WHAT I LEARNED IN TAIWAN

Taiwan Summer Course • Medical Device Innovation

A visual summary of **what the course taught me**, **what I learned**, and **how I applied it** in my Smart Chest-Clip Patch presentation.

Hypertension monitoring in resource-constrained settings — the starting point of my presentation.

01 CLINICAL NEED VALIDATION

What the course taught: Clinical Need Validation is a systematic way to identify, screen and validate real clinical pain points before choosing a technology.

What I learned: A medical innovation should begin with understanding **who has the problem, what the problem is, and why it matters**.

In my presentation: Limited hypertension monitoring creates the need for earlier detection and continuous monitoring.

> **KEY PRINCIPLE: Start with the need, not the device.**

02 HMW — HOW MIGHT WE?

HMW turns a validated problem into an open design question, helping us explore different solutions before choosing one.

> **My HMW: How might we enable people with limited access to healthcare to continuously monitor blood pressure and detect hypertension earlier?**

Clinical Need → HMW → Ideas → Smart Patch

I learned that HMW is the bridge between identifying a problem and creating an innovative solution.

FROM A PROBLEM TO A MEDICAL DEVICE

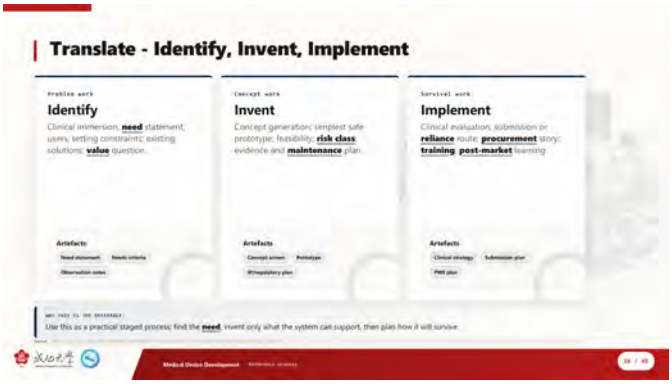
03 MEDICAL DEVICE DEVELOPMENT

Identify → Invent → Implement

Identify: Understand the clinical need, users, setting and constraints.

Invent: Generate concepts, prototype, and evaluate feasibility and risk.

Implement: Consider evaluation, regulation, procurement, training and post-market learning.



Course framework: Identify → Invent → Implement.

In my presentation: Identify = hypertension monitoring problem → Invent = Smart Chest-Clip Patch → Implement = safety, evidence, regulation, cost and distribution.

04 HUMAN-CENTERED DESIGN

What the course taught: Design should consider users, stakeholders, environment, workflow, cost and access—not only technical performance.

What I learned: The best device is not necessarily the most advanced. It is the one that fits the people and setting where it will be used.

Smart Chest-Clip Patch concept — designed around affordability, comfort, portability and real-world use.

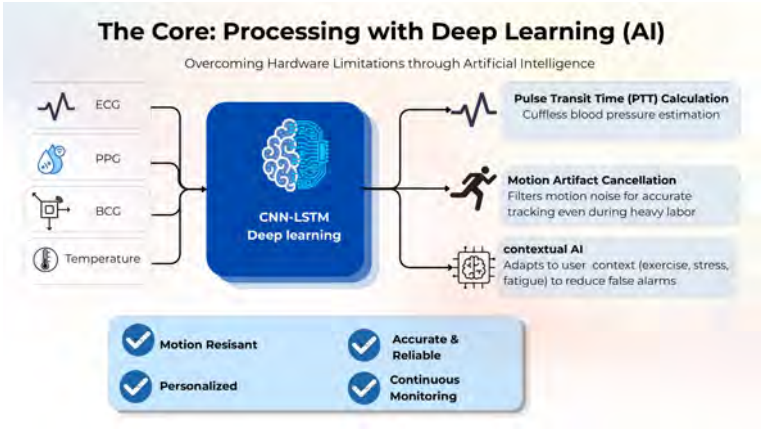
In my presentation: Low cost • Lightweight • Comfortable • Biocompatible • IP65 • Bluetooth/mobile connectivity.

BIOMEDICAL DATA → AI → HEALTHCARE

05 AI / BIOMEDICAL DATA

What the course taught: Biomedical signals and data can be processed using computational methods and AI to support healthcare applications.

What I learned: Sensors collect physiological information; AI helps interpret complex signals. The technology should answer a defined clinical need.



Presentation example: ECG + PPG + BCG + temperature → CNN-LSTM / AI → PTT, cuffless BP and contextual monitoring.

7 VITAL SIGNS: Heart Rate • HRV • Respiratory Rate • SpO■ • Body Temperature • Cuffless BP • Activity/Fatigue

In my presentation: Multi-modal sensing and AI support continuous monitoring and early detection of hypertension.

KEY PRINCIPLE: Technology is a tool for solving the clinical need—not the goal itself.

FROM PROTOTYPE TO REAL MEDICAL DEVICE

06 SAFETY • REGULATION • IP

What the course taught: A medical device must consider intended use, risk, evidence, verification/validation, regulation and post-market responsibility.

What I learned: A prototype is only the beginning. A device must also be safe, evidence-based and appropriate for its intended use.

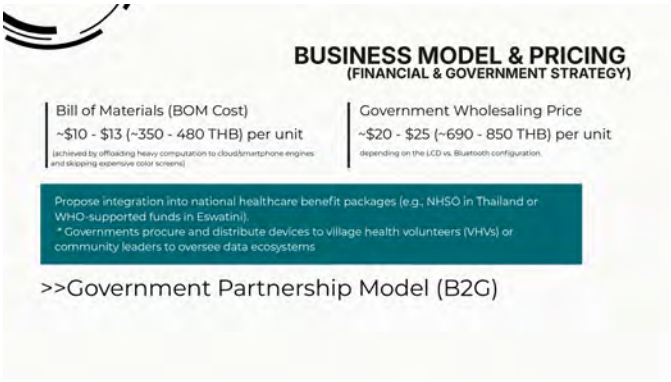
Hazards in the presentation are linked to mitigation strategies.

In my presentation: Skin irritation → biocompatible material • Motion noise → filtering • Water/dust → IP65 • Electrical risk → safe low-power design.

07 BUSINESS & IMPLEMENTATION

What the course taught: Innovation must move beyond invention through procurement, distribution, training, maintenance and sustainable implementation.

What I learned: A good technology creates impact only when people can access, use and sustain it.



Presentation example: affordability connected with government/community distribution.

In my presentation: Low cost → community/government distribution → wider access → earlier detection.

WHAT I LEARNED FROM THE TAIWAN SUMMER COURSE

The most important learning was understanding that medical innovation is a **connected process**, not a single technology.

01 Start with the unmet need

Understand and validate the real problem before choosing a technology.

02 Use HMW to think differently

Turn a problem into an open question that creates space for multiple solutions.

03 Design for real people

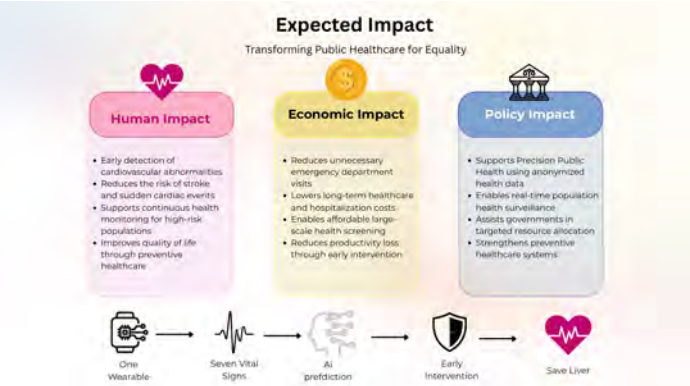
Consider users, environment, accessibility, cost and workflow.

04 Connect different disciplines

Clinical knowledge, engineering, AI/data, design, safety, regulation and business must work together.

05 Think beyond the prototype

A medical device must be safe, evidence-based, feasible, affordable and implementable.



Expected impact from the presentation: earlier detection, scalable screening and stronger preventive healthcare.

MY CHANGE IN PERSPECTIVE

Before the course, I mainly saw the Smart Patch as a technical product. After the course, I understand it as a **healthcare system solution** that connects clinical need, HMW, human-centered design, biomedical engineering, AI, safety, regulation and implementation.

FINAL REFLECTION

> **The course changed my question from “Can we build this?” to “Is it the right solution, for the right people, in the right setting—and can it actually reach them?”**