Context Shapes Experience: Building Better Tulip Apps

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FEATURING

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AGENDA

01 **Why User Centricity?**
The Philosophy & Benefits

02 **The Physical Perspective**
How to plan in Solution Design

03 **App Context**
Thinking Through App Experience

04 **Best Practices in Action**
A look at Human-Centric Solutions

05 **Feedback Cycles**
Getting Users in the Loop

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Why User Centric Solutions?

Lean MFG x Tulip Apps

The Toyota style is not to create results by working hard. It is a system that says **there is no limit to people's creativity.**

People don't go to Toyota to 'work' they go there to 'think'.

– Taiichi Ohno

Industrial Engineer, Creator of
Toyota Production System

What is “User Centric”?

The System

Serves the Users

Core (Lean) Principles

User Centric Solutions are rooted in Lean Manufacturing concepts:

- Everyone participates in continuous improvement → **Kaizen** Small, Incremental Change
- Entering data is a non value-add activity → **Muda** Waste in Operations
- Model the Solution around where the work happens → **Gemba** The Actual Place
- Provide the right, contextualized information → **Respect for People** Human Nature

Navigating from Point to Point

Which is serving the User?

A

B

MapQuest: Driving Directions: North America — Page 1 of 3

MAPQUEST

Send To Printer Back To Directions

Start: Dallas, TX US

End: 312 Barton Springs Rd Austin, TX 78704-1213 US

Distance: 196.99 miles

Total Estimated Time: 3 hours, 21 minutes

Directions	Distance
1. Start out going South on N AKARD ST toward FEDERAL ST.	0.1 miles
2. Turn RIGHT onto ELM ST.	0.5 miles
3. Turn SLIGHT LEFT to stay on ELM ST.	0.1 miles
4. ELM ST becomes COMMERCE ST.	<0.1 miles
5. Merge onto I-35E S.	57.4 miles
6. Merge onto I-35 S/US-81 S via the exit- on the left.	137.6 miles
7. Take the exit- exit number 234A- toward 1ST ST/HOLLY ST.	<0.1 miles
8. Turn SLIGHT LEFT onto I-35 N.	<0.1 miles
9. Turn RIGHT onto CESAR CHAVEZ ST E/E 1ST ST/TX-343 LOOP.	0.4 miles
10. Turn RIGHT onto BRAZOS ST.	<0.1 miles
11. Turn LEFT onto E 2ND ST.	<0.1 miles
12. Turn LEFT onto CONGRESS AVE S.	0.3 miles
13. Turn RIGHT onto BARTON SPRINGS RD.	0.1 miles
End at 312 Barton Springs Rd, Austin, TX 78704-1213 US	

http://www.mapquest.com/directions/main.adp?do=prt&2n=TRAVIS%20COUNTY&1g=39Vzj74hg7M... 04/15/2004

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User Centric Solutions = Productivity Gains = ROI

User Centric Solutions play a part in:

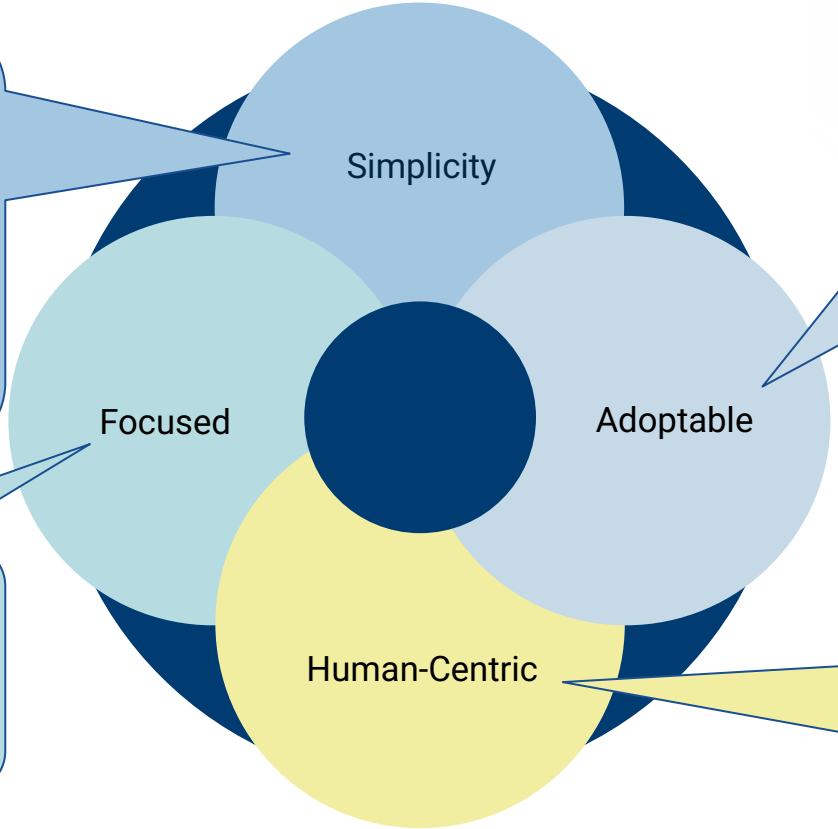
- Reduction in Downtime
- Improvement in Quality
- Increased Throughput

Through providing Users:

- Clear work instructions and digital guidance
- Communicating the right information at the right time
- Eliminating pen and paper as the only way to record information

Evaluating Tulip Apps - Solution Design Credo

- Composable Table Model
- Only a handful of tables per app.
- A new Operator can use it with little-to-no training.
- Another Citizen Developer can understand and iterate on it.



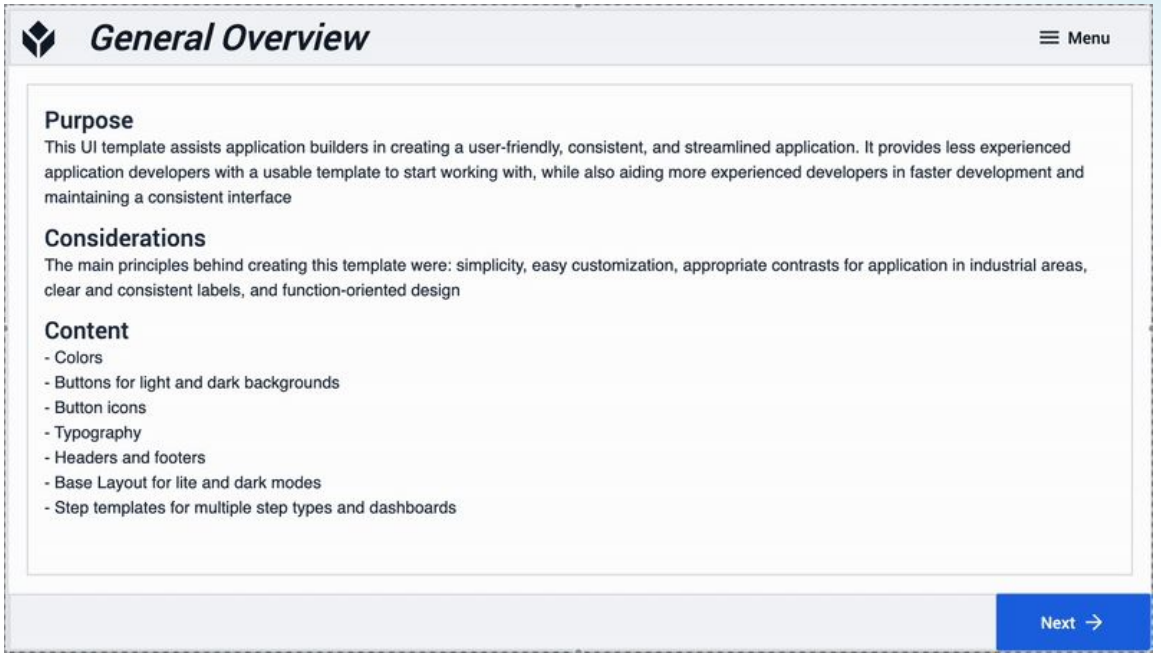
- Published apps are used on the Shop Floor.
- Customer Citizen Developers building new solutions and iterating on existing solutions.

- Solution split into Apps by: Place / Process / Persona
- Satisfies the Business Objectives

- Apps *serve* the *Operator*
- Connected devices (minimize keystrokes & human errors)
- Operator-centric KPIs

Basic UI principles

- Standard colors
- Consistent layout
- Step trigger naming conventions
- Intuitive navigation
- Standard icon usage on buttons
- Consistent header and footer design



Check out: Templates and guidelines in the ***library.tulip.co***

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The Physical Perspective in Solution Design

A Starting Point

Where and How to Start

1

See the Process

Go beyond the documents and spreadsheets and view operations first hand

2

Understand the Environment

Will the users be wearing gloves and a suit? Will users be sitting at a desk or operating a machine?

3

Plan for Devices

Laptop, Tablet, and mobile devices are all options to run Tulip, and the device should be fit for purpose

1

See the Process

Aka: “Genchi gembutsu.” = “Go and see for yourself.”

2

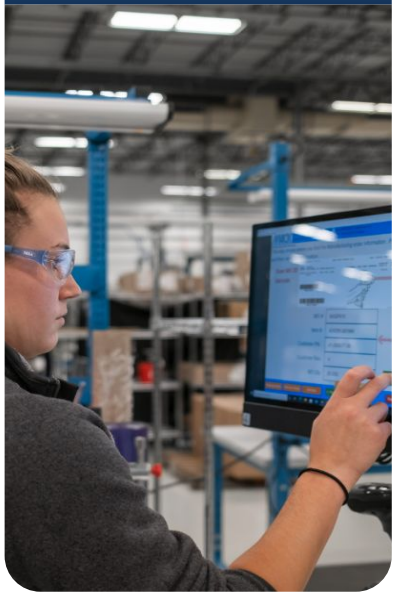
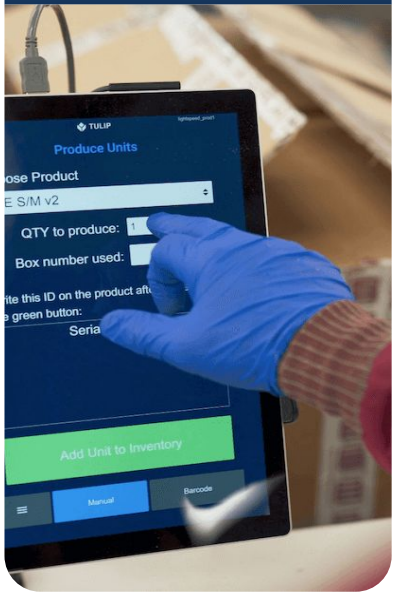
Understand the Environment

2

Understand the Environment

3

Plan for Devices

Computers	Mobile Phones & Tablets	Machines	Wearable Devices
			

The Physical Perspective in Composability

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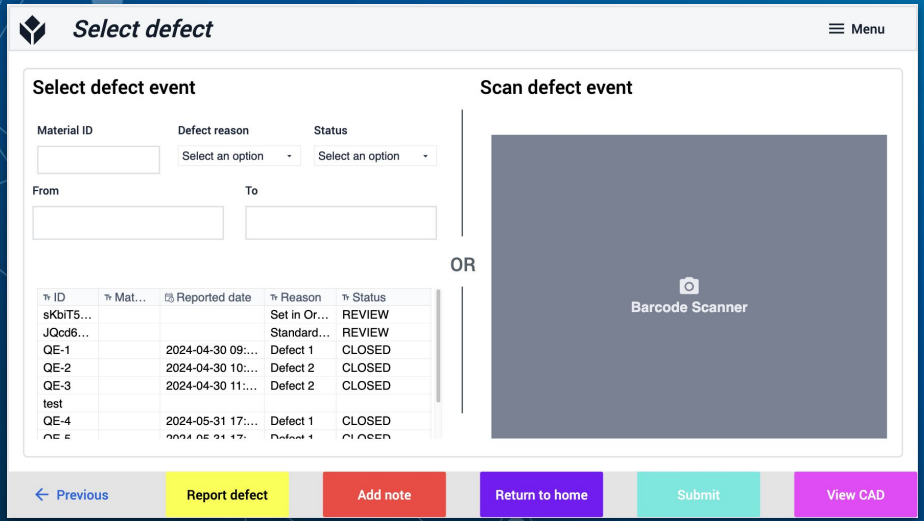
Context Matters

Empowering Humans to be Successful

STANDARD AND MEANINGFUL COLORS

WHICH DESIGN IS BETTER?

A



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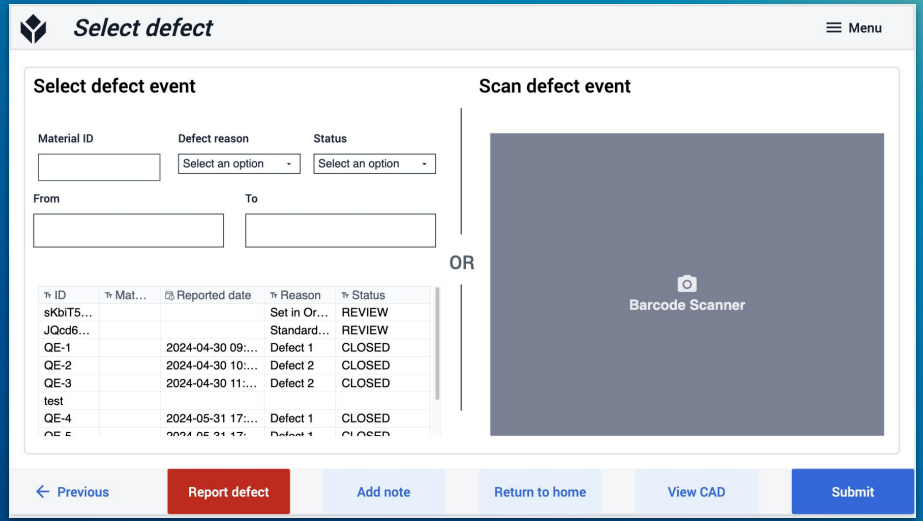

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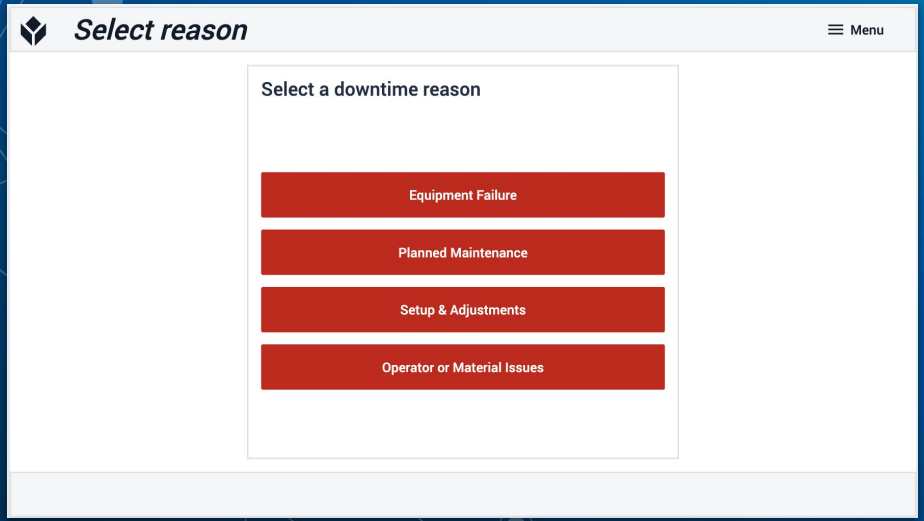
OPERATOR WEARING GLOVES

WHICH STEP DESIGN IS BETTER?

A



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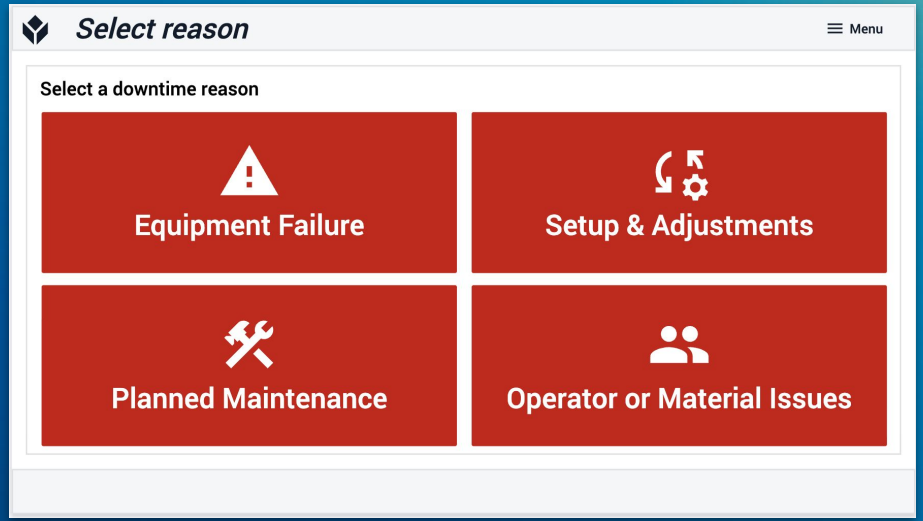

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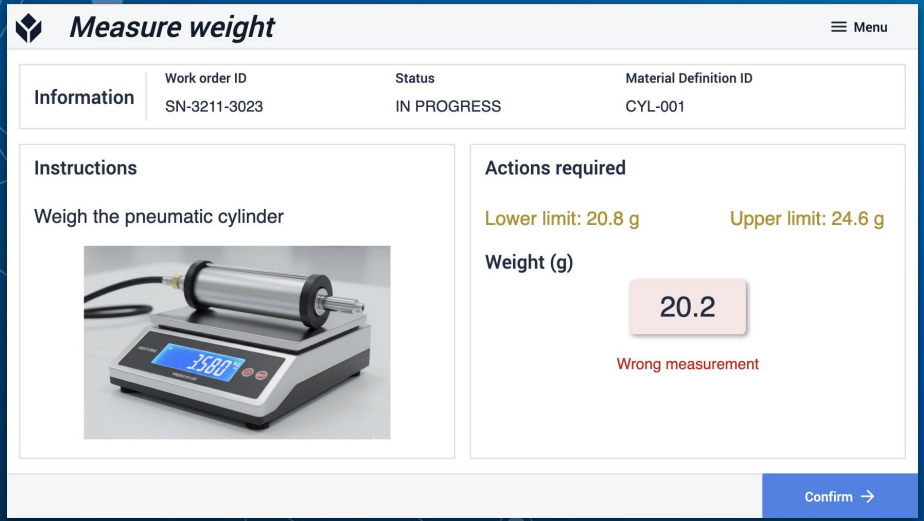
HAVE AN INTEGRATED SCALE, BUT THE USER NEEDS TO TAKE ACTIONS

WHICH STEP DESIGN IS BETTER?

A



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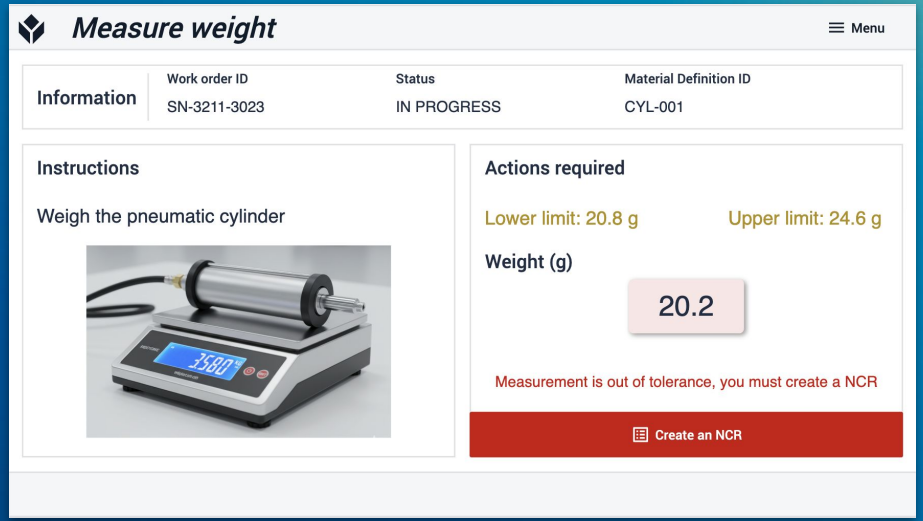

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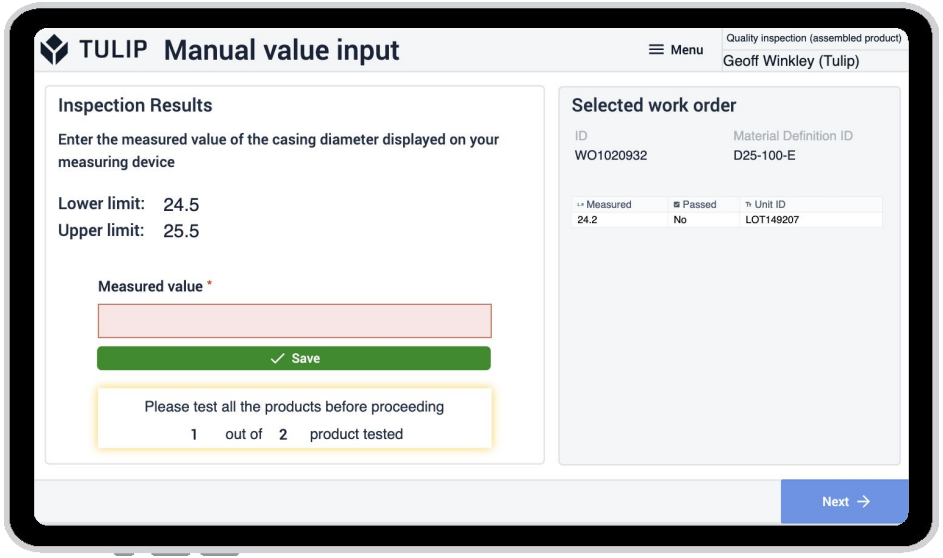
Building the Right Interface

Encourages Use: Makes life easier for the User



Represents Process: Familiar order of steps

Built in Compliance: Logical mistake proofing

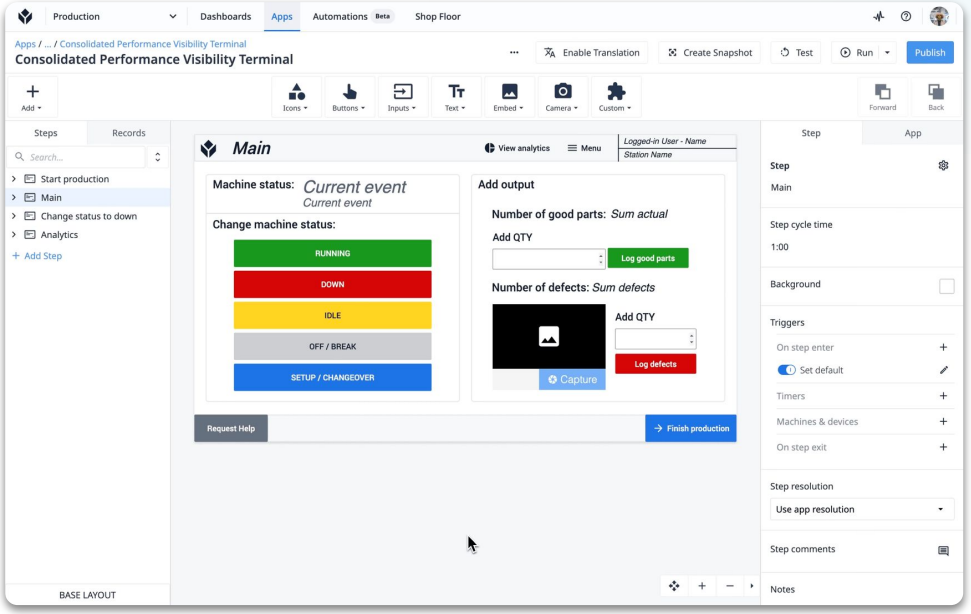
Product of Feedback: Input Captured during Development

Great Apps Augment the Human

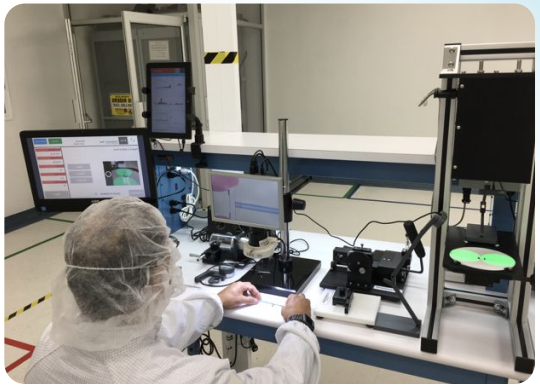
Fit for the User Persona

Provide the Right Information

Active Feedback



All Users Are Not The Same



What role does the User have?

- Assembly Technician, Machine Operator, Supervisor, Quality Control, ect
- Each role will have unique perspective and requirements

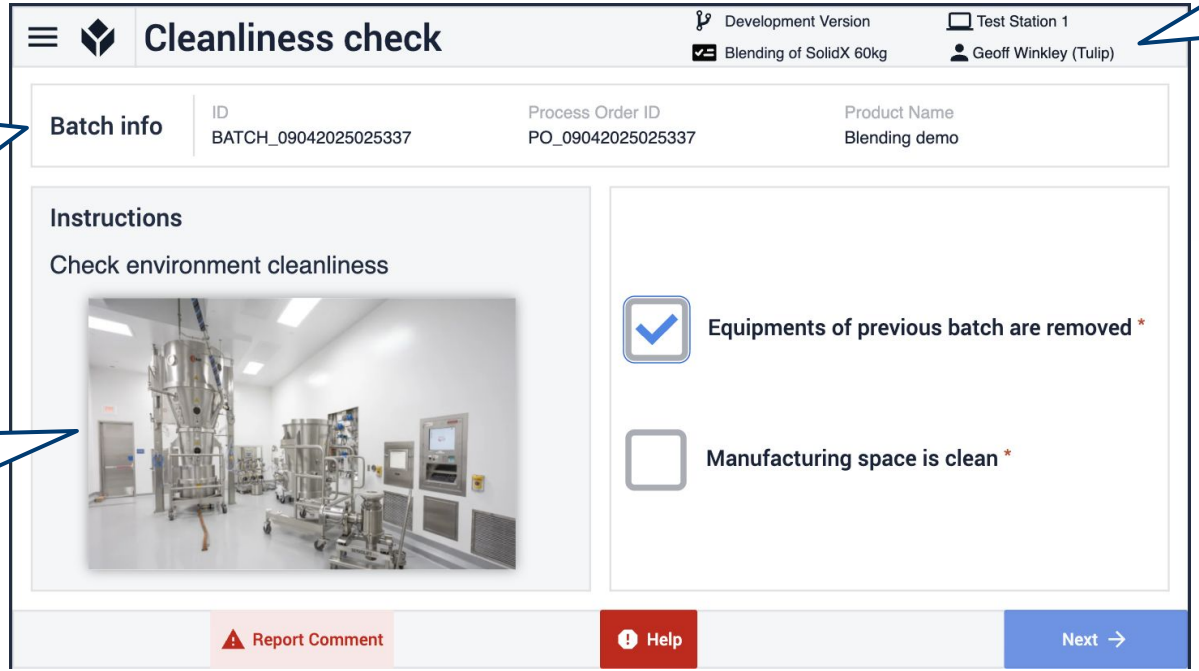
What level of training or experience do they tend to have?

- New employees in a high-turnover industry may need more guidance, *e.g. low complexity assembly*
- Experienced technicians may need flexibility, *e.g. lab operations*

Provide Relevant Information, Not More

Order/Batch to match with physical product

Rich media, simple instructions



Helpful metadata

Clear choices to proceed

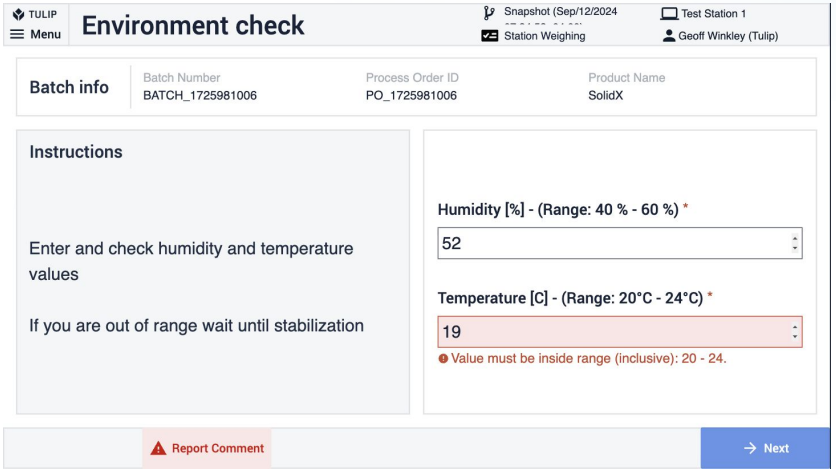
Embedded Feedback

Automate, but Notify

- An out of tolerance inspection may trigger a defect to be created, but let the user know with a message
- Use colors and text to indicate good vs. bad results

Practice Positive Error Messaging

- Consider hard validation rules vs. conditional errors
- Make error messages clear and concise so the user understands the issue



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Best Practices in Action

Let's look at some scenarios

Demo Setup!

- Located in the Packaging Room
- There is a shelf of boxes that need to be weighed before shipping
- Operator’s role is to take a box from a shelf, weigh the box, and record the weight on the work order

Yes, this is a very simple example!

Asking questions

WHERE?

Context of interaction

WHO?

Subject of interaction

WHAT?

Object of interaction

HOW?

Constraints of interaction

WHERE? - Context of interaction

How often can the user interact with the application?

How can we limit the number of interactions and clicks?

Is the interaction in the form of touching/clicking or other (e.g. barcode scanning)?

Is the environment well lit? Is the environment noisy?

WHAT? - Devices and integrations

What devices that user actually needs?

Does it speed up the process or ensures data capture if the device is integrated?

Are there any devices already available? If yes, what kind?

Can we collect information from any machines? Which HMI to use?

Check out: Devices and connectors in the ***library.tulip.co***

WHO? - Mistake proofing & positive error messaging

How much information does the specific user need?

Does the user need to resolve the error / ask for help / be informed?

Should there be highlighted points in work instructions to avoid common mistakes?

How much experience does the user have?

HOW? - Other human needs

Which languages are spoken by the user(s)?

Does any user have any disabilities?

How does the app handle necessary breaks?

What if somebody makes a mistake?

Check out: Use AI for automatic translations ***tulip.co/platform/frontline-copilot***

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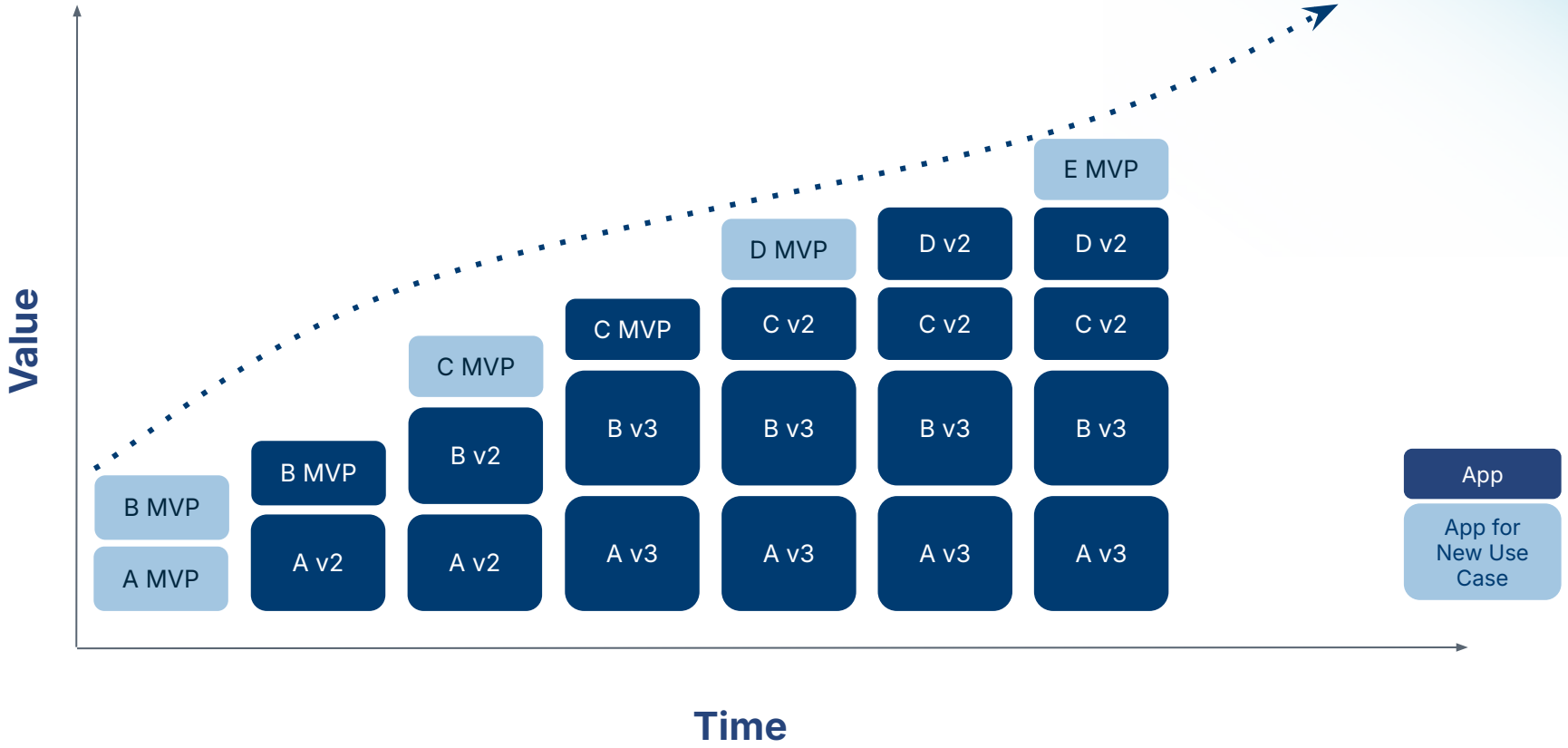
User Feedback and Iteration

Let's look at some scenarios

Solutions Evolve Over Time



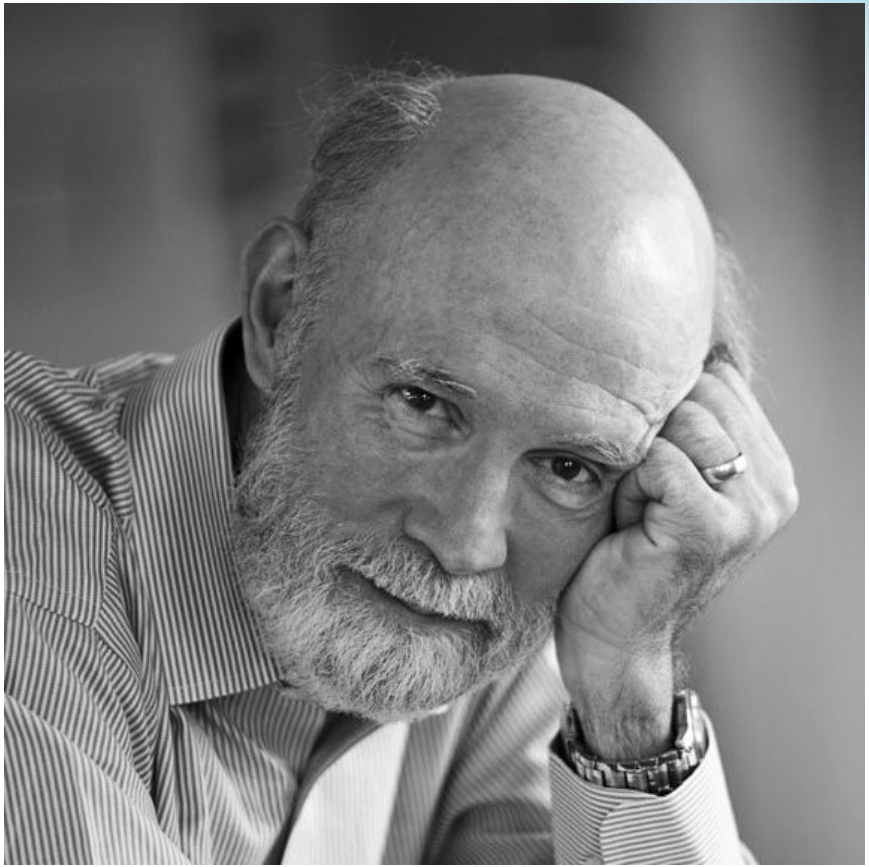
Listen to Users

- No App is perfect in Version 1
  - It’s impossible to understand all edge cases and “real world behaviors”
- Collect user feedback at all points in the development process, including post-deployment
  - Inerating fast builds end user confidence and excitement
  - This is one of Tulip’s core capabilities as a cloud based platform - Lean into it

If this lean stuff seems easy, **you're probably not doing it.**

– Jim Womack

Researcher, Author, and founder of the **Lean Enterprise Institute**



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QUESTIONS?

THANK YOU