**
>
> Degree, University | Year | Relevant courses or honours
>
> **COMMUNITY AND LEADERSHIP**

> Ambassadorships, organizing roles, talks, hackathon results, and volunteering.

Try This Today

Take one real job ad and spend 25 minutes tailoring your CV to it using the six steps above. Then open a blank note titled “Rejection Log” and write one entry about your most recent “no,” even if it was months ago. What stage was it? What would you change?

Lesson Recap

- Rejection is feedback about a specific stage: silence, interview, or offer.
- Tailor your CV for every role and prepare your interviews aloud.
- Keep a rejection log, learn the pattern, and try again.

Lesson 19: Compare Local and Remote Roles, and Compete Globally

At the Deep Learning Indaba 2026, I had a conversation with Shadrack Nyarku, a senior data engineer at Ishango. He shared a perspective that made me stop and think.

In his view, data science roles can be very tough to land in Europe for people based in Africa, partly because Europe has strict data protection rules and regulations. His advice was to focus on data engineering and building pipelines, where there is strong demand and where the work can be done within the rules. This is one person's view, and data engineers face the same rules, so treat it as an opinion to test, not a fact.

You can agree or disagree with him. What I took from it was not a single answer. It was a habit: study the market, learn how rules and demand shape opportunities, and be willing to adjust your direction.

> **The lesson: Know your options, local, remote, and freelance, and keep learning so that you can compete for roles anywhere.**

Why It Matters, Especially from Africa

Our generation has choices that did not exist before. You can work for a bank in your city, for a startup in another country, or for clients in several time zones. But each choice has different rules, risks, and rewards. A clear view of them helps you choose, rather than drift.

The Framework: The Three Routes

Route 1: Local roles. Work with organizations in your country: banks, telecoms, fintechs, NGOs, hospitals, government agencies, and local startups.

Route 2: Remote roles. Be employed by a company elsewhere while working from home.

Route 3: Freelance and contract work. Serve clients directly, either through platforms or your own network.

	Local	Remote employee	Freelance
Pay	Local scale; may be lower	Often higher, in foreign currency	Varies widely, no guarantee
Stability	Usually stable	Stable, but depends on the company and contract type	Least stable
Competition	Mostly local candidates	Candidates from around the world	Global, plus price pressure
Learning	Context, mentors nearby	Exposure to global practices	Fast learning, many industries
Challenges	Fewer openings in some fields	Time zones, legal and payment setup	Finding clients, managing income

No route is best for everyone. Many people use more than one, for example a local job with occasional freelance projects.

Local Roles: Look Beyond the Title

Some local roles will not say "data analyst" or "data scientist." Look at what the job involves, not just the name. Roles such as **Product Analyst**, **Business Analyst**, **Reporting Analyst**, **Risk Analyst**, **Operations Analyst**, **MEL Officer**, or **Research Officer** often involve SQL, Excel, dashboards, and analysis, which are core data skills (remember the table in Lesson 3).

Read the responsibilities. If they mention reports, data, metrics, forecasting, or insights, you may have found a data job in disguise. Also, tell your network what you are looking for. Many local roles are filled through referrals before they are ever advertised.

Remote Roles and Freelancing

Remote opportunities are advertised in many places:

- **LinkedIn:** use the filter for "Remote" and set your location to broad regions. Many remote roles are posted here, and it is the first place to look.
- **Remote job boards:** such as Remote OK, We Work Remotely, and Himalayas.
- **Startup job boards** such as Wellfound.
- **Talent marketplaces** that connect African professionals with global companies.
- **Freelance platforms:** Upwork, Fiverr, Freelancer, Contra, and similar sites. Start with smaller gigs to build reviews, then raise your rates.

Stay safe. Never pay a fee to get a job. Be careful with offers that seem too good, that ask for sensitive documents too early, or that refuse a video call. Check the company's website and people. Read contracts and agree on payment terms and methods before you start.

Prepare the practical side. Learn how you will receive payment before you accept the job. Common options include a domiciliary (foreign currency) bank account, platforms such as Payoneer or Wise, and local fintech apps. Availability, fees and rules differ by country, so check current terms where you live and ask the employer which method they support. Also learn what taxes apply in your country, and plan for your internet and power backup. Reliability matters to remote employers more than almost anything else.

How to Price Your Freelance Work

Pricing is where many beginners get stuck. Charge too little and you burn out. Charge too much, too soon, and nobody replies. Use this simple method.

Step 1: Find your floor. Work out the lowest rate that keeps you going. Take the monthly income you need, add a cushion for tax, platform fees, data, electricity, and tools, then divide by the hours you can really bill.

Here is a worked example with illustrative numbers. Suppose you need $1,000 a month. Add 20 percent for tax, fees, and costs, and you get $1,200. If you can work 25 hours a week, that is about 100 hours a month, but finding clients, writing emails, and handling revisions take time. If 60

percent of your time is billable, that is 60 hours. Your floor is $1,200 ÷ 60 hours = **$20 an hour**. Anything below that costs you money to work.

Step 2: Check the market. Look at what freelancers with similar skills and reviews charge on the platforms, and ask mentors and community members what they charge. Your rate should sit inside that range, not far below it. Rates vary widely by skill, client, and country, so treat any number you see online as a data point, not a rule.

Step 3: Choose how to charge.

- **Hourly:** simple, and good when the scope is unclear. The client pays for your time, so track your hours.
- **Fixed price per project:** good when the scope is clear, for example "one Tableau dashboard with three views." Estimate your hours, multiply by your rate, and add a buffer of 20 to 30 percent for revisions.
- **Retainer:** a fixed monthly fee for a set amount of work, such as monthly reporting. It gives you steadier income, and it is often the best arrangement once a client trusts you.

Step 4: Put it in writing. Agree the scope, the number of revision rounds, the deadline, and the payment terms before you start. For fixed-price projects, ask for a deposit (many freelancers ask for 30 to 50 percent upfront) and split the rest into milestones. Add a sentence on what counts as extra work. Platforms charge fees, so read the current fee schedule before you set your price.

Step 5: Raise your rates. Start a little lower while you collect your first reviews and portfolio pieces, but do not stay there. After every few completed projects, or whenever you are fully booked, raise your rate for new clients. When you can, price by value: a dashboard that saves a team ten hours of work every week is worth more than the hours it took you to build.

My story in Lesson 12 shows why scope matters. The freelance dashboard role turned out to need advanced analytics, which was more than the first conversation suggested. Ask early what work will really be involved before you quote.

Data Protection: A Skill, Not a Barrier

Shadrack's point about regulations deserves attention. Europe has the GDPR. Many African countries also have data protection laws, such as Ghana's Data Protection Act, Nigeria's data protection law, Kenya's Data Protection Act, and South Africa's POPIA.

Learn the basics: personal data, consent, anonymization, storage limits, and cross-border transfers. Understanding data privacy makes you more employable everywhere, and it matters a great deal in engineering and governance roles. What looks like a barrier can become your edge.

Competing Globally: Keep Learning

Whichever route you choose, the way to stay competitive is simple and unglamorous: **keep learning.**

- Follow trends in your lane, such as new tools, cloud services, and AI-assisted analytics (see Lesson 23).
- Update your skills every quarter. Choose one new thing to learn and apply it in a project.
- Read job ads regularly, even when you are not looking, to see how demand changes.
- Improve your written and spoken English, and your async communication.
- Stay active in communities, so that you hear about shifts before they become obvious.

The people who do best globally are not always the most brilliant. They are the ones who keep adapting.

Try This Today

Spend 25 minutes on a **Market Scan**:

1. Search LinkedIn for your target role with the "Remote" filter and write down five repeated requirements.
2. Search for three local jobs that might be data roles without the data title.

3. Choose which Route you want to try first for the next three months.
4. Write one skill you will add this quarter.

Lesson Recap

- You have three routes: local, remote, and freelance. Each has trade-offs.
- Local data roles often hide behind titles like product analyst or MEL officer. Read the job description.
- Learn data protection, stay safe from scams, and keep learning to compete globally.

PART 5

Stay in the Game

Getting started is one challenge. Staying in the game for years is another. These last lessons are about the long run: quieting the voice that says you do not belong, growing through community and giving back, choosing whether graduate study is your next big step, and learning how AI is changing the field.

Lesson 20: Manage Imposter Syndrome and Stop Comparing Your Journey

Every time I stepped into a new space, a quiet voice showed up with me.

Ambassador. Co-organizer. Speaker. Each title came with the same whisper: *Do you really belong here? Everyone else seems to know more than you. One day they will find out.*

If you have ever felt this, you are in very good company. The feeling has a name: **imposter syndrome**. Psychologists Pauline Clance and Suzanne Imes described it in 1978 (Clance and Imes, 1978), and it shows up in students, professionals, and experts in every field. It is especially loud in data, where the list of things to learn never ends, and where every scroll through social media shows someone who seems to be ahead.

> **The lesson: Stop measuring your journey against other people's highlight reels, and start collecting evidence of your own growth.**

Why It Matters, Especially from Africa

Many of us carry extra weight. We may be the first in our family in tech, or the only person from our school in a global community. We may feel we have to prove that we deserve to be in the room. When you are the "only one," it is easy to turn every mistake into a verdict on yourself, and every success into luck.

This does real damage. Imposter syndrome makes people turn down speaking invitations, skip applications, avoid posting their work, and quit before they get to the good part. Some of the people who most need to be in data are the ones who stay quiet because of this voice.

The Framework: The Evidence Folder

Feelings are not facts. The fix for a feeling that has no evidence is to gather evidence. Keep a simple **Evidence Folder** with three parts.

Wins. Every project finished, every problem solved, every skill learned, every compliment received. Write the date and a sentence. When the voice says, "You do not know anything," open the list.

Feedback. Save kind messages, thank-you notes, comments on your work, and testimonials. They are proof that your work reaches people. Screenshot them.

Growth. Once a month, compare this month's you with last month's you. What can you do now that you could not do then? Not "Am I as good as them?" but "Am I better than before?"

Then pair it with a second tool, **The Right Comparison**:

- Compare yourself only to your past self.
- Compare other people's work to yours only to learn from it. Ask, "What can I take from this?" and not "Why am I not there yet?"

Understand What You Are Comparing

When you look at someone else's career, you see a few things: their title, their post, their offer. You do not see:

- The years of confusion and rejection before it.
- Their starting point, which may have been very different from yours: a better laptop, a mentor in the family, a school with resources.
- The things they struggle with privately.
- The fact that they may be looking at your progress and feeling behind.

Careers are not races on a single track. They are more like many different roads, with different terrains, speeds, and destinations. Someone being ahead of you on one road tells you nothing about where you will arrive on yours.

Practical Tools for Hard Days

- **Name it.** When the voice appears, say it plainly: "This is imposter syndrome." Naming a feeling takes away some of its power.
- **Remember the spotlight effect.** People think about your mistakes far less than you do. Most are busy worrying about their own.
- **Ask questions.** In every room, someone else has the same question. Asking does not expose you. It helps everyone.
- **Prepare, then trust your preparation.** Confidence follows evidence, not the other way around.
- **Talk about it.** Share the feeling with a mentor or friend. You will often hear, "Me too."
- **Curate your feed.** Follow people who teach and encourage, and mute the ones who leave you drained (see Lesson 17).
- **Celebrate others, and yourself.** Congratulating a friend costs you nothing, and so does acknowledging your own progress.

And a gentle note: if feelings of anxiety, worthlessness, or exhaustion become constant or overwhelming, speak to someone you trust or a mental health professional. Looking after your mind is part of looking after your career.

Evidence and Example

Think about how many "firsts" you have already had: your first query, your first dashboard, your first post, your first event. Each one felt uncomfortable at the time. Each one is now behind you. The discomfort was not a sign that you did not belong. It was the feeling of growing.

Notice also that the people you admire most were beginners once. They simply kept showing up long enough for the discomfort to turn into skill.

Try This Today

Create your **Evidence Folder** in 15 minutes. Open a note and write the heading "Wins." Under it, list five things you can do now that you could not do a year ago. Then open your messages and save one piece of kind feedback

you received. Finally, write one sentence you can say to yourself on a hard day, such as: “I am not behind. I am on my own road.”

Lesson Recap

- Imposter syndrome is common, and it is a feeling, not a fact.
- Build an Evidence Folder of wins, feedback, and growth, and compare yourself only to your past self.
- You see other people’s highlight reels, not their full story. Your road is your own.

Lesson 21: Grow Through Tech Communities, and Give Back

At PyCon Africa 2024, I was a volunteer. I was not on the speaker list. I was not a sponsor. I wore a badge, helped where help was needed, and stayed close to the people who made the event happen.

For two years, I volunteered to organize workshops at the Ghana Data Science Summit in 2024 and 2025. For the latter, I missed an important quiz in school and had to pay for it in my final grade. I still love to volunteer. No payment, in some cases no reimbursement for travel but I still showed up.

Probably, service has been an etched personal principle due to my religious upbringing and Christocentric foundations. JESUS says, “The greatest among you must become a servant or slave”. (Matthew 20:26-28) And that verse moves me till today.

That decision, to say yes to volunteering, is the reason I met Herve Aniglo, who became my first mentor in tech, as I shared in Lesson 15. Everything that followed, including speaking at over twenty events, traces back to a student who gave his time.

This lesson is the longest in the book on purpose. Tech communities are the single greatest source of opportunity I know for young Africans in data. If you want to grow, here is how to use them.

> **The lesson: Serve in tech communities, because the people and platforms you help are the ones who open the biggest doors for you.**

Why It Matters, Especially from Africa

Our best tech events and communities are largely built by volunteers. PyCon Africa, for example, is a non-profit conference run entirely by volunteers (source). Developer communities, Google Developer Groups, AWS user

groups, data communities, and many hackathons run the same way. They have a constant need for hands, ideas, and energy, and very little money.

That need is your opportunity. When you serve, you gain things money cannot easily buy:

- **Access** to rooms, speakers, and organizers you would otherwise not meet.
- **Skills** in project management, communication, teamwork, and leadership.
- **Reputation** as someone reliable, which is the strongest currency in a small ecosystem.
- **Referrals and opportunities,** from speaking slots to scholarships to jobs.
- **Friends** who will walk the road with you.

The Framework: The Contribution Path

You do not need to jump to the top. Climb one rung at a time.

1. **Attend.** Show up to meetups, online sessions, and conferences. Listen. Ask questions.
2. **Volunteer.** Help at events: registration, ushering, setup, social media, photography, speaker support.
3. **Join the team.** Move from event volunteer to a regular member of a community chapter or organizing committee.
4. **Speak and teach.** Give a lightning talk, run a workshop, or share your project.
5. **Lead.** Organize an event, start a study group, or head a team.

I climbed the ladder myself: from attending, to volunteering, to speaking, to organizing workshops, to co-organizing within a Google Developer Group and serving as an ambassador for data communities.

How a Conference Really Works

Understanding the machine helps you find your place in it. A community conference usually follows this timeline:

- **6 to 12 months before:** the core team chooses a theme, date, and venue, and begins talking to sponsors.
- **3 to 6 months before:** a call for proposals (CFP) opens, speakers and workshops are chosen, and the program is built. Volunteer calls are often announced.
- **1 to 3 months before:** tickets, communications, design, and logistics ramp up.
- **Event week:** registration, sessions, workshops, and sprints run, with volunteers working across every area.
- **After:** recap posts, thank-yous, feedback, and planning for next year.

These are the roles that need people:

Team	What they do
Registration and ushers	Check in attendees, guide people, answer questions
Speaker liaison	Support speakers before and during the event
Session chairs and MCs	Introduce talks, manage time, keep sessions on track
Communications and social media	Announce, share updates, post recaps
Design and media	Graphics, photography, video
Sponsorship and partnerships	Reach out to organizations and manage relationships
Programme and content	Review proposals, shape the schedule
Logistics and tech	Venue, audio, internet, setup
Community and inclusion	Make everyone feel welcome, support newcomers
Financial aid and travel	Help eligible attendees get support to attend

Pick the area that matches your strengths, or the one you most want to learn.

How to Get In

- **Watch for volunteer calls.** They are usually announced on LinkedIn, X, and community chats a few months before an event.
- **Apply with specifics.** Do not write “I want to volunteer.” Write: “I can help with social media and photography, and I have experience posting data content.”

- **Reach out early.** Message the organizers, introduce yourself, and offer help.
- **Join the community year-round.** Many chapters run monthly meetups. Be a face people know long before the big event.
- **Be reliable.** Show up on time, finish what you promise, and communicate if plans change. Reliability gets you invited back and recommended.

How to Speak

Speaking is a fast way to become known. To begin:

1. **Start small.** A five-minute lightning talk at a local meetup is a great first step.
2. **Choose a topic you have lived.** "How I built my first dashboard," "What I learned from my first hackathon," or "How I analyzed local price data" are all valuable.
3. **Answer a CFP clearly.** In your abstract, state the problem, what the audience will take away, and who the talk is for.
4. **Practise.** Rehearse aloud and time yourself.
5. **Share afterwards.** Post your slides and a recap.

The Annual Calendar: Ghana and Africa

Here are major recurring events to watch. Dates, venues, and formats change every year, so check each official page.

In Ghana

Event details change often. Last checked: November 2026. Always confirm on the official page before you plan.

Event	What it is	Notes
PyCon Ghana	Annual Python community conference	The 2026 edition took place in August.
AWS Community Day Accra	Cloud and data community conference run by the AWS User Group Accra	The 2026 edition was held on 29 August at the University of Ghana

Event	What it is	Notes
DevFest Accra	Ghana's largest community-led developer conference, run by GDG Accra	The 2026 edition took place on 6 and 7 November in Accra, with workshops on day one and the main conference on day two
Ghana Data Science Summit (IndabaX Ghana)	Ghana's annual gathering on machine learning, data science, and responsible AI, launched in 2019 as a local IndabaX of the Deep Learning Indaba.	The 2024 edition was held in Kumasi, the 2025 edition at Ashesi University, and the 2026 edition at Ho Technical University. Venues change each year
Pan African AI Summit	High-level continental gathering scaling Africa's AI ecosystem.	Focuses on Afrocentric LLMs, ethical AI policy, and digital market strategies.
Ghana Youth Tech Summit	Youth-focused innovation and future-readiness event.	Equips students and young founders with skills in AI, robotics, and fintech.
Google I/O Extended and Build with AI events	Community events around Google's latest AI and cloud tools	Held by GDG chapters in several Ghanaian cities
WiMLDS (Women in Machine Learning & Data Science)	A global community supporting and promoting women and gender minorities in AI fields.	Highly active regional chapters like WiMLDS Accra and Nairobi host regular technical workshops, monthly meetups, and hackathons.
Divas in AI	A diversity network dedicated to bridging the gender gap and elevating women's leadership in AI.	Runs hands-on coding bootcamps, the TechsiStars mentorship program, and collaborative webinars across West and West-Central Africa.
AI Afahyɛ	A festival by AI Ghana for AI collaboration and knowledge sharing	First held in September 2024 in Accra
Local meetups	Tableau, Databricks, AWS, Python, and data groups	Search each community's pages for regular sessions

Across Africa

Event	What it is	Notes
Deep Learning Indaba	Africa's flagship machine learning and AI gathering, hosted in a different country each year	The 2026 edition was held in Lagos; the 2023 edition was in Accra. Look for calls for datasets, tutorials, workshops, and financial aid
PyCon Africa	The continental Python conference, hosted in a different city each time	The 2024 edition was held in Accra
Data Science Africa	An annual event with workshops and summer schools for machine learning and data science	Check the official site for new dates
AMLD Africa	Applied Machine Learning Days, a pan-African conference on applied AI, with student ambassadors across the continent	Held in Tunisia and Morocco, then Nairobi in 2024 and Wits University in Johannesburg in 2026
DevFest (many cities)	GDG community conferences across the continent	For example, DevFest Nairobi in 2026
AWS Community Days and AWS Summits	Cloud, data, and AI events	The 2026 events included Lagos and Johannesburg
Zindi events and meetups	Data science competitions, hackathons, and community sessions	Follow their channels
Other continental tech events	Larger tech summits and festivals across Africa	Check their official pages for dates

Dates change every year. Pick one event in the next three months and register for it this week. For more programmes, fellowships, and scholarships, see the Opportunities Directory at the end of the book.

Your Conference Playbook

Before:

- Pick one or two goals, such as "meet three data engineers" or "give my first talk."

- Look at the speaker list and note the people you want to meet.
- Apply to volunteer, speak, or request financial aid early. Many events, including large ones like the Indaba, offer aid but have strict deadlines.
- Update your LinkedIn and portfolio. Bring your link and a way to connect.

During:

- Arrive early. Talk to the people next to you.
- Ask one good question in a session.
- Take notes and photos with permission.
- Use the Meet step from Lesson 15: a short introduction and a note on who you want to follow up with.

After:

- Message the people you met within 48 hours.
- Post a recap with your top three lessons and tag the organizers and speakers.
- Write down what you will do differently or try next.
- Offer to help with the next edition.

Contribute All Year, Not Only at Events

- Help run a monthly meetup or study group.
- Moderate a community chat and welcome newcomers.
- Write beginner guides and recap posts.
- Share datasets, templates, and resources.
- Contribute to open-source projects, such as documentation fixes or small bug fixes.
- Mentor someone one step behind you (Lesson 16).
- Speak at your school or community about what you learned.

Service is not a favour you do for others while you wait to be noticed. It is the way you become the kind of person who is noticed.

Try This Today

Do a 20-minute **Community Move**:

1. Choose one event or community from the tables above that matches your lane.
2. Find its volunteer, speaker, or membership link, or its organizers on LinkedIn.
3. Write a three-line message: who you are, what you can help with, and when you are available.
4. Send it, and add the event date to your calendar.

Lesson Recap

- Tech communities and conferences are run by volunteers and open doors for people who serve.
- Climb the Contribution Path: attend, volunteer, join the team, speak, lead.
- Use a Before, During, After playbook, and keep contributing all year.

Lesson 22: Pursue Graduate Study in Data, from Africa to the World

I met Alex Mutua at TReND-CaMinA 2026, a moment when I was thinking hard about my next step. Alex had completed an MSc in Data Science at AIMS Senegal and was working as a financial data scientist in Kenya.

Alex was doing remarkably well. What struck me was not only the job. It was the confidence in how Alex spoke about the work, the people met along the way, and the way the program had opened rooms that might otherwise have stayed closed. I walked away thinking: an African graduate program had taken Alex from the classroom to a serious career, without leaving the continent.

That conversation made me see graduate study in a new light. It is not only a path abroad. It is also a path at home.

My own path went through this process too. I have since been admitted to a master's programme in data science in the USA, with a graduate assistantship. The Five Fs below are the thinking I used to compare programmes, and I hope they help you do the same.

> **The lesson: Graduate study can accelerate your data career, so choose a program that fits your goals, your funding, and your network, whether in Africa or abroad.**

Why It Matters, Especially from Africa

A master's degree is not required for every data role. Many people build strong careers with projects and experience alone. But graduate study can help if you want to:

- Move into data science, machine learning, or research roles that value advanced training.

- Switch fields, for example from biology, economics, or engineering into data.
- Build deep theory and a research record.
- Join a strong alumni network and access scholarships, internships, and conferences.
- Qualify for academic paths and a PhD.

It is also a major investment of time and money, so choose carefully.

The Framework: The Five Fs

Compare every program, anywhere in the world, using five questions.

1. **Funding.** Who pays? Tuition, living costs, scholarships, assistantships, and stipends. A great program you cannot afford is not an option, but many have funding you can find.
2. **Focus.** Is it theory-heavy or applied? Is it statistics, computer science, machine learning, business analytics, or engineering? Match it to your lane (Lesson 2).
3. **Faculty.** Who teaches and does research? Look for professors whose work excites you, and check what they have published and supervised.
4. **Footprint.** How strong is the network? Alumni, industry partners, internships, and access to events and companies.
5. **Future.** Where do graduates actually go? Look at LinkedIn for alumni jobs, and ask them directly.

The AIMS Brand in Africa

The **African Institute for Mathematical Sciences (AIMS)** is a pan-African network of centres, with locations in Senegal, South Africa, Ghana, Cameroon, and Rwanda. It was established in 2003 and has built a strong reputation for rigorous, intensive postgraduate training in mathematical sciences, with data science and machine learning pathways at various centres. AIMS also runs the **African Master's in Machine Intelligence (AMMI)**, a one-year programme launched in 2018 at AIMS Rwanda in Kigali with support from Facebook and Google, and later also offered at

AIMS Ghana. (Sources: AIMS South Africa, the AIMS Next Einstein Initiative, the AMMI overview at AIMS Rwanda, and the AMMI website.) Details change, so confirm the current programmes, centres, and scholarships on the official pages.

Why does the AIMS name carry weight? In my experience and from conversations with graduates like Alex:

- The programs are intensive and international, with students from many African countries.
- Scholarships are often available to admitted students, though they change, so check each year.
- Graduates and students are visible in top African data and AI summer schools and events, and the alumni network opens doors to internships, research, and jobs.
- The brand is recognised by employers and universities in Africa and beyond, which helps if you later apply for a PhD or a job abroad.

Other Strong Options in Africa

Programs, fees, and names change, so treat this as a starting map and verify every detail on the official pages.

Region	Institutions to explore	What to look for
Rwanda	University of Rwanda, African Centre of Excellence in Data Science (ACE-DS); Carnegie Mellon University Africa; AIMS Rwanda and AMMI	Dedicated data science and AI training, strong international links, and a fast-growing tech scene in Kigali
South Africa	University of Cape Town, University of the Witwatersrand, Stellenbosch University, University of Pretoria	Established research, strong machine learning and statistics groups; Pretoria also hosts the AfriDSAI institute for data science and AI
Kenya	University of Nairobi, Strathmore University, Kenyatta University	Growing data science and analytics programs and a lively tech and fintech industry

Region	Institutions to explore	What to look for
Ghana	University of Ghana, KNUST, AIMS Ghana	Local access, lower cost, and strong links with Ghana's tech communities
Nigeria	University of Ibadan, Pan-Atlantic University	Large tech ecosystem and a major hub for AI events
North Africa	American University in Cairo, Mohammed VI Polytechnic University (Morocco), universities in Tunisia	Strong computer science and engineering programs; check language of instruction
Namibia and others	Namibia University of Science and Technology and regional universities	Applied statistics and analytics programs

Some of these appear in recent Eduniversal regional rankings of data analytics programs, such as those listing the University of Pretoria's GIBS Business School, the American University in Cairo, the Namibia University of Science and Technology, and the University of Rwanda's ACE-DS. Rankings are only one input. Use the Five Fs.

Advantages of studying in Africa: lower cost, closer to home and to local problems, strong regional networks, and the chance to build your name where you plan to work.

Challenges: some programs have limited funding or fewer industry links, and the quality varies. Check the facts for each one.

Going Abroad: What to Know

Studying abroad can bring access to major research labs, large companies, and global networks. Common routes include:

- **United Kingdom:** one-year master's programs. Look at Chevening, Commonwealth scholarships, and university-specific awards.
- **Germany and other parts of Europe:** DAAD scholarships, low or no tuition at many public universities, and Erasmus Mundus programs.

- **United States:** strong research and assistantships, mostly at the PhD level, but some master's programmes offer graduate assistantships, which can cover part of the cost in return for teaching or research work. I am one example. Fulbright is one major scholarship. Some programs no longer require standardised tests, but check each one.
- **Canada:** strong data science and AI programs, with scholarships at some universities, including programs tied to the Mastercard Foundation.
- **Other global scholarships:** programs such as Rhodes, Gates Cambridge, and others for exceptional applicants.

Think seriously about total cost, visa rules, living costs, and what you want to do after graduation. And remember that going abroad does not mean giving up on Africa. Many graduates come back, or work remotely for African problems, with new skills and networks.

What Admissions Committees Look For

Most applications ask for:

- **Transcripts and grades,** with evidence of math and statistics.
- **A statement of purpose:** why this program, what you have done, and what you will do next.
- **Two or three recommendation letters** from people who know your work.
- **A CV,** ideally one page (Lesson 18).
- **English proficiency tests** such as IELTS or TOEFL for many programs, with exemptions in some cases.
- **A portfolio or research interest,** which many data programs value.
- **Sometimes an interview.** Your project story (Lesson 8) becomes your strongest tool.

Everything you have learned in this book helps: your projects, your public work, your talks, your mentors who can write about you, and your ability to explain your work.

A Simple Timeline

- **12 to 18 months before:** research programs, funding, and deadlines. Build projects and relationships with potential recommenders.
- **9 to 12 months before:** prepare your statement, take any tests, and ask recommenders.
- **6 to 9 months before:** apply, since many deadlines fall in the months before the intake.
- **After offers:** compare funding and the Five Fs, then decide.

Try This Today

Spend 25 minutes building a **Program Shortlist**:

1. Choose three programs: one in Africa, one at AIMS or a similar network, and one abroad (or another African option).
2. Make a table with the Five Fs for each.
3. Find one alumnus of each on LinkedIn and send a short message (use the template in Lesson 16).
4. Write the earliest application deadline on your calendar.

Lesson Recap

- Graduate study can accelerate a data career, and it is possible within Africa as well as abroad.
- Compare programs using the Five Fs: funding, focus, faculty, footprint, and future.
- Start early, build your projects and relationships, and ask alumni for the real picture.

Link to schools list: Road to Grad School Data Science/AI/CS Programs

Lesson 23: Learn How AI Is Changing Data, and Use It Without Losing Your Edge

Sooner or later, every beginner in data asks two questions. Will AI take entry-level data jobs? And can I use AI to learn without becoming dependent on it?

Both questions are fair. Both can feel a little scary. And nobody, including me, can promise you a neat answer to the first one.

Here is what I can tell you. Think back to OnionGuard in Lesson 13, the AI-powered tool my team built for detecting onion diseases. A tool like that can give an answer in seconds. But someone still has to ask whether the answer makes sense for the farm, the crop, and the season. That someone is the person who understands the problem. This lesson is about becoming that person.

> **The lesson: AI is changing how data work gets done, so use it as a tutor and a teammate, and build the judgment it cannot supply.**

Why It Matters, Especially from Africa

AI tools can now draft a SQL query, explain an error message, write routine code, and suggest a chart in seconds. Tasks that once filled a junior analyst's week are getting faster. That means employers will increasingly expect speed. It also means the value of a beginner is shifting toward what AI does not do for you: choosing the right question, noticing when a number looks wrong, understanding the context behind the data, and taking responsibility for a decision.

For those of us learning in Africa, there are two more reasons to pay attention. The first is access. If you have no mentor nearby and a limited data

bundle, an AI tutor can explain a concept at midnight, as many times as you need. The second is context. AI models are often trained on data that underrepresents African languages, markets, and realities. Someone who knows the local setting, and can check an AI's answer against what is true on the ground, is more valuable, not less.

The Framework: Try, Ask, Check

Use AI the way a good student uses a tutor. Three steps, in this order:

1. **Try.** Write your own query, code, or analysis first, even if it is rough. The struggle is where learning happens.
2. **Ask.** Then ask AI to review your work, explain what you missed, or show another approach. Ask "why," not only "what."
3. **Check.** Run the code. Test it on a small sample. Compare the result with a number you already know. If you cannot explain the answer in plain language, you do not own it yet.

Two habits protect you as you go. First, never paste private or sensitive data into an AI tool (see the data protection section in Lesson 19). Second, be honest about what you used. In your Project Card (Lesson 10), add one line on where AI helped. Honesty builds trust with employers, and it shows you can use these tools responsibly.

Evidence and Example

Here is a simple way to see where AI helps and where you still matter.

Getting faster with AI:

- First drafts of SQL and Python.
- Explaining errors and unfamiliar code.
- Suggesting charts and summarizing long documents.

Still on you:

- Asking the right question.
- Checking the data and the result.
- Understanding the local context.

- Explaining your findings in plain language (Lesson 14).
- Taking responsibility for the decision.

This is how I see the field today, not a promise. Tools change quickly, so keep checking what is current, and test any claim about the job market, including mine, against the job ads near you.

Try This Today

Take 20 minutes. Pick one SQL or Python exercise. Solve it yourself first. Then ask an AI tool to review your answer and explain any difference. Finish by writing one sentence in your Learning Log (Lesson 9): what did the AI get right, and what did you have to correct?

Lesson Recap

- AI is making routine data tasks faster, so judgment, context, and honesty matter more.
- Use Try, Ask, Check: attempt it yourself, ask AI to explain, then verify the result.
- Protect private data, and say where AI helped in your projects.

Conclusion: Start Today

Let me take you back to the beginning.

A young person in Accra, Lagos, Nairobi, or Kigali opens a laptop. They are not sure what to learn. They are not sure they are allowed to be here. They have a data bundle that will not last long and a dream that feels bigger than their circumstances.

That young person could be you. At one point, it was me.

Over 23 lessons, we have covered a lot of ground. Let us walk through it one last time.

We began with purpose. We learned to look beyond the numbers and the salaries, to create a path and choose a lane that fit who we are, to choose one data career first, to learn on a budget, and to take one step at a time.

We built skills, not just credentials. We mastered the fundamentals, respected statistics and math, built real projects, and documented the journey.

We proved what we can do. We let our portfolio become our CV, solved African problems with African data, shared our learning in public, competed and collaborated, and learned to explain our work to people who do not speak data.

We got noticed and got hired. We built our network before we needed it, found mentors, made LinkedIn work for us, prepared for interviews and learned from failure, and weighed local, remote, and global roles.

And we learned to stay in the game. We quieted imposter syndrome, grew through communities and gave back, looked at graduate study as a path from Africa to the world, and saw how AI is changing the data space.

If I had to compress all of it into three sentences, they would be these:

Start small, and keep going. Build in public, and bring people with you. Be proud of where you are from, because the world needs the questions only you can ask.

Your First Seven Days

Do not close this book and wait for motivation. Use this simple plan.

- **Day 1:** Write your reason (Lesson 1) and choose your first data role (Lesson 3).
- **Day 2:** Pick your learning path and one free course (Lesson 4).
- **Day 3:** Set up your Day After Rule tracker (Lesson 5) and finish one SQL or Excel exercise (Lesson 6).
- **Day 4:** Write your Learning Log entry (Lesson 9) and choose your project idea (Lessons 8 and 11).
- **Day 5:** Fix your LinkedIn headline and About section (Lesson 17).
- **Day 6:** Message one person you admire (Lessons 15 and 16).
- **Day 7:** Share your first Four-Line Post (Lesson 12) and sign up for one community event (Lesson 21).

Seven days. Seven small actions. That is a career beginning.

An Invitation

This book is free because I do not want money to be the reason someone does not start. If it helped you, here is how you can help back:

- **Share it** with one person who needs it.
- **Tell me what you did** with it. Send me your first project, your first post, or your first interview story.
- **Join the community.** Come to the next event, ask questions, and answer someone else's.
- **Pass it on.** When you are a few steps ahead, turn around and lend a hand.

The road is real. It is muddy in places, but it goes somewhere. I will see you on it.

> *YOUR MOVE: Close this book, open your Learning Log, and write the date and one sentence about what you will do first. Then do it.*

Opportunities Directory

This is a starting list of programmes, communities, competitions, scholarships, and job sources that I know of or have used. It is not complete, and nothing here is guaranteed. Eligibility, deadlines, costs, and availability change often, so open the official page and read the current terms before you apply. Last checked: November 2026.

Free and Funded Learning

Opportunity	What it offers	Link
Google Data Analytics Certificate	A structured entry-level analytics path, with financial aid available on Coursera	Visit
IBM Data Analyst and Data Science certificates	Beginner to intermediate paths with hands-on projects	Visit
Microsoft Learn	Free learning paths for Power BI, Excel, Azure, and Fabric	Visit
AWS Skill Builder	Free digital courses on cloud, data, and AI	Visit
Kaggle Learn	Short free courses on SQL, Python, pandas, and machine learning	Visit
freeCodeCamp	Free courses and certifications in data analysis and Python	Visit
DataTalks.Club Zoomcamps	Free, cohort-based courses in data engineering and machine learning	Visit
Generation Ghana (data analyst upskilling)	Training for Ghanaian learners, offered with partners	Visit
Azubi Africa	Training in data analytics, cloud, and AI, sometimes with funded programmes	Visit
Blossom Academy	Data analytics training and job-placement support in Ghana and beyond	Visit
ALX Africa	Cohort-based programmes in data, software, and cloud, plus a community of hubs	Visit

Opportunity	What it offers	Link
GitHub Student Developer Pack	Free tools and credits for verified students	Visit
Tableau for Students	Free software access and learning resources for students	Visit

Ambassador, Student, and Community Programmes

Opportunity	What it offers	Link
Tableau Community and Ambassadors	User groups, events, and community leadership	Visit
Zindi	African data science competitions, community, and an ambassador programme	Visit
Google Developer Groups (GDG)	Local chapters, DevFest, and campus communities	Visit
Microsoft Learn Student Ambassadors	A global student community with training and leadership opportunities	Visit
Women Techmakers	Community and resources for women in tech	Visit
AMLD Africa	Pan-African applied AI conference with student ambassadors	Visit
IndabaX	Local, volunteer-run machine learning events linked to the Deep Learning Indaba	Visit
WiMLDS, WiDS, and R-Ladies	Women-focused data science communities with local chapters	Visit 1, Visit 2, Visit 3
Black in AI	A community supporting Black researchers and practitioners in AI	Visit
Masakhane	A grassroots community building NLP for African languages	Visit

Summer Schools, Fellowships, and Open Source

Opportunity	What it offers	Link
TReND-CaMinA	A competitive summer school I attended in 2026	Visit

Opportunity	What it offers	Link
Data Science Africa	Annual event with workshops and summer schools	Visit
Deep Learning Indaba	Africa's flagship AI gathering, with financial aid in some years	Visit
Google Summer of Code	Paid mentored open-source projects for newcomers	Visit
Outreachy	Paid remote internships in open source for people underrepresented in tech	Visit

Competitions and Challenges

Opportunity	What it offers	Link
Zindi competitions	African datasets and problems, with prizes on some challenges	Visit
Kaggle competitions	Global competitions and learning challenges	Visit
DrivenData	Data science competitions for social impact	Visit
Makeover Monday	A weekly data visualisation challenge	Visit
Tableau Iron Viz	A global data visualisation competition	Visit

Graduate Study and Scholarships

Opportunity	What it offers	Link
AIMS and AMMI	Postgraduate training across Africa; AMMI focuses on machine intelligence	Visit 1, Visit 2
Carnegie Mellon University Africa	US-accredited graduate programmes in Kigali	Visit
Chevening	UK government scholarships for one-year master's study	Visit
Commonwealth Scholarships	UK scholarships for eligible Commonwealth countries	Visit
DAAD	German scholarships and study programmes	Visit

Opportunity	What it offers	Link
Fulbright	US government scholarships and exchange programmes	Visit
Erasmus Mundus	Joint master's programmes in Europe, with scholarships	Visit
Mastercard Foundation Scholars	Scholarships at partner universities, with eligibility rules	Visit
Rhodes and Gates Cambridge	Highly competitive scholarships for study at Oxford and Cambridge	Visit 1, Visit 2

Jobs, Remote Work, and Freelancing

Opportunity	What it offers	Link
LinkedIn Jobs	The largest job board, with a Remote filter	Visit
Remote OK, We Work Remotely, Himalayas	Remote job boards	Visit 1, Visit 2, Visit 3
Wellfound	Startup jobs	Visit
Upwork, Fiverr, Freelancer, Contra	Freelance platforms	Visit 1, Visit 2, Visit 3, Visit 4
Payoneer and Wise	Ways to receive international payments, subject to availability in your country	Visit 1, Visit 2

Resource List

Links last checked in November 2026. If a link no longer works, search the name to find the current official page.

Free and Low-Cost Learning

- **Google Data Analytics Certificate** on Coursera. Apply for financial aid.
- **IBM Data Analyst and IBM Data Science** programs on Coursera.
- **Kaggle Learn:** short free courses on SQL, Python, pandas, data visualization, and machine learning.
- **Microsoft Learn:** free Power BI, Excel, Azure, and Fabric training.
- **freeCodeCamp:** data analysis, Python, and SQL courses.
- **SQLBolt and Mode SQL Tutorial:** interactive SQL practice.
- **Khan Academy:** statistics, probability, and algebra.
- **StatQuest with Josh Starmer (YouTube):** friendly explanations of statistics and machine learning.
- **Seeing Theory:** a visual introduction to probability and statistics.
- **Python for Everybody:** a free beginner Python course.
- **CS50 (Harvard):** a free introduction to computer science.
- **DataTalks.Club Zoomcamps:** free courses in data engineering and machine learning.
- **Machine Learning Specialization (Andrew Ng)** and **fast.ai** for machine learning and deep learning.
- **Tableau Public and Power BI Desktop:** free tools for building and sharing dashboards.
- **Google Colab and Kaggle Notebooks:** free cloud notebooks for Python.

Training Programs and Hubs

- **ALX Africa** data programs.

- **Azubi Africa**, **Blossom Academy**, **Generation Ghana**, **Only Quality Data, and Festman Hub** (Ghana).
- Look for hubs and training programs in your own city, and ask in local communities.

Datasets

- **Zindi:** competitions and African datasets.
- **Kaggle Datasets.**
- **Humanitarian Data Exchange (HDX).**
- **World Bank Open Data.**
- **African Development Bank data portal.**
- **Ghana Statistical Service** and **Ghana's open data portal**, plus national open data portals in your country.
- **The DHS Program:** health and demographic surveys.
- **FAOSTAT:** food and agriculture data.
- **Our World in Data.**
- **Masakhane:** African language datasets and research.
- **OpenStreetMap.**
- **Google Dataset Search.**

Communities and Events

- **Zindi community** and meetups.
- **Tableau Community** and user groups.
- **Google Developer Groups (GDG)**, including DevFest events.
- **AWS User Group Accra** and AWS Community Days.
- **PyCon Ghana** and **PyCon Africa**.
- **Deep Learning Indaba** and **IndabaX.**
- **Data Science Africa.**
- **AMLD Africa.**
- **Women in Data Science (WiDS)**, **WiMLDS**, **and Black in AI.**
- **ALX community and local tech hubs.**

Jobs and Freelancing

- LinkedIn Jobs, with the Remote filter.
- Remote OK, We Work Remotely, Himalayas, and Wellfound.
- Upwork, Fiverr, Freelancer, and Contra.

Sources and Further Reading

These are the sources behind the facts and figures in this book, grouped by lesson. Personal stories and opinions come from my own experience. All links were checked in November 2026, and programme details can change, so use the official pages for current information.

Lesson 1 (completion rates). Jordan, K. (2015). Massive open online course completion rates revisited: Assessment, length and attrition. *International Review of Research in Open and Distributed Learning*, 16(3), 341 to 358. https://doi.org/10.19173/irrodl.v16i3.2112

Lesson 4 (certifications). Check the official pages: Google Data Analytics, IBM Data Analyst, Microsoft PL-300, Tableau certifications, AWS Certified Data Engineer, Google Cloud Professional Data Engineer, Databricks, and Microsoft Fabric Data Engineer.

Lesson 7 (statistics). Khan Academy: Statistics and probability, StatQuest, and Seeing Theory.

Lesson 10 (TReND-CaMinA). TReND in Africa: CaMinA.

Lesson 11 (datasets). See the linked sources in the lesson and in the Resource List. Always check each dataset's licence and terms of use.

Lessons 15 and 21 (events).

- PyCon Africa 2024 and its volunteer-run model: About PyCon Africa 2024.
- PyCon Ghana.
- Deep Learning Indaba 2026.
- AMLD Africa: about page and the Wits University report on AMLD Africa 2026.
- AWS User Group Accra (Meetup).
- DevFest Accra 2026.

- Ghana Data Science Summit (IndabaX Ghana): Ghana News Agency report on the 2026 summit and Joy Online report on the 2025 summit.

Lesson 19 (data protection). EU General Data Protection Regulation, Ghana Data Protection Commission, Nigeria Data Protection Commission, Kenya Office of the Data Protection Commissioner, and South Africa's Information Regulator (POPIA).

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- AIMS: AIMS South Africa, About and the AIMS Next Einstein Initiative. AIMS was established in 2003, and its current centres are in South Africa, Senegal, Ghana, Cameroon, and Rwanda.
- AMMI: overview at AIMS Rwanda, AMMI launch announcement, and AIMS Ghana.
- Regional rankings: Eduniversal Best Masters ranking for data analytics in Africa.
- Scholarships: Chevening, Commonwealth Scholarships, DAAD, Fulbright, Erasmus Mundus, Mastercard Foundation, Rhodes, and Gates Cambridge.

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About the Author



Elvis Kwabena Asare Nkrumah is a data scientist, incoming MS Data Science student, and community builder from Ghana. He earned a BSc in Computer Science and Statistics from the University of Ghana. His journey in data began with an interest in data engineering, moved into data analytics in his second and third years of undergraduate study, and grew into data science and AI by his fourth year.

He has served as a Tableau Ambassador (the only one from Ghana in 2024, and again this year), a Zindi Ambassador (2025 to now), and a Google Developer Group on-campus co-organizer. As a lover of volunteering, he has served at several tech events in Ghana, from the Google Developer Group in Accra's annual DevFest to PyCon Africa 2024. He is a tech speaker, workshop organizer, and hackathon winner, and he has spoken at more than twenty tech events. He is also co-founder of ADARA AI Lab, and a former data science intern and later Junior Data Scientist at GETA Solutions. He has been a beneficiary of several competitive programs in Ghana and Africa, including TReND-CaMinA, the National Geographic and The Nature Conservancy Externship Program, the University of Ghana Nkabom Honours Scholars Program, and GIZ and Ishango's Data and AI program.

Breaking into Data from Africa: 23 Lessons at 23 was written around his 23rd birthday as a way to give back to the tech community in Ghana and Africa and to appreciate the impact of his mentors in his life.

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