“People will spend a lot of time on Facebook and Instagram and I’m ok with that because it funds the building of digital infrastructure” - Neil Lawrence

“We didn’t have enough data to make the map, there are only 500 Boda Bodas, but maybe over time we can” - Martin Mubangizi

“60% of Ashesi students go into industry” - David Ebo Adjepoon-Yamoah

“80% of the problems you see can be solved with linear regression” - Moustapha Cisse

“These guys turned my 50 page statistics paper into 1 equation and a 3D pie chart” - Katie P Bernhard
End-to-end data science

The goal of Data Science Africa is to create a network of data science practitioners, trainers & students in “end-to-end” data science.

1. Data collection
2. Data analysis
3. Communication & visualization
4. Building ML-powered products, services & policy recommendations
5. Growing impact through marketing & entrepreneurship
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0. What is growth?
What is growth?
What is growth?
What is growth data science?

1. Pick a metric, measure it & align teams to it
2. Experiment & data-driven decisions
3. Marketing
4. Watch the graph go up & to the right :)
1. Metrics
Retention: Have you built something people want?

Measuring product market fit

<table>
<thead>
<tr>
<th>Company</th>
<th>Metric that represent value</th>
<th>Ideal frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airbnb</td>
<td>Bookings / Stays</td>
<td>Annual</td>
</tr>
<tr>
<td>Facebook</td>
<td>Active users</td>
<td>Daily/Monthly</td>
</tr>
<tr>
<td>Gusto</td>
<td>Running employee payroll</td>
<td>By-weekly/Monthly</td>
</tr>
<tr>
<td>Lyft</td>
<td>Rides</td>
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<td>Background checks</td>
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Metrics = value your users get from your product

Measure their repeat usage of those metrics

Log everything about usage (responsibly)
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Metrics = value your users get from your product

Measure their repeat usage of those metrics

Log everything about usage (responsibly)
## Growth accounting

<table>
<thead>
<tr>
<th>Type</th>
<th>Week 1</th>
<th>Week 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ New users</td>
<td>N/A</td>
<td>Active (sign up)</td>
</tr>
<tr>
<td>- Churn</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>+ Resurrection</td>
<td>Inactive</td>
<td>Active</td>
</tr>
<tr>
<td>+ Retention</td>
<td>Active</td>
<td>Active</td>
</tr>
<tr>
<td><strong>Total active users</strong></td>
<td><strong>N</strong></td>
<td><strong>N++</strong></td>
</tr>
</tbody>
</table>
Retention: Have you built something people want?

Metrics = value your users get from your product

Measure their repeat usage of those metrics

Log everything about usage (responsibly)
SELECT account_age, active_users/total_users GROUP BY account_age ORDER BY account_age
2. Experimentation
Why do experiments?

1. **Empathy** - you learn what people **actually** are doing, not what you think they are doing.

2. **“The future is here, but it is not evenly distributed”**
   - If I signed them all up, how much revenue would I get?
   - Look at who you signed up today, tell you how much revenue they would contribute a hundred days out.

3. **Make decisions faster**
   - (by not having conversations where you guess instead of know)
A/B testing

PM: Ship it!

Eng: Git Push

Data Scientist

Are you sure?

SIR?

Yay! Metric is going up. Win!

But how do you really know?
A/B testing

What you need is a counter-factual to understand what would’ve happened if we didn’t launch?
A/B testing - THIS IS SIMPLE (even at scale)

- Compute mean and variance of your metrics
- T-test (usually) on means
- Reject the change if effect isn't desirable
3. Marketing
Marketing - it’s a big deal

In order to reach an audience, they need to know about you

1. Channels
   - Search engines
   - Social media - pages, groups,
   - Email, websites

2. Behavioral triggers
   - what is the “magic moment” for your product?
   - How does it lead to more users? E.g. Friending.

3. Creative - beautiful products sometimes beat better products
Takeaways
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End-to-end data science: Growth is ENGINEERED!

5. Growing impact through marketing & entrepreneurship

1. **1 key metric** for everyone in org
2. Growth = new users + resurrections + retention - churn
3. **Retention is key** to growth and SIMPLE to track
4. **Experimentation** gives you superpowers and is SIMPLE.
5. **Growth Data Science is End-to-end:**

   Goals → Metrics -->Logging → Storage → Queries → Decisions → Tests
We are writing DSA’s growth story right now
References

Gustaf Alstromer on Growth

Alex Schultz on Growth

A/B testing summary by Kelly Peng (notebook by Tammy Rotem)