Deploying SRE Training Best Practices to Production

How to “SRE” an SRE Training Program

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Senior Program Manager and Global Lead, SRE EDU

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Site Reliability Engineer and Lead Educator, SRE EDU
Hello
my name is

Jennifer Petoff
(aka Dr. J)
Google Ireland

- Ph.D. in Chemistry
- 12 years at Google
- Co-editor of the SRE Book
- Part-time Travel Blogger at Sidewalk Safari
Hello my name is

JC van Winkel

Google Switzerland

- 8 years at Google
- Was oncall for production monitoring at Google for 6 years
- 30 years experience in teaching
Why is training important?
believe in yourself
SRE EDU: A Brief History

- **Google SRE Founded**: 2003
- **Grokking SRE The Hard Way**: 2014
- **‘Secret Alliance’ for SRE Education convenes**: 2015
- **SRE EDU Team Formed**: 2016
- **v1 SRE EDU Orientation Launched**: 2017
- **Going On Call Curriculum Launched**: 2018
- **SRE EDU Ongoing Education Week Launched**: 2019
- **v2 SRE EDU Orientation Launched**: 2019

Focus on Operations, Automation, Toil Reduction (SRE’ing our SRE Training Programs)
Avoid “Sink or Swim” if you value inclusivity.
- Breeds stress, frustration, attrition
- Imposter syndrome

For other options, consider the ROI on the effort invested
- Are you a small or large organization?
- Are you growing rapidly?
- How experienced are the people you are trying to train?

SRE Principle in Practice:

- Do just enough to meet the needs of your students.
- Keep them happy, but not too happy.
- Consider trade-offs and avoid polishing a diamond.
## Analogy Between Software Development and Training Programs

<table>
<thead>
<tr>
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<th>“What”</th>
<th>“How”</th>
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</thead>
<tbody>
<tr>
<td>Software Development</td>
<td>Product Features</td>
<td>Deploying to production in a reliable way to meet the needs of our users.</td>
</tr>
<tr>
<td>Training Program</td>
<td>Training Content</td>
<td>Deploying a consistent and reliable training program that meets the needs of our students.</td>
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</table>
How to Apply SRE Principles to a Training Program

Service Reliability Hierarchy*
- Monitoring
- Incident Response
- Testing & Release
- Capacity Planning
- Development
- Product

SRE Training Reliability Hierarchy
- Attendance Tracking / Survey Feedback
- Address Issues
- Postmortem / RCA
- Test Teaching
- Scale Operations
- Curriculum design
- Program

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Also more prepared, **hands-on** "Hello world" demonstrations and in-class labs allowing use of the aforementioned paths would be welcome (kinesthetic).

More time doing **hands-on work** and deeper exploration of how {redacted} were run by SRE teams would be nice.

I disliked the "wall of lecture" in some classes, meaning 1.5 or 2 hours of listening with **little/no hands-on exercise**.

Some more **hands-on activities** would have been good.
Main Goal of SRE EDU Onboarding

- Instill confidence and convey SRE Culture
  - Teach just enough tech and tools to be able to navigate our troubleshooting exercises
  - Understand it is OK to ask questions or escalate
Introduction to SRE EDU Orientation v2

- Move away from passive listening
- Instill confidence
- Troubleshoot a real system, built for this purpose
- Facilitator backs off more and more
- Groups of three students, least experienced in the middle, driving
v2 Application Requirements

- Tangible
- ‘Real world’ applicable
- Distributed
- Applying best practices
- Application feels alive
- Breakable

"Sollbruchstelle"
(predetermined breaking point)
Typical reaction to the training experience...
Design and Development Challenges

- Cannot "just" build it: follow best practices
- Use frameworks that guarantee best practices
- We need more than 1 instance
- Spoilers
- Development cycles...
SRE EDU Orientation Was Built with Volunteers

### Pros

- Knowledge about distributed systems is distributed.
- Flexible workforce.

### Cons

- It takes longer.
- “Day job” can get in the way.

### “WIIFM”

- Flex skills
- Recognition
The “Product”
Architecture of the “Product”

- **User**
  - proxy
  - Google Generic Image service
  - UiServer
  - Operator CLI

- **Student**
  - CLI

- **Prod**
  - Uploader
  - LogicServer
  - Cleanup Pipeline
  - Spawner

- **Net**
  - Cloud storage long_term
  - Cloud storage drop_zone

- **Dependents**
  - Product
How Does v2 Work in Practice

- As much automation as possible
- Names of new hires and interested people are added to the SRE EDU list
- Automatically assigned classes and give proper production permissions
- Instructor automation
- Breakage automation...
Automation of Breakages

- Breakages are enabled automatically based on class schedule (calendar)
- SRE EDU oncaller is paged if breakage is *not* eating out of SLO fast enough
- Facilitator removes a silence when phones must page
- Students use the normal Google internal tools and have full rights
What Does Our Monitoring Tell Us Now?

SRE EDU Orientation V2

- 97% Net Promoter Score (+7 pp vs v1)
- +26 pp increase in ‘Very Likely to Recommend’
- 87% of respondents report 1+ increase in confidence (+14 pp vs v1)
- Positive shift in histogram of Δ self-reported confidence
I went in feeling quite apprehensive & came out feeling like I at least know which way I'm pointed. **Thoroughly enjoyed the breakage activities** and learning about how Google's infra, monitoring and processes fit together.

**Delving into real breaking scenarios was super valuable** - I would love more of these (1 per day would be amazing).

The **breakage scenarios in SRE EDU** were awesome.

It was the **funnest week** I've had this year. Overall, it made me feel more **connected to production** and the technology, which made me really happy.

What Does Our Monitoring Tell Us Now?
Concrete behaviors demonstrated

- Use a system diagram
- Diagnose issues using SRE tools
- Annotate an outage
- Mitigate a realistic production issue
- Find root cause & propose a solution
SRE Training: Adapting for Small Companies

- Probably no classes, but self directed and hands on exercises
- Hands on in an environment that looks like a production environment
- Have a script that breaks things
- Plausible story for breakage
Instructional Design Principles for Orgs of All Sizes

- Know your audience
- Consider your culture
- Tell stories
- Define learning objectives
- Use a model for instructional design
  i.e. ADDIE
SRE Training Takeaways

● Training SREs is about building confidence and reducing imposter syndrome not about a fire hose of information
SRE Training Takeaways

- Hands on exercises → more confidence
SRE Training Takeaways

- Training SREs is about building confidence and reducing imposter syndrome, not about a fire hose of information.
- Hands-on exercises increase confidence.
- The Service Reliability Hierarchy provides a useful framework for building and running an SRE training program.
SRE Training Takeaways

- Training SREs is about **building confidence** and reducing **imposter syndrome** not about a fire hose of information.
- Hands on exercises → more confidence.
- The Service Reliability Hierarchy provides a useful framework for building and running an SRE training program.
Final Words...

ASSBAT
Thanks to the SRE EDU Core Team and All Our Volunteers!

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