# Teaching Wi-Fi Shaping the Future

**Jelle Vanderhauwaert**

**CWNE #614**

THE REALITY

# The Challenge

Knowledge gaps in everyday Wi-Fi engineering concepts

| Correct answer | Observed % |
|---|---|
| Access point function | 72.8% |
| Classic 1-6-11 channel plan | 9.9% |
| Client makes roaming decision | 16.0% |
| Meaning of SNR | 18.5% |

**Everyday Wi-Fi use does not guarantee engineering knowledge.**

FIRST THEY MUST UNDERSTAND THE BASICS

# Build the Foundation

**“I’m connected to Wi-Fi, but I cannot access the internet…”**

**“If they cannot explain why 1-6-11 channel plan is important,
they are not ready to discuss other things.”**

Classic 20 MHz operation in the 2.4 GHz band

THEORY ALONE DOES NOT CREATE ENGINEERS

# Make It Real

The textbook question

What is co-channel contention?

The customer problem

Why is Teams voice breaking up in this warehouse?

Why is this scanner disconnecting?

Why does roaming fail here?

**Students start connecting theory to evidence.**

FUTURE ENGINEERS NEED EXPOSURE TO REAL TOOLS

# Give Them Professional Tools

Ekahau / Hamina

Wireshark

Spectrum analysis

AP management platforms

**“This is what real wireless engineers actually do.”**

One tool. One question. Evidence they can explain.

THE LAB PHILOSOPHY

# Let Them Break Things

**Students are allowed to fail.**
**They are expected to experiment.**

Wrong VLAN

Wrong PSK

Wrong RADIUS settings

Bad channel plan

Transmit power mistakes

Roaming issues

THE MOST IMPORTANT SKILL

# Make Them Troubleshoot

## Troubleshooting

01 What is wrong?

02 Why is it wrong?

03 How do you prove it?

04 How do you fix it?

Hypothesis
Evidence
Controlled change
Validation

**The objective is learning how to find the answer.**

BEYOND WI-FI

# What Students Really Learn

Critical thinking

Root cause analysis

Problem solving

Structured troubleshooting

Communication skills

**A useful lab report explains the symptom, evidence, change and validation.**

FINAL MESSAGE

# We Need ~~More~~ Wireless Engineers

*Well Educated*