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BEASLEY**



**GREG
MARTINEZ**



**MICHAEL
DIEDERICH**



Enhance and extend the learning of craft through thoughtful and meaningful use of emerging technology



Why Craft?



“ DIY as a vibrant culture with a long history of learning, creating and sharing ”

Empowerment & Creative Expression

“ Ultimately, we conceptualize craft as **power**
[the ability or capacity to act] ”

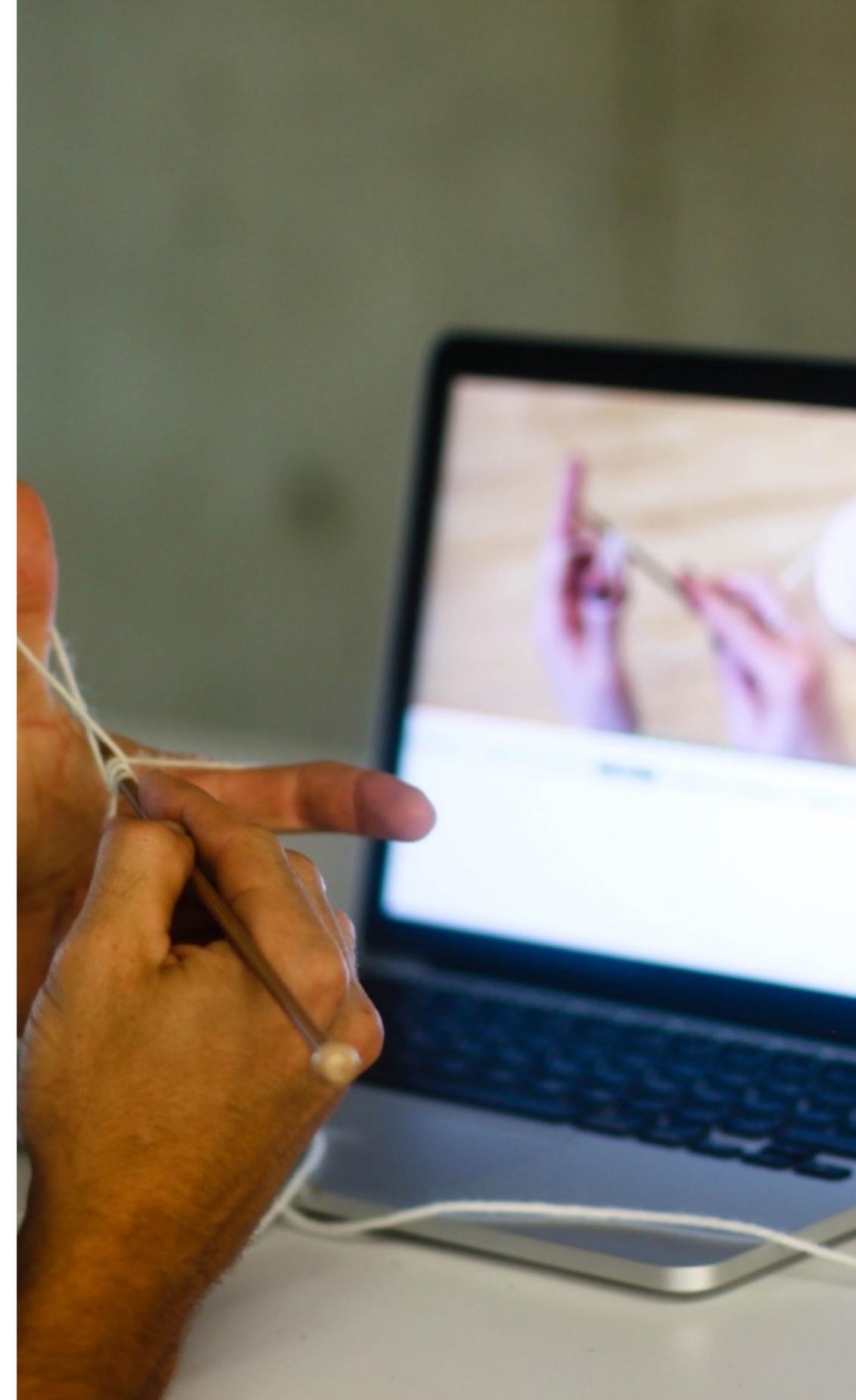
- Braitch et al. (2011)



Craft & Technology

“ ...we **preserve cultural practices** by enacting tradition and experience. Digitization can enable and extend this work of preservation. ”

- Rosner et al. (2010)



Current Platforms



An Example





An Example





An Example



**Current online platforms support
general purpose tutorials**



There are unique problems in craft learning that are not addressed by these platforms

Context of Control

3D Perspectives

Adaptive Learning

Context of Control

3D Perspectives

Adaptive Learning

Context of Control

Craft and other hands-on skills frequently require the use of both hands



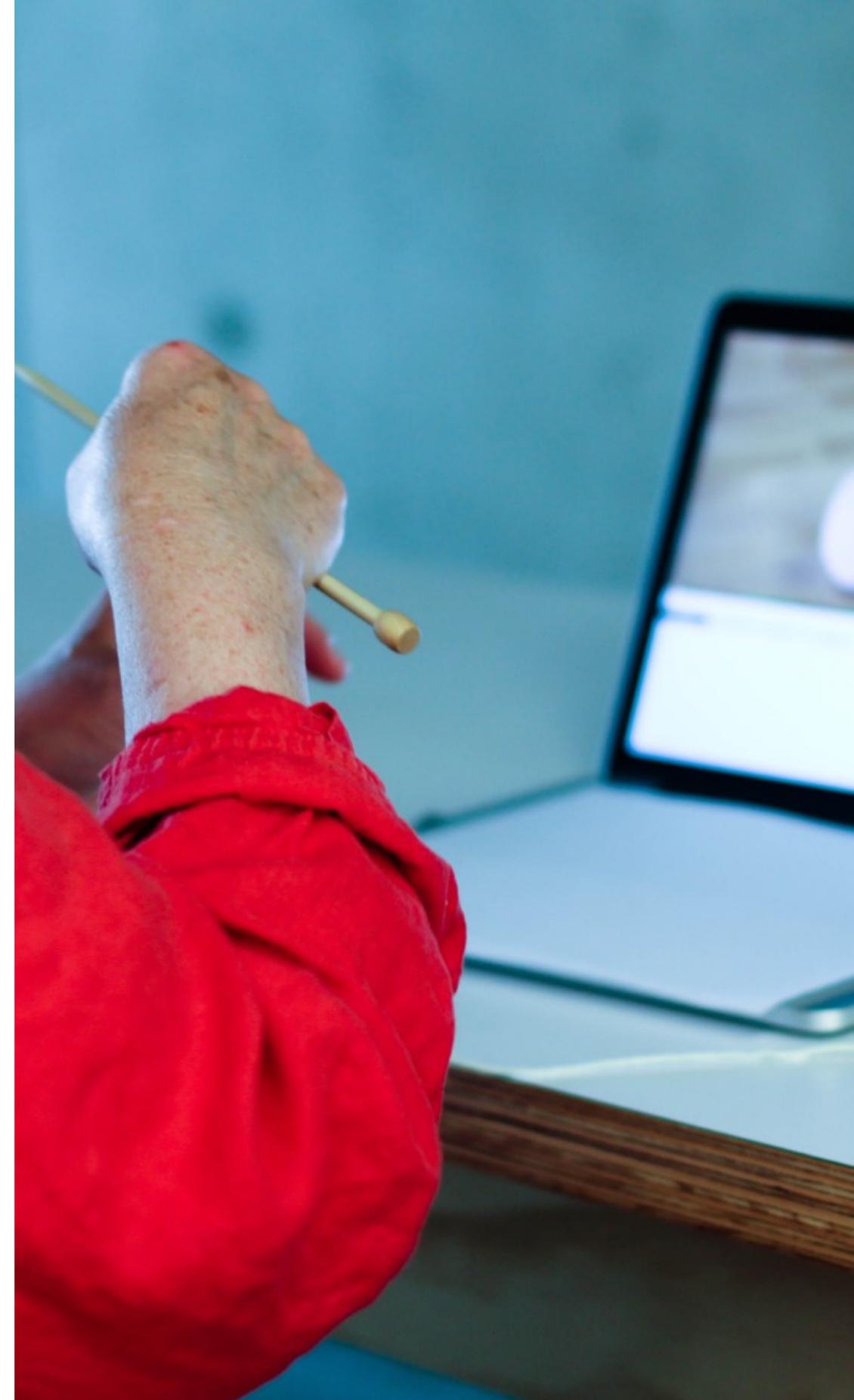
Context of Control

3D Perspectives

Adaptive Learning

3D Perspectives

Views are often limited to a single view determined by the tutorial creator



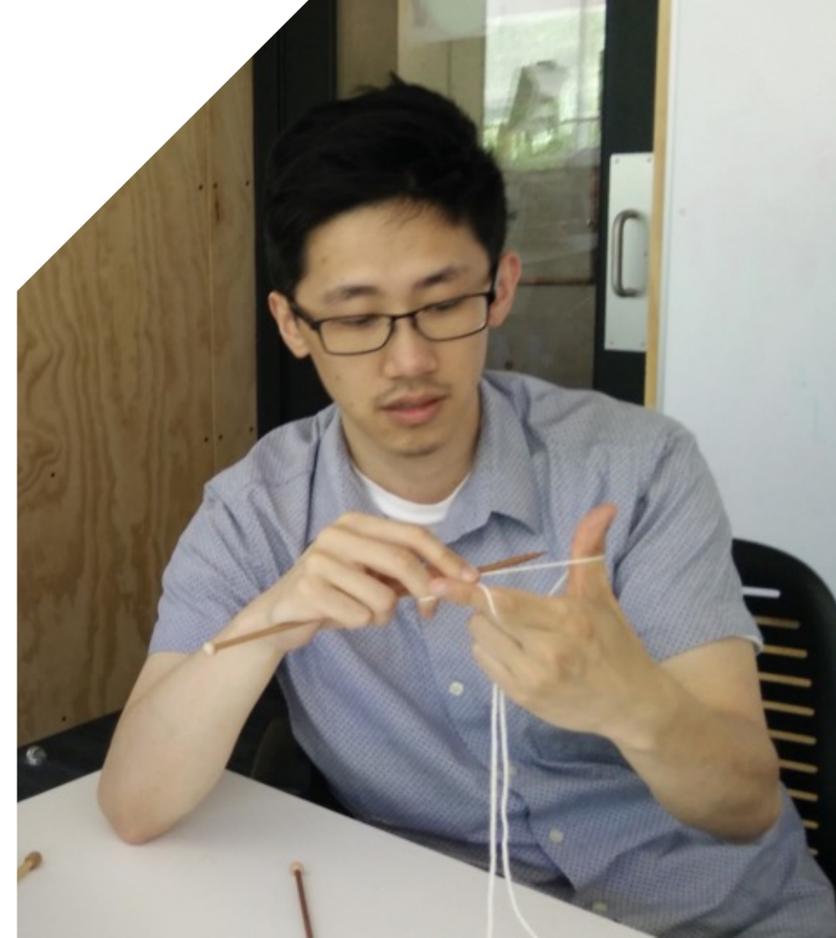
Context of Control

3D Perspectives

Adaptive Learning

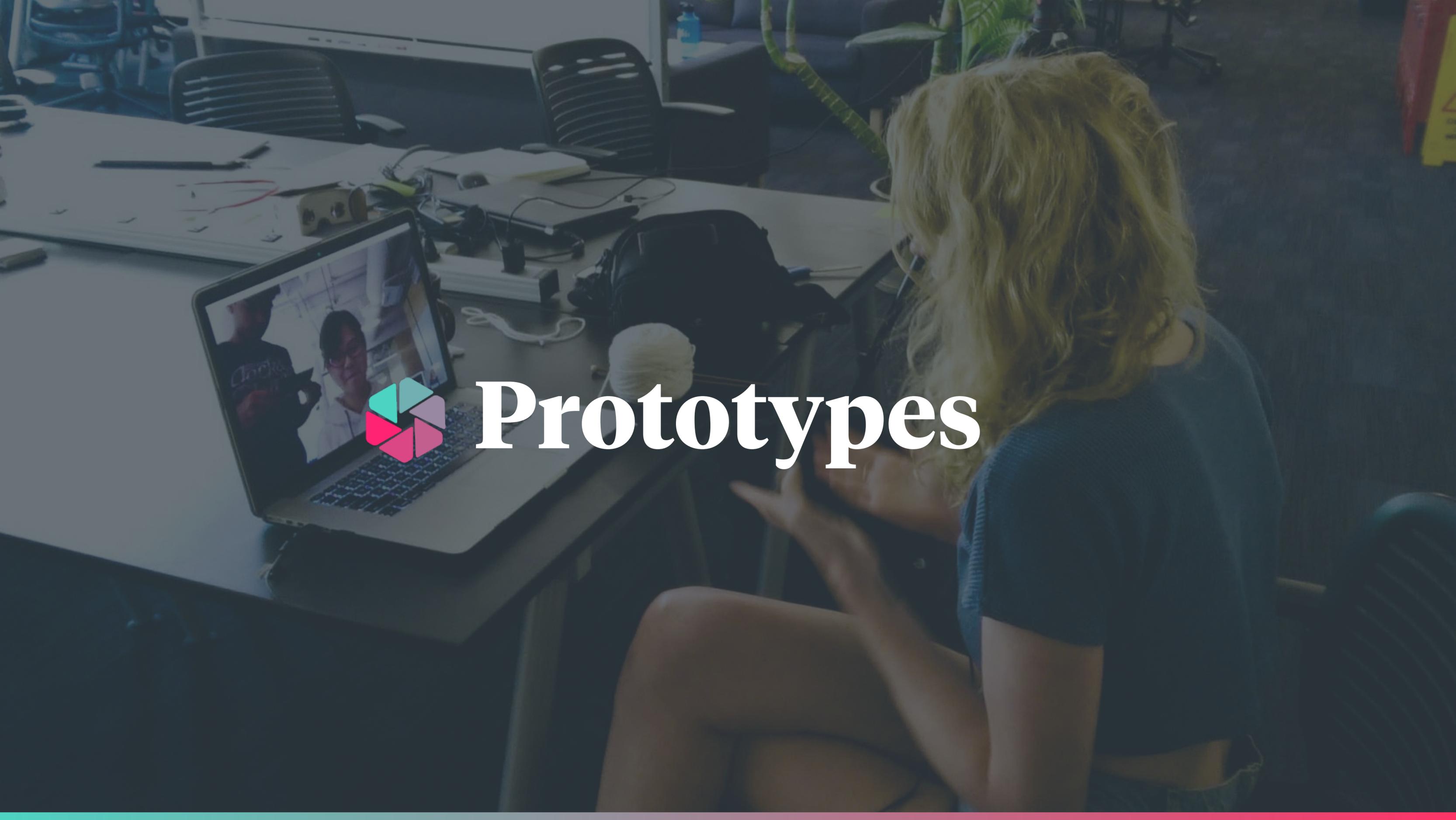
Adaptive Learning

People learn at different paces and require different types of instruction



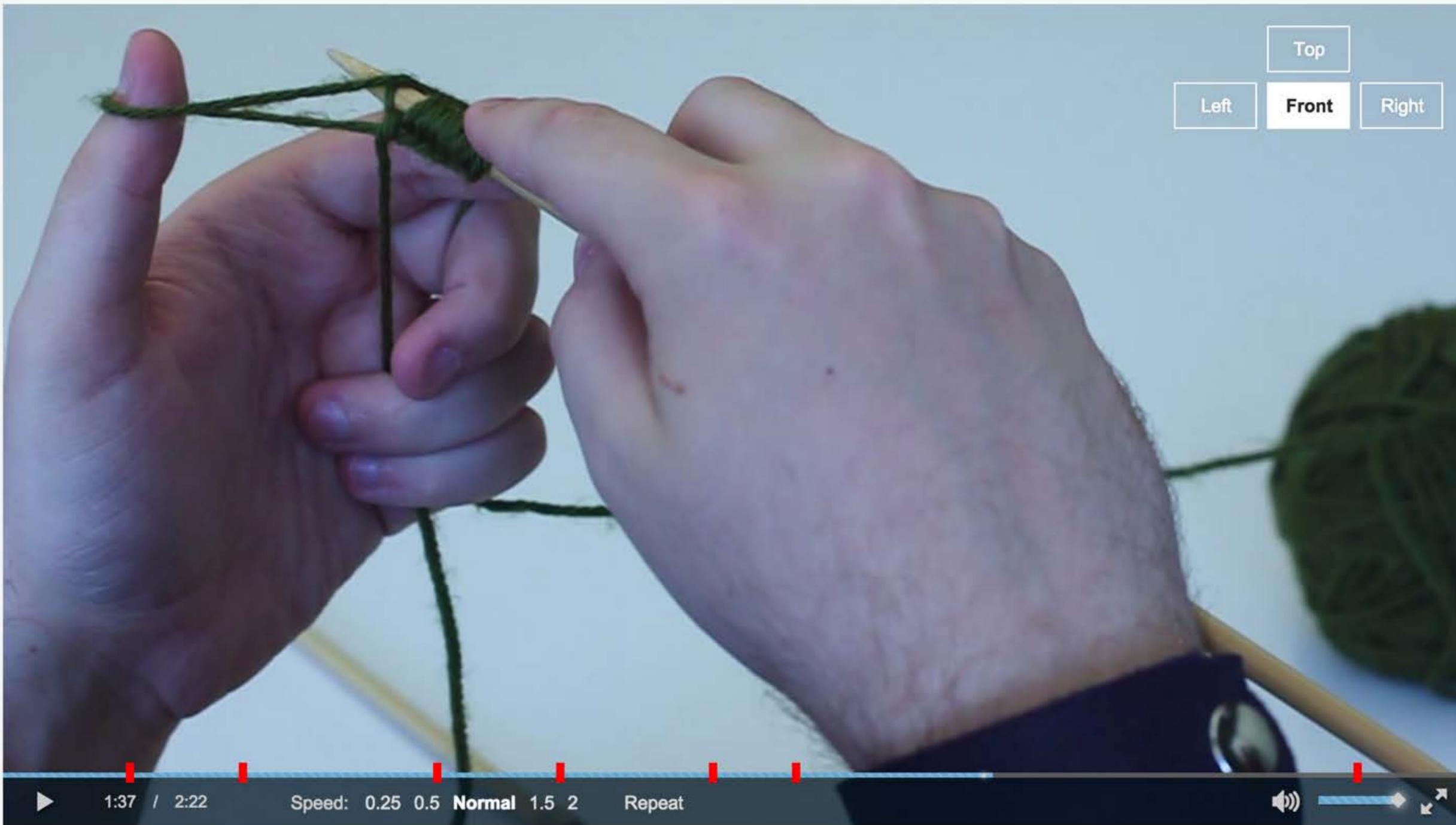


Prototypes





Prototype #1



Cast-on

Casting on is the process of adding the very first stitches onto the knitting needle before starting to knit.

[Start Tutorial](#)

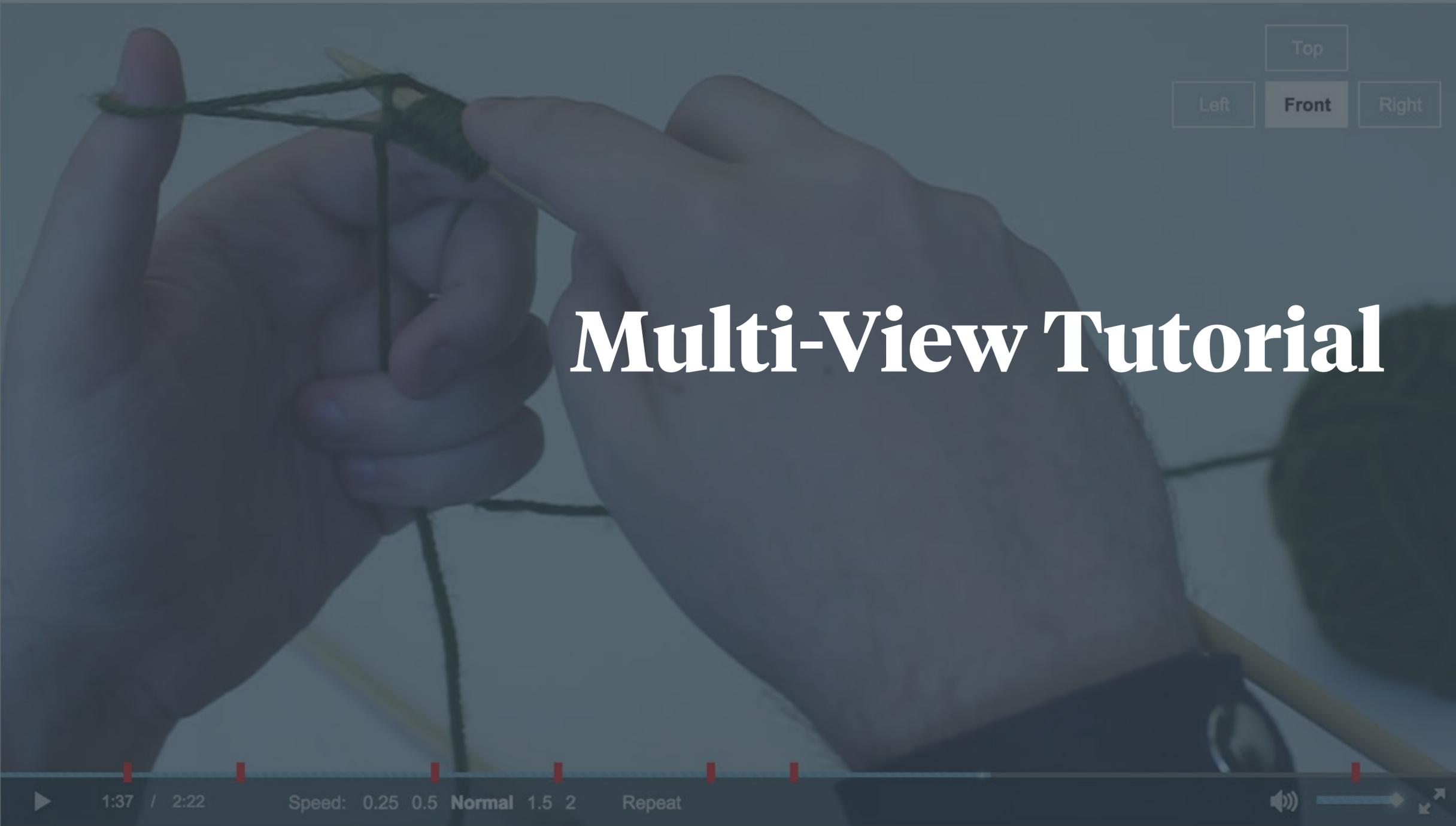
Stitch

Now that you know how to cast-on, learn how to stitch a row using the garter stitch.

[Start Tutorial](#)



Prototype #1



Multi-View Tutorial

Cast-on

Casting on is the process of adding the very first stitches onto the knitting needle before starting to knit.

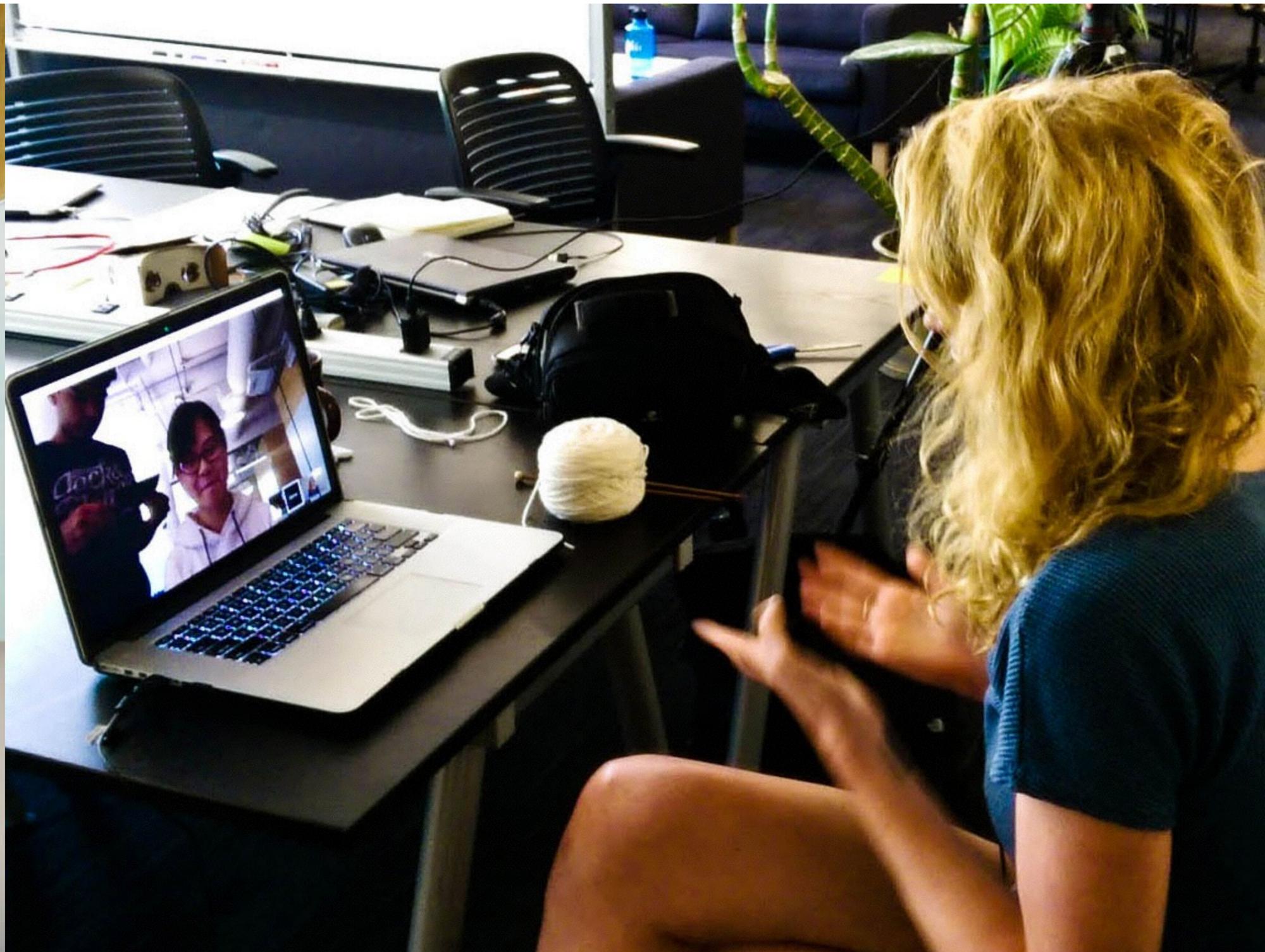
[Start Tutorial](#)

Stitch

Now that you know how to cast-on, learn how to stitch a row using the garter stitch.

[Start Tutorial](#)

Prototype #2



 **Prototype #2**



Online Skillshare



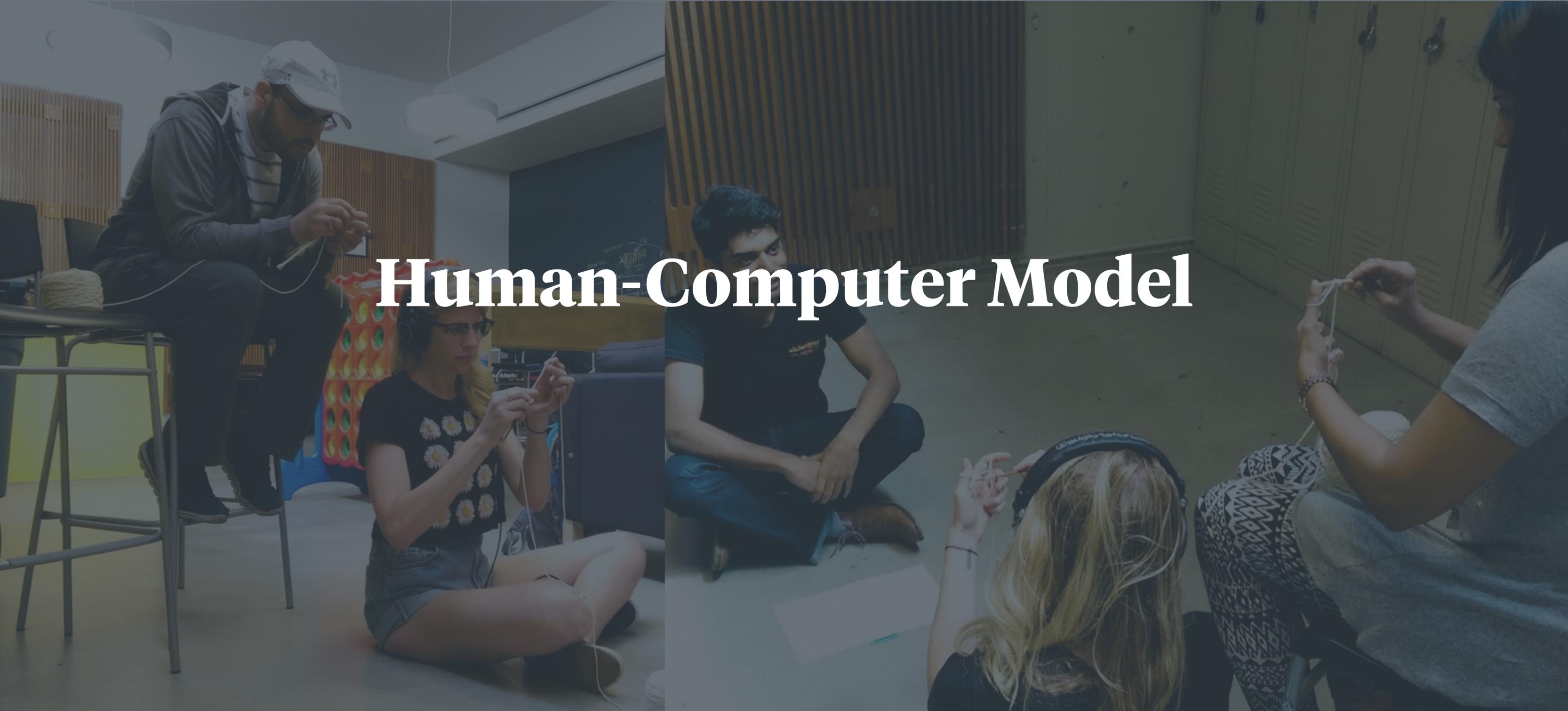
Prototype #3





Prototype #3

Human-Computer Model



Final Prototype




"Play" or "Pause"


"Back"

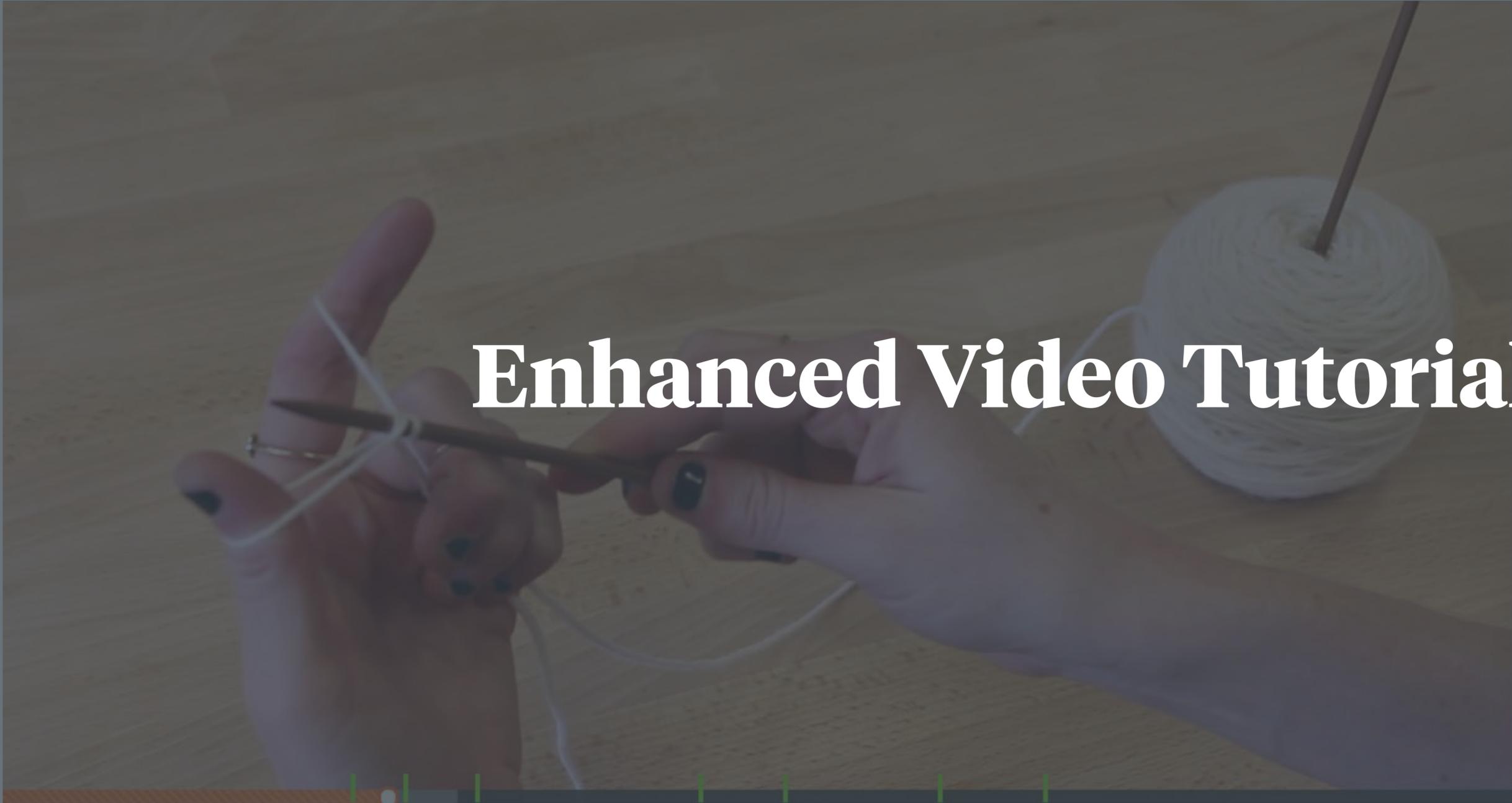

"Next"

0.5x
"Slow Down"

1x

2x
"Speed Up"

- Step 1
- Step 2**
- Step 3
- Step 4
- Step 5
- Step 6
- Step 7
- Step 8




"Play" or "Pause"


"Back"


"Next"

0.5x
"Slow Down"

1x

2x
"Speed Up"

- Step 1
- Step 2**
- Step 3
- Step 4
- Step 5
- Step 6
- Step 7
- Step 8



Pottery Basics

INTERMEDIATE

- 1. Understanding the wheel, clay, and hand tools 1m 6s
- 2. Creating your first bowl 2m 13s
- ▶ Wedging the clay and basic wheel technique 32% of 4m 45s
- 4. Centering the clay on the wheel 2m 12s
- 5. Common techniques to open the bowl 2m 6s
- Measuring thickness 1m 3s
- Shaping the sides 4m 45s
- 8. Shaping the base and extracting the bowl from the wheel. 4m 45s



LOOP





A mixed-reality tutorial platform for learning hands-on craft skills

Pottery Basics INTERMEDIATE

1. Understanding the wheel, clay, and hand tools 1m 6s

2. Creating your first bowl 2m 13s

▶ Wedging the clay and basic wheel technique 32% of 4m 45s

4. Centering the clay on the wheel 2m 12s

6. Measuring thickness 2m 13s

Raising and finishing the side of the bowl.

Flipping the base and extracting the bowl from the wheel. 4m 45s





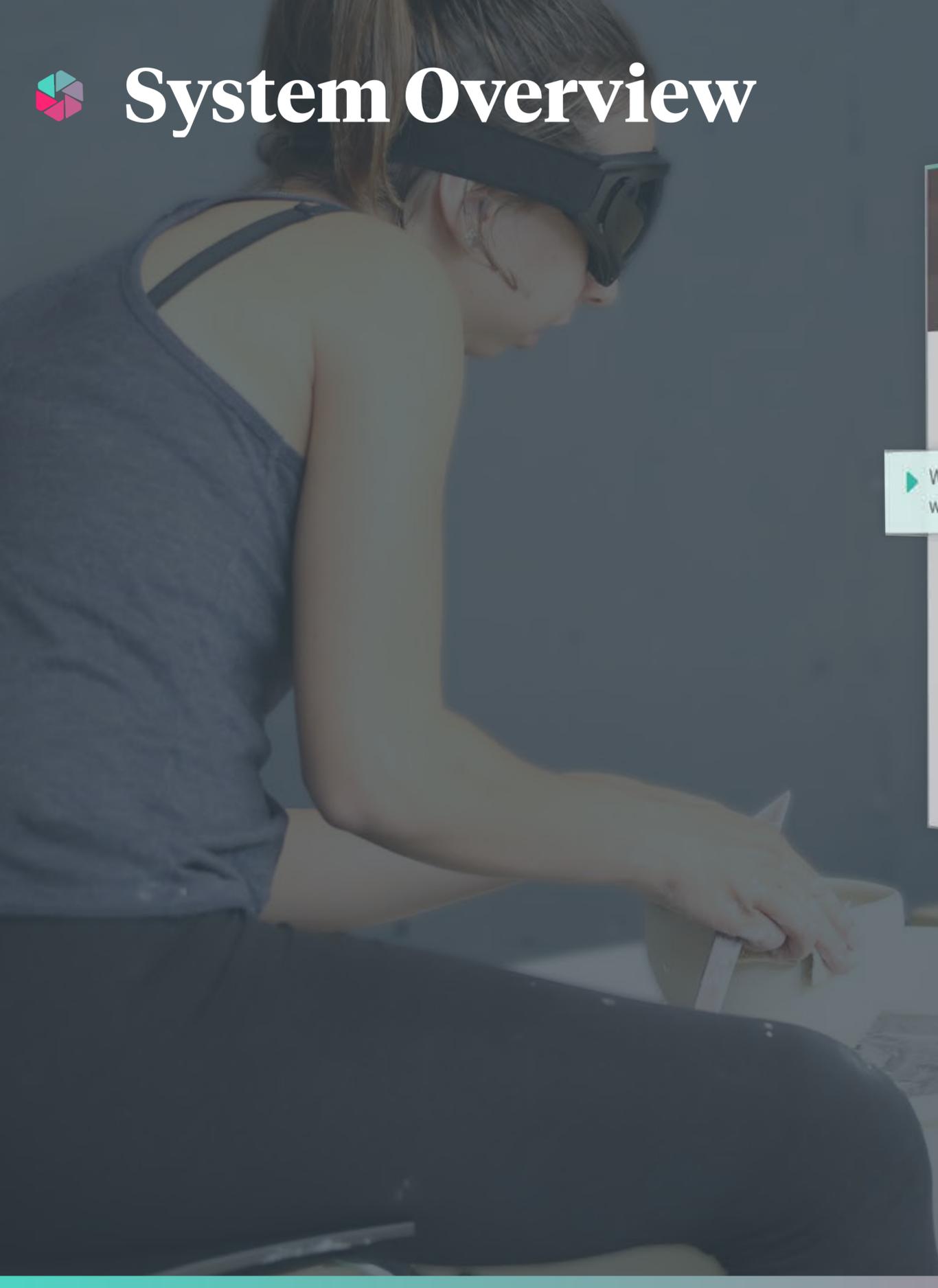
Pottery Basics

INTERMEDIATE

1. Understanding the wheel, clay, and hand tools	1m 6s
2. Creating your first bowl	2m 13s
▶ Wedging the clay and basic wheel technique	32% of 4m 45s
4. Centering the clay on the wheel	2m 12s
5. Common techniques to open the clay	1m 6s
6. Measuring thickness	2m 13s
7. Raising and finishing the side surfaces	4m 45s
8. Shaping the base and extracting the bowl from the wheel.	4m 45s



System Overview



Pottery Basics

INTERMEDIATE

1. Understanding the wheel, clay, and hand tools 1m 6s

2. Creating your first bowl 2m 13s

▶ Wedging the clay and basic wheel technique **32%** of 4m 45s

4. Centering the clay on the wheel 2m 12s

5. Common techniques to open the clay 1m 6s

6. Measuring thickness 2m 13s

7. Raising and finishing the side surfaces 4m 45s

8. Shaping the base and extracting the bowl from the wheel. 4m 45s 



System Overview

Pottery Basics INTERMEDIATE

1. Understanding the wheel, clay, and hand tools 1m 6s

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5. Common techniques to open the clay 1m 6s

6. Measuring thickness 2m 13s

7. Raising and finishing the side surfaces 4m 45s

8. Shaping the base and extracting the bowl from the wheel. 4m 45s 

Info Panel



System Overview

Pottery Basics		INTERMEDIATE
1. Understanding the wheel, clay, and hand tools	1m 6s	
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Tutorial Hologram

System Overview

Pottery Basics INTERMEDIATE

1. Understanding the wheel, clay, and hand tools 1m 6s

2. Creating your first bowl 2m 13s

▶ **Wedging the clay and basic wheel technique** **32% of 4m 45s**

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7. Raising and finishing the side surfaces 4m 45s

8. Shaping the base and extracting the bowl from the wheel. 4m 45s

Playback bar





Learning Model

Learners — **Feedback Loop** — **Experts**



Learning Model

Learners

Adaptive Learning

Experts

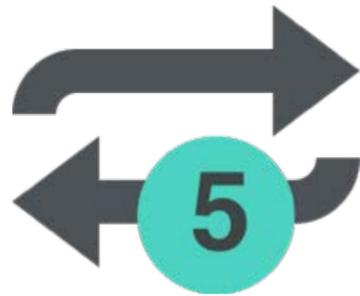
Additional Tips

Feedback Loop

Total Control



Tutorial Features



Repetition



Slower Pace



Annotations



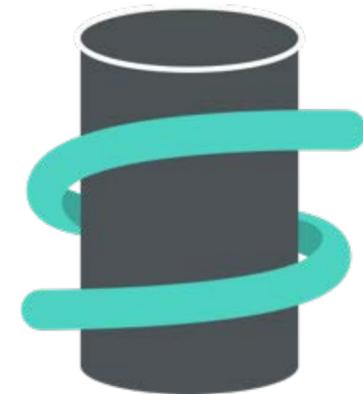
Diagrams/Schematics



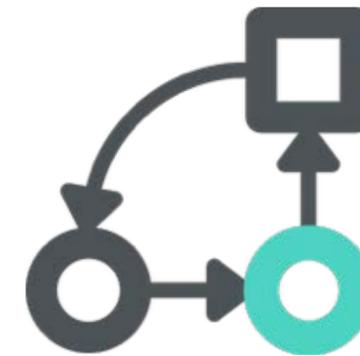
Alternate Views



Detailed Instruction



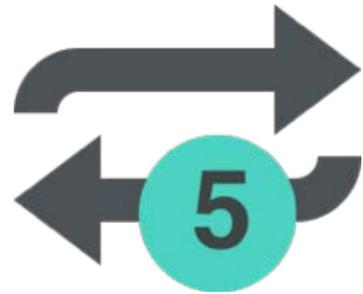
3D Animations



FAQs & Tips



Built-In Features



Repetition



Slower Pace



Alternate Views



Detailed Instruction

Supplementary Content



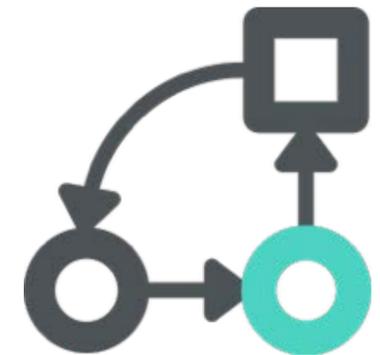
Annotations



Diagrams/Schematics



3D Animations



FAQs & Tips

Example User Scenario

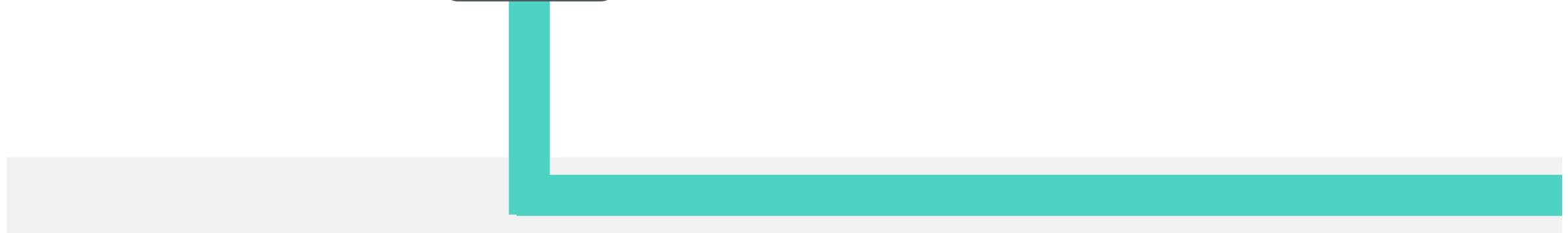
Advanced



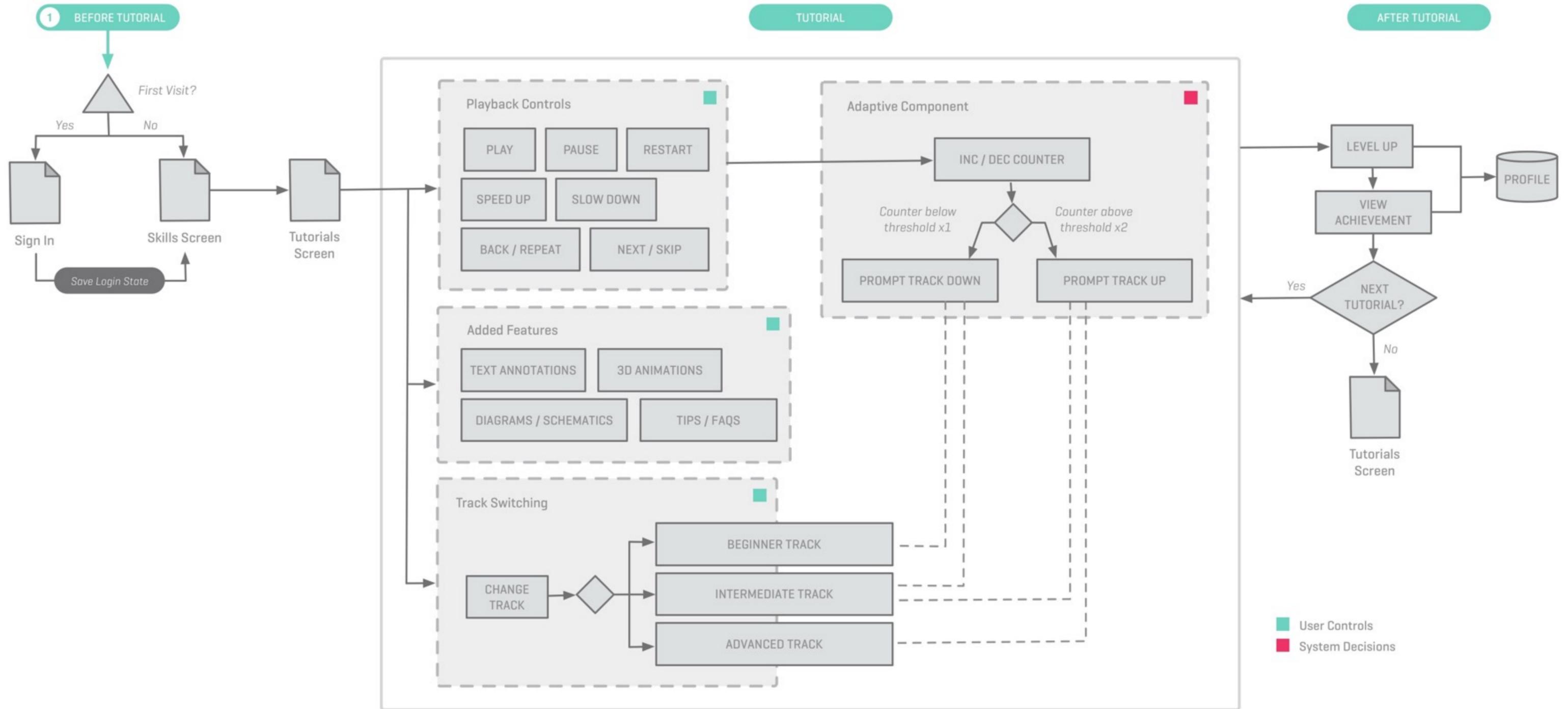
Intermediate



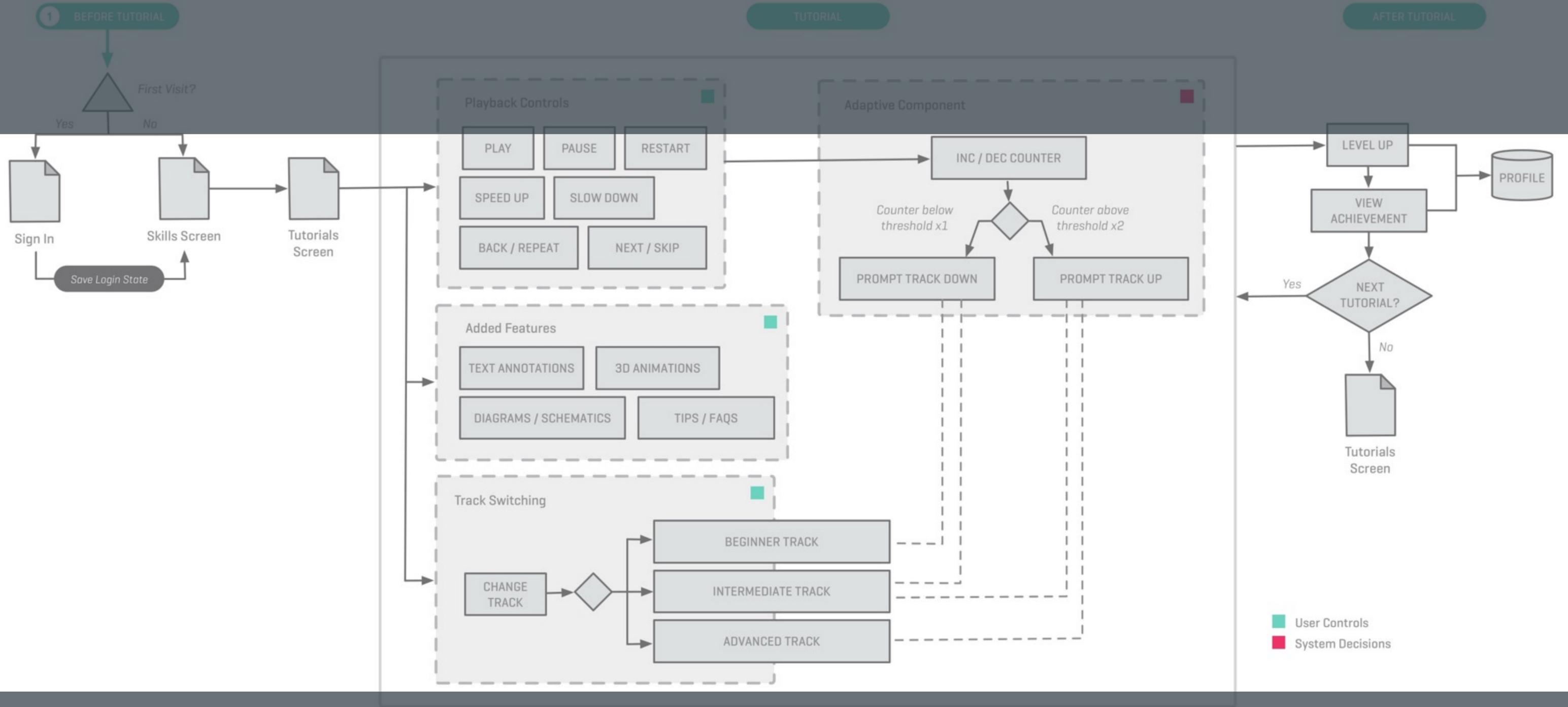
Beginner



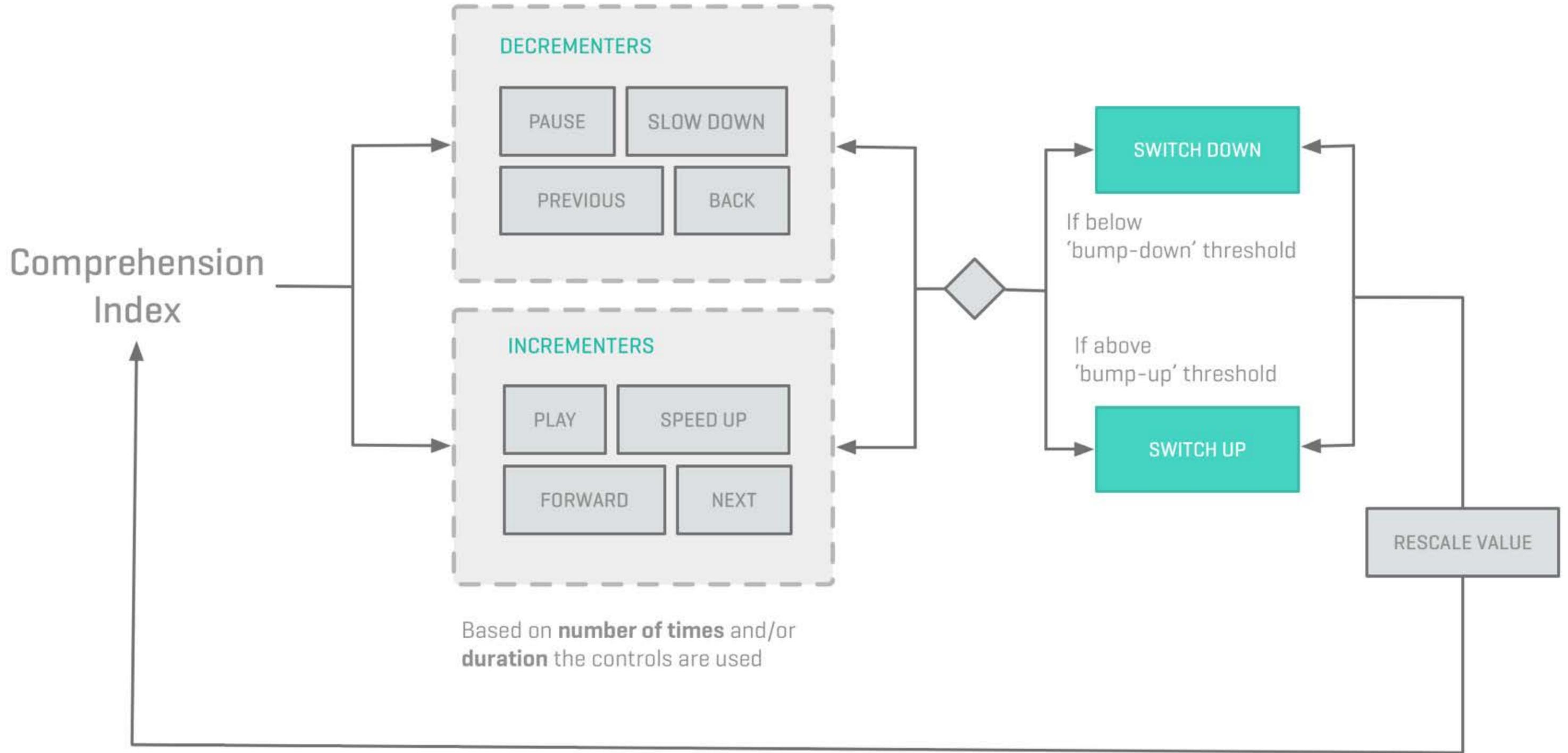
System Diagram



System Diagram



Track Switching Logic



Our Implementation

Pottery Basics INTERMEDIATE

4m 25s

1. Understanding the wheel, clay, and hand tools	1m 6s
2. Creating your first bowl	2m 13s
▶ Wedging the clay and basic wheel technique	32% of 4m 45s
4. Centering the clay on the wheel	2m 12s
5. Common techniques to open the clay	1m 6s
6. Measuring thickness	2m 13s
7. Raising and finishing the side surfaces	4m 45s
8. Shaping the base and extracting the bowl from the wheel.	4m 45s

6m 5s

1m 23s

1m 43s





Learning Model

Learners

Adaptive Learning

Experts

Additional Tips

Feedback Loop

Total Control

Expert Blind Spots

Experts teach in specific ways, and do not always consider alternate methods of instruction





Our Implementation



Our Implementation

Comments ✕



Protip for stability 👍 73

When your hands touch the clay, your hands should also touch each other to help support and keep them from wobbling and getting off center. This is especially important when pulling up the wall of clay. If your hands aren't touching, your outside hand will tend to move with the rotation of the clay, which then throws your clay off center.

Michelle Brooks 30 minutes ago

So this is what I've been doing wrong all along. Thank you for posting this and saving me a ton of frustration!

Jane Adams 16 minutes ago

◀ PREV 1 of 3 NEXT ▶



Our Implementation



Capture



Tag



Annotate



Learning Model

Learners

Adaptive Learning

Experts

Additional Tips

Feedback Loop

Total Control



Outcome

**A human-computer interaction model for
hands-free skill learning**

A platform to support :

Machinist Training

Medical Procedure Training

Home Improvement



Outcome

Preservation of artisanal crafts and dextrous hand skills in a digital domain

 **Special Thanks**



Heath Green

**UW Ceramic
& Metal Arts**



Clare Lunceford



Thank you!

