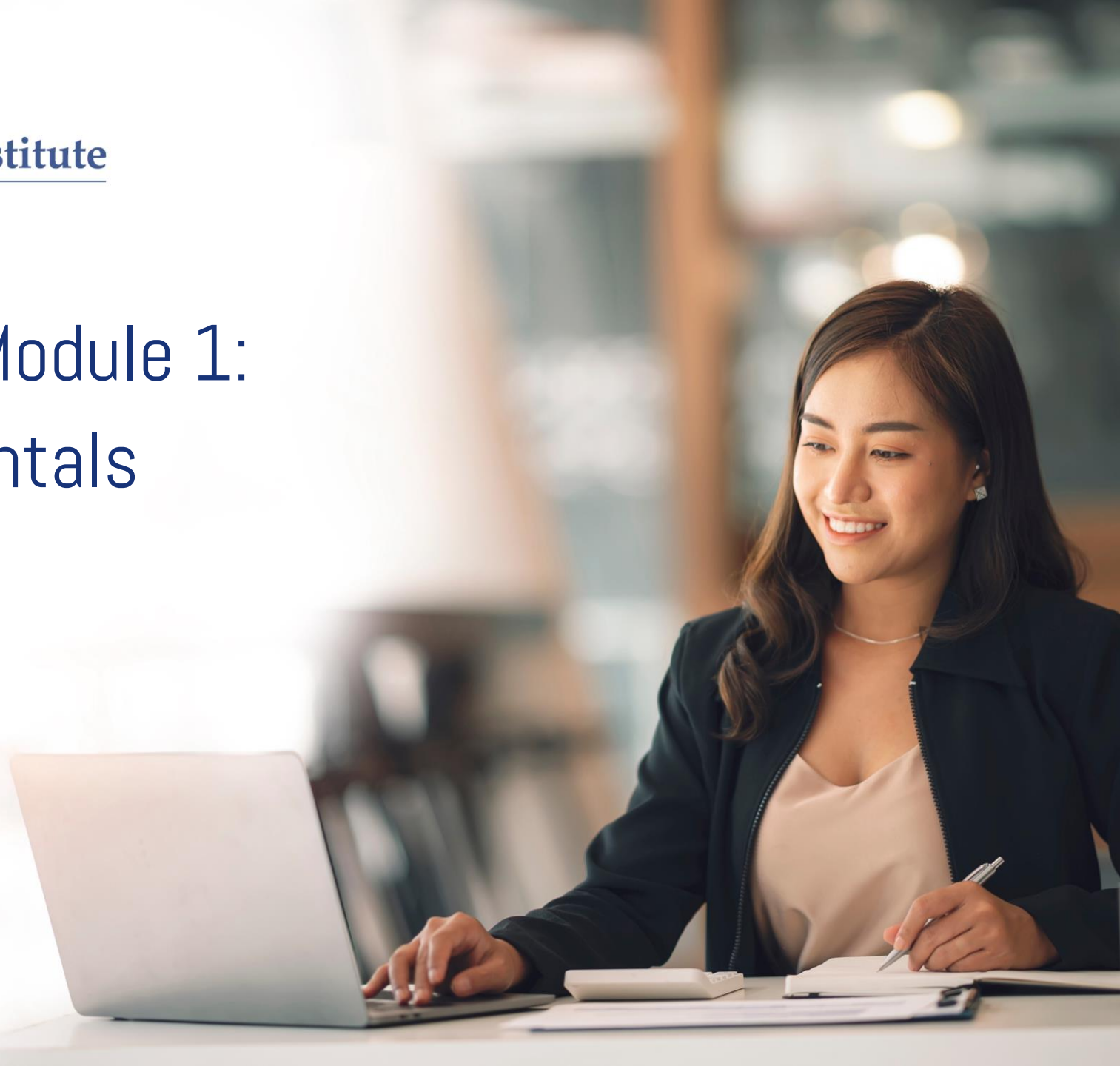
Lean Construction Institute
Immersive Education Program

Target Value Delivery Module 1: Learning the Fundamentals



Tammy McConaughy – CRB
Julie Glassmeyer – G3C, LLC

October 24, 2023

Lean Construction Institute
Immersive Education Program

Presenter Highlights

Tammy McConaughy

Julie Glassmeyer

Ryan Little

Lean Construction Institute
Immersive Education Program

LCI Course:
Target Value Delivery Module 1:
Learning the Fundamentals
4 CEU

Sign the sign-in sheet for credit

AIA Approved Continuing Education

TVD Modules

Lean Construction Institute
Immersive Education Program

Module 1: Learning the Fundamentals

- Gain insight into how implementing TVD approaches improves project outcomes through an overview of the phases and key components of TVD.

Module 2: Setting the Stage for Success

- Discover how creating early alignment and understanding of the owner's Business Case, Value Statements and Conditions of Satisfaction will lead to successful outcomes and how these foundations become the anchor for future decisions.

Module 3: Organizing for Flow and Efficiency

- Discover how teams can be challenged with maintaining effective processes and engagement through creating a cross-functional work cluster organization as a highly effective means of driving innovation and productivity through concurrent work.

Module 4: Modeling for Predictable Outcomes

- Experience a framework for predictive cost modeling, target setting and rapid innovation capture in collaborative TVD environments.

Learning Objectives

Lean Construction Institute
Immersive Education Program

Define the meaning of Target Value Delivery and understand the intent of the approach.

Identify the four phases, including the actions and outputs of each phase.

Identify key Core Components of TVD.

Discover how implementing TVD approaches improves project outcomes.

Lean Construction Institute
Immersive Education Program

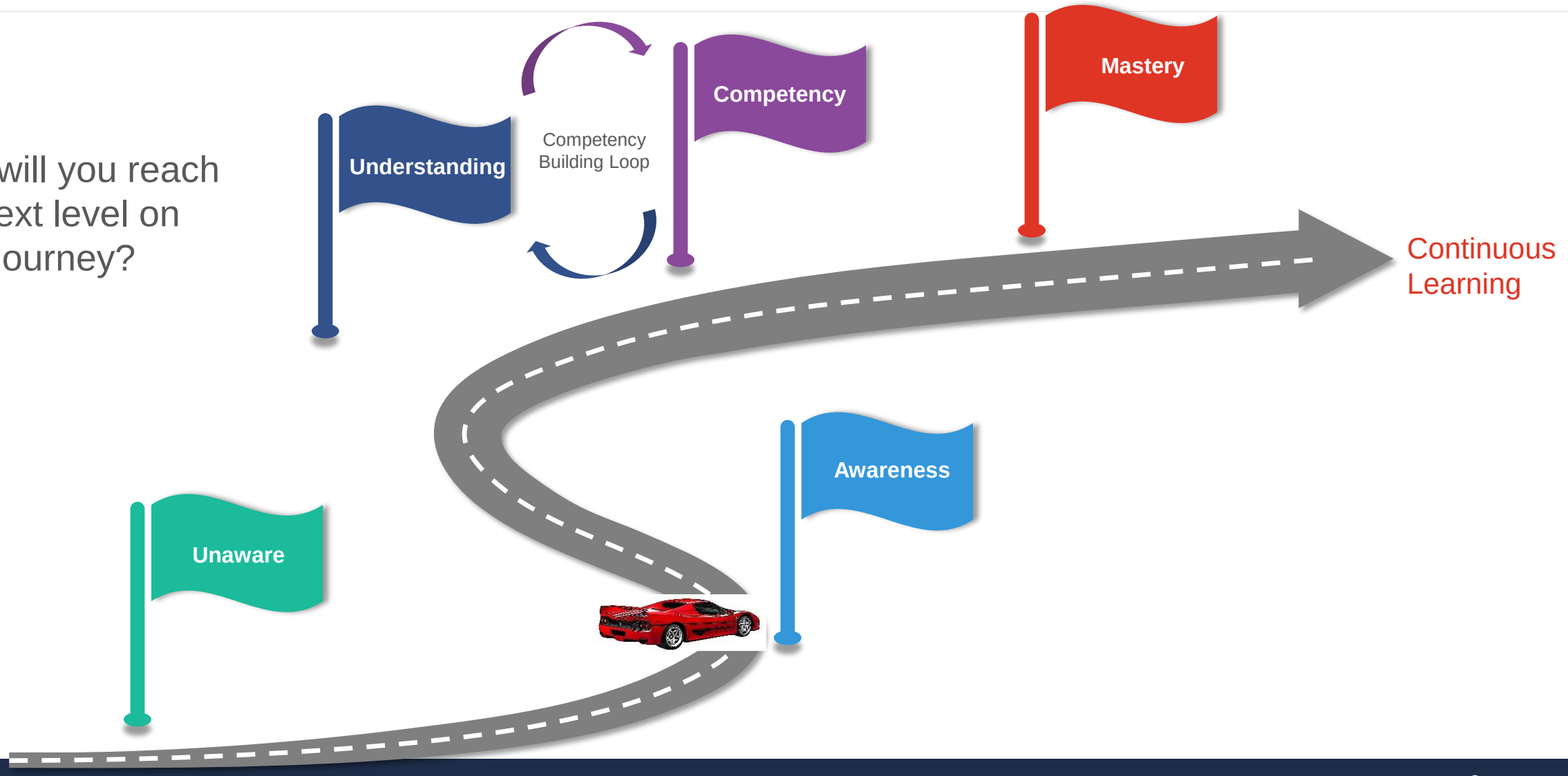
Participants' Conditions of Satisfaction

What do you want to gain from this workshop?

Lean Journey to Mastery

Lean Construction Institute
Immersive Education Program

How will you reach the next level on your journey?



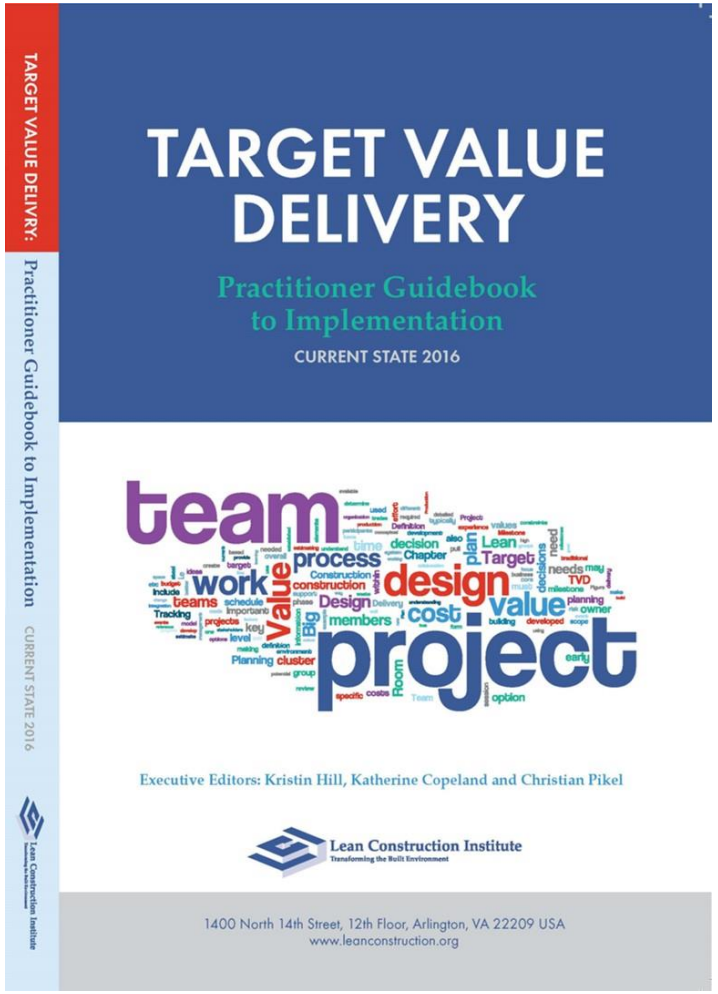
Lean Construction Institute
Immersive Education Program

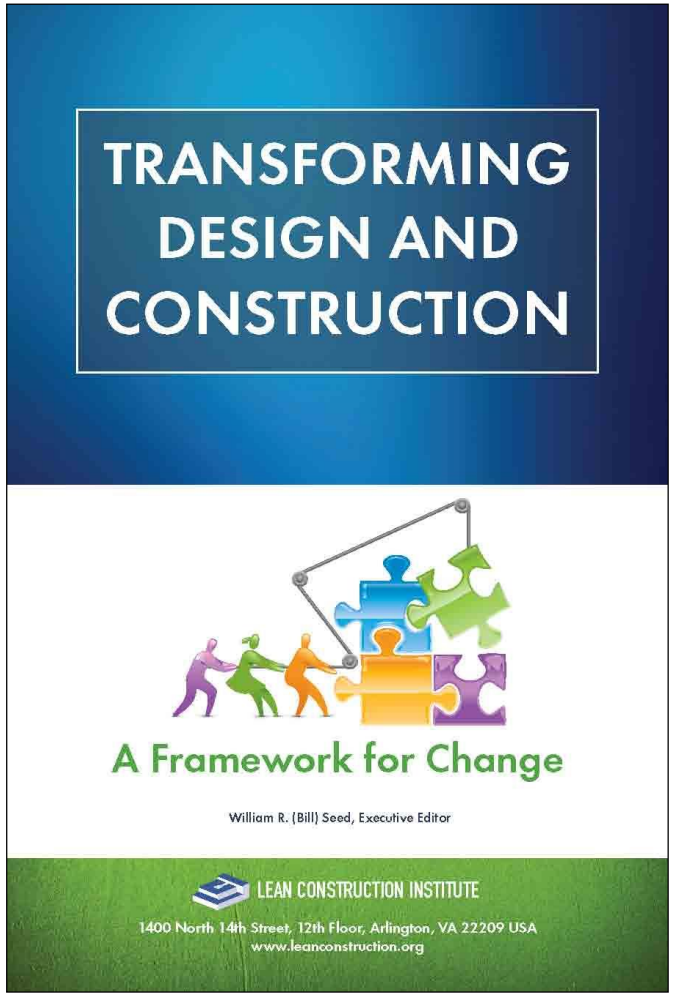
Rules of Engagement

- This is a safe zone
- Everyone has equal status
- Speak up and share your ideas
- Actively listen to others
- One conversation at a time
- Use E.L.M.O.
- Silence phones
- Be focused and engaged
- Stay on time
- Have fun!

References

Lean Construction Institute
Immersive Education Program





Introduction / Ice Breaker

- Introduction: Who you are? What you do?
- Discuss challenges associated with delivering to budgets

10 MINUTES TABLE DISCUSSION
5 MINUTES REPORT OUT

Six Tenets of Lean Construction

Lean Construction Institute
Immersive Education Program

1. Respect for people
2. Optimize the Whole
3. Generate Value
4. Eliminate Waste
5. Focus on Flow
6. Continuous Improvement

Project Elements

Lean teams organize in a structure that leads to improved coordination, outcomes and shared leadership.

Lean can be implemented regardless of commercial terms: Design-Bid-Build, Design-Build or Integrated Project Delivery. The degree of implementation varies with the terms.

A Lean Operating System is an organized implementation of Lean Principles and Tools combined to allow a team to operate in unison to create flow.

Lean Construction Institute
Immersive Education Program

TVD Definition

A disciplined management practice to be used *throughout* the project to ensure:

- The facility meets the operational and performance *needs and values* of the users.
- The project is delivered within the *allowable budget*, *schedule*, and *intended scope.*
- That *innovation* is promoted throughout the process to *increase value* and eliminate waste.

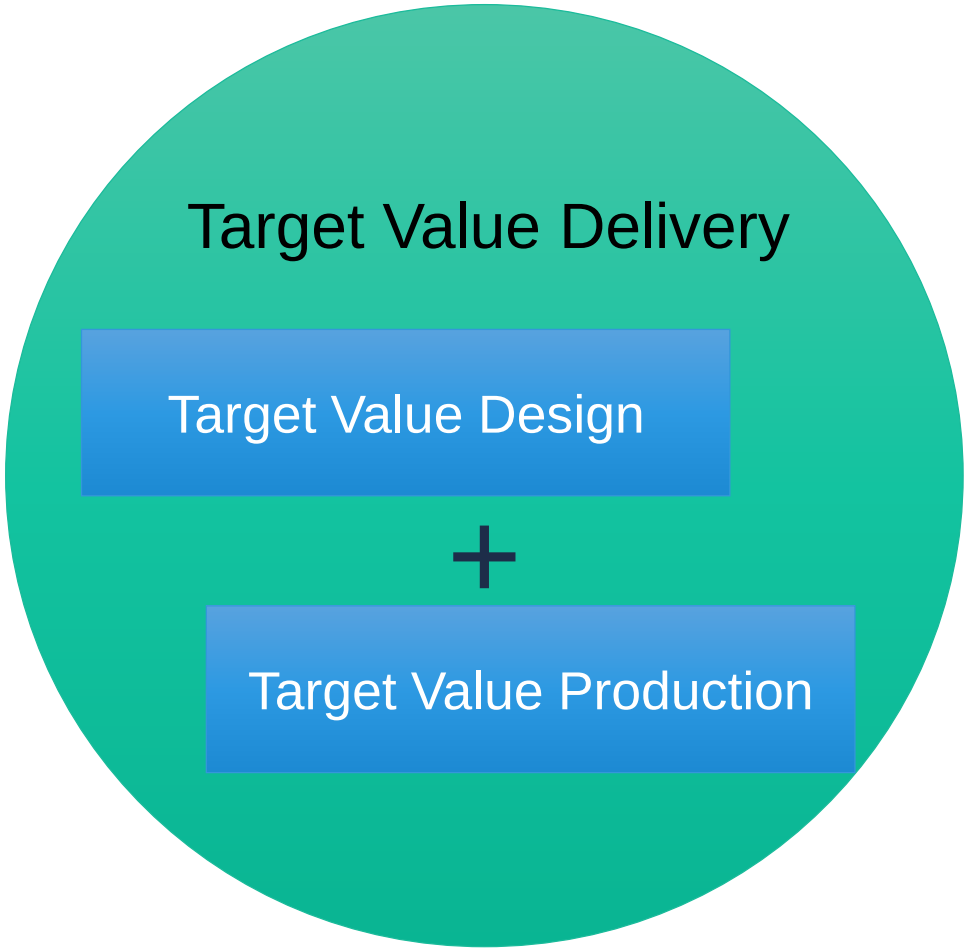
Target Value Delivery

Target Value Delivery encompasses

Target Value Design

AND

Target Value Production (Construction)



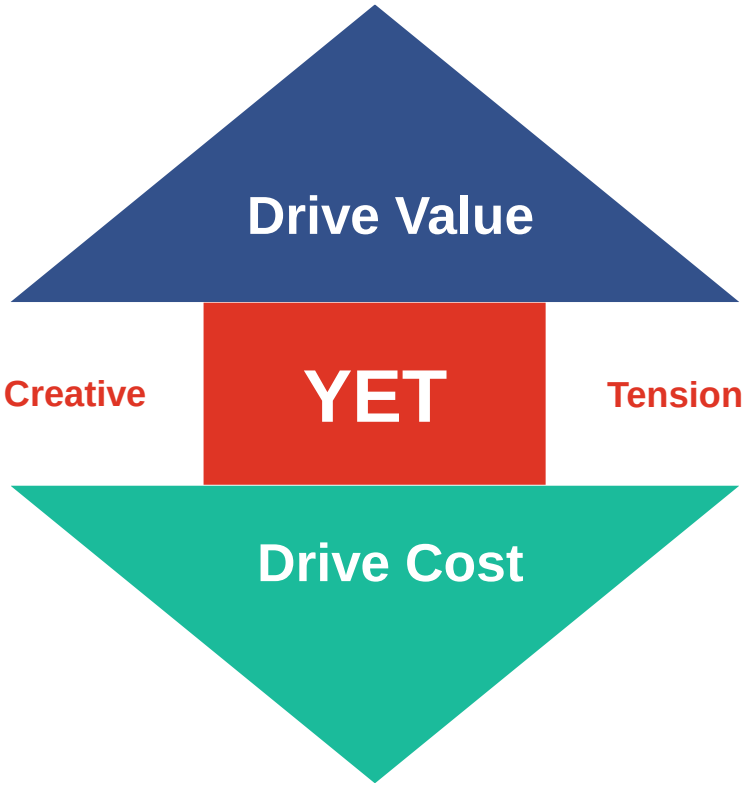
Lean Construction Institute
Immersive Education Program

Application

Target Value Delivery is to be applied holistically to obtain maximum value.

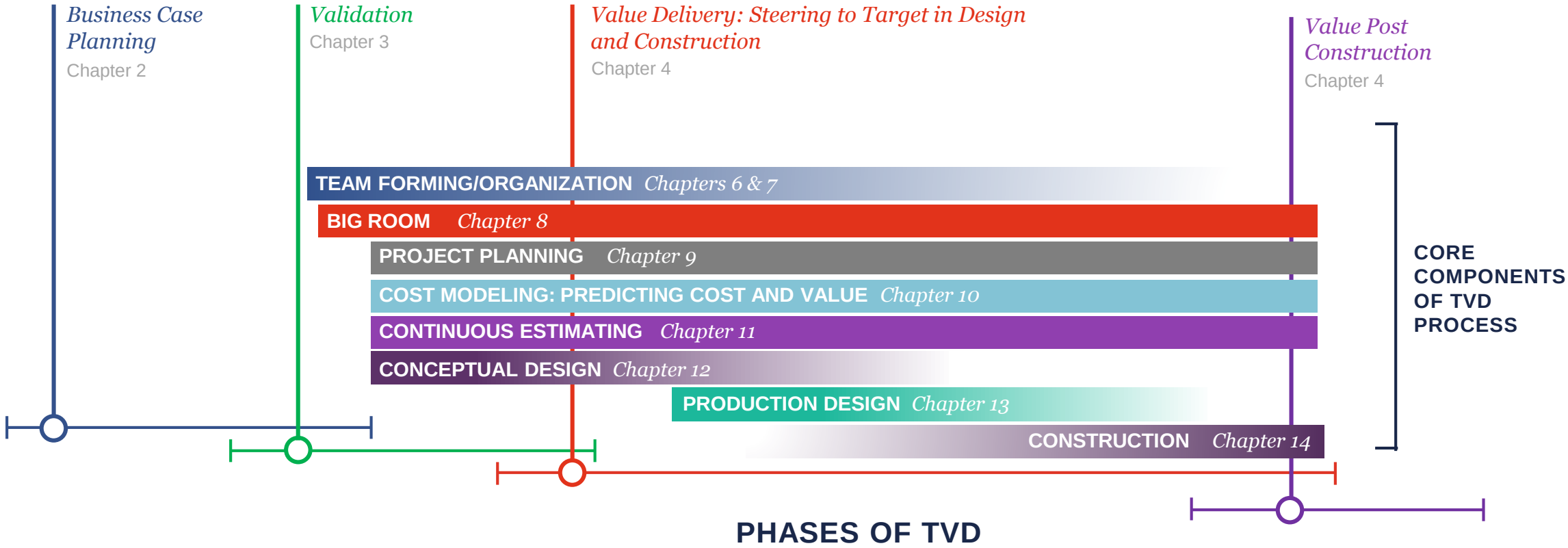
Regardless of the project delivery framework, the owner, designers, builders, and key trades must be fully engaged from the onset.

It generates a creative tension between driving up quality YET driving cost down.



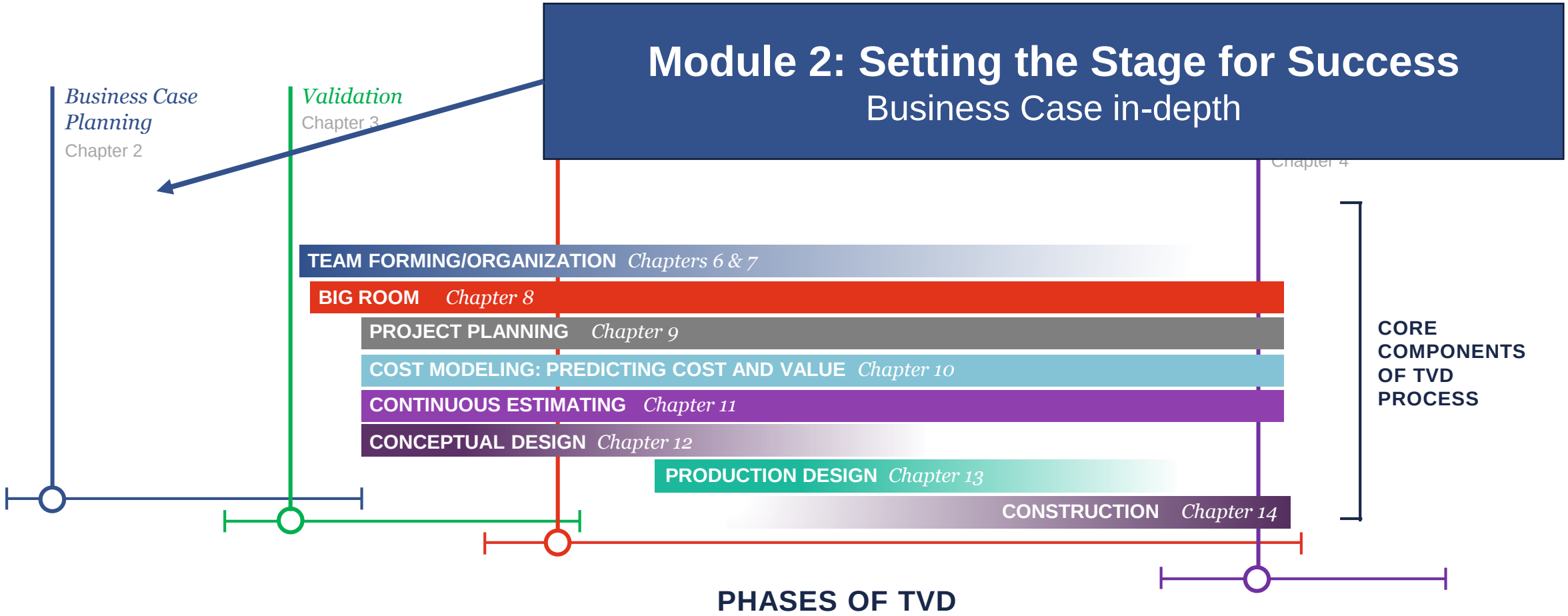
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



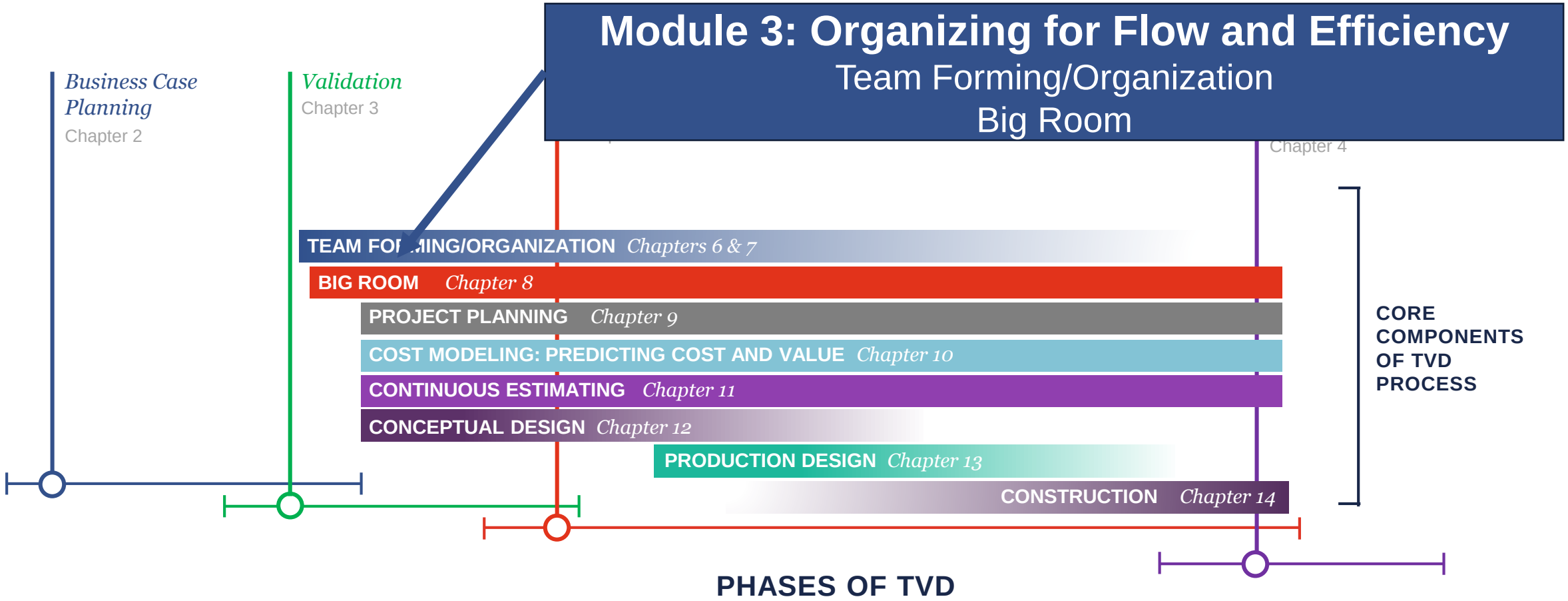
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



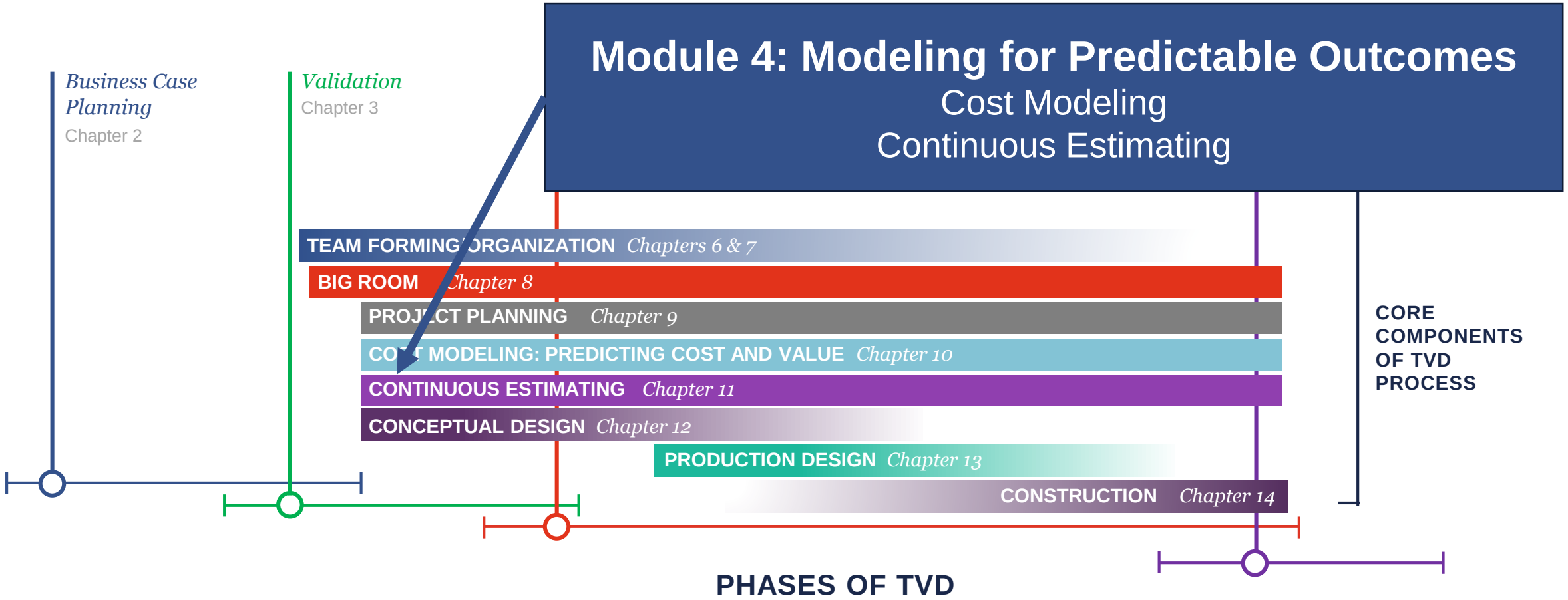
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



Business Case Planning Phase

Lean Construction Institute
Immersive Education Program

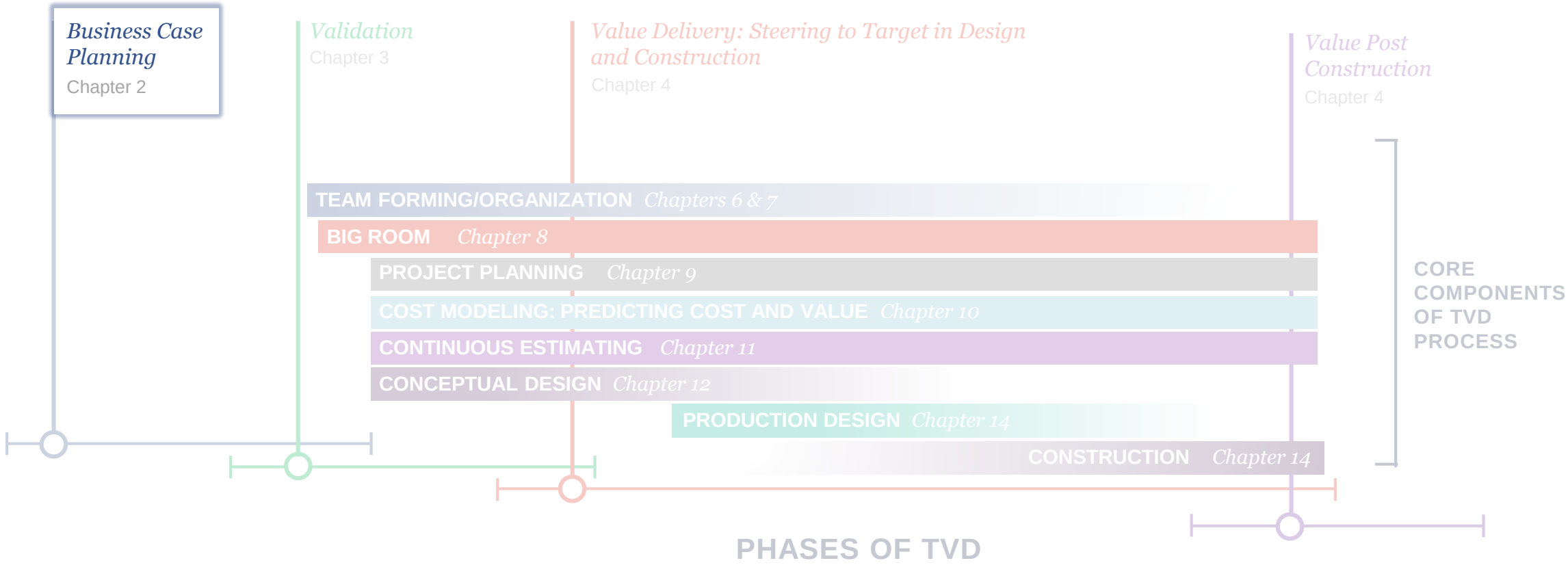


Image courtesy of InsideOut Consulting & Southland Industries

Business Case Phase

The operational use/benefit proposition described by the owner that initiates the development of the project.

- The owner-provided purpose or “why” that becomes the anchor of the project.
- Sets the ***Allowable Cost***.
- Includes ***Value Definition Statements*** by the owner for the project.

Framing the Business Case

Lean Construction Institute
Immersive Education Program

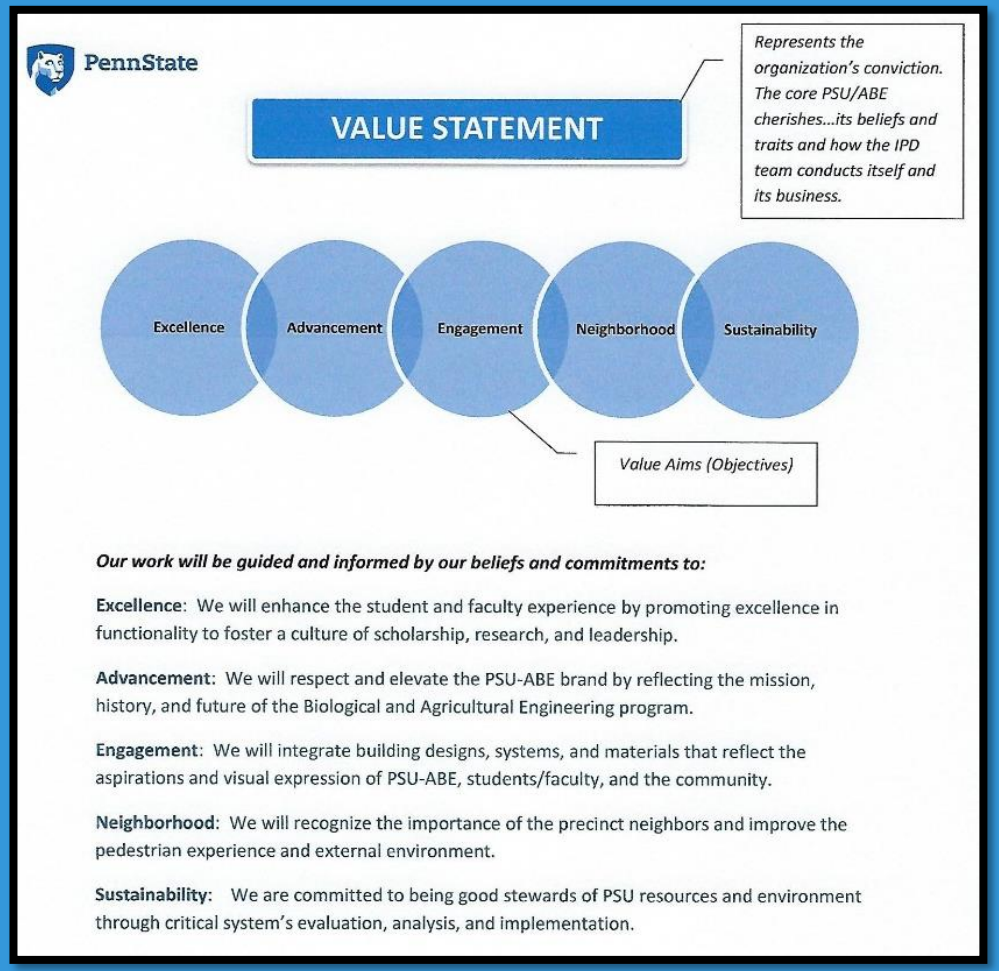
Could we build **X** thing for $**Y** and have it by **Z** date?

- Could we open a replacement hospital in Castro Valley, CA for $300 million by early 2027?
- Could we find a way to increase overall visitor count by X% for a capital expenditure of $1 billion by 2030?

Value Definition Statements

Lean Construction Institute
Immersive Education Program

- Define what the customer wants from the process.
- Are composed of high-level statements that describe expected outcomes, or “value” that the project will deliver.
- Should not be ranked or weighted.
- Should include all stakeholder input.



Conditions of Satisfaction (CoS):

Lean Construction Institute
Immersive Education Program

- Are developed by the team informed by the ***Value Definition Statements***.
- Measurable statements that inform a project team about which tests a project must pass to be accepted as a success.
- Inform the decision-making process of the team.
- Are developed by the team including the owner.

TVD Cost Terminology

Allowable Cost

The amount the owner is willing to spend for the total project.

Business Case Planning Phase

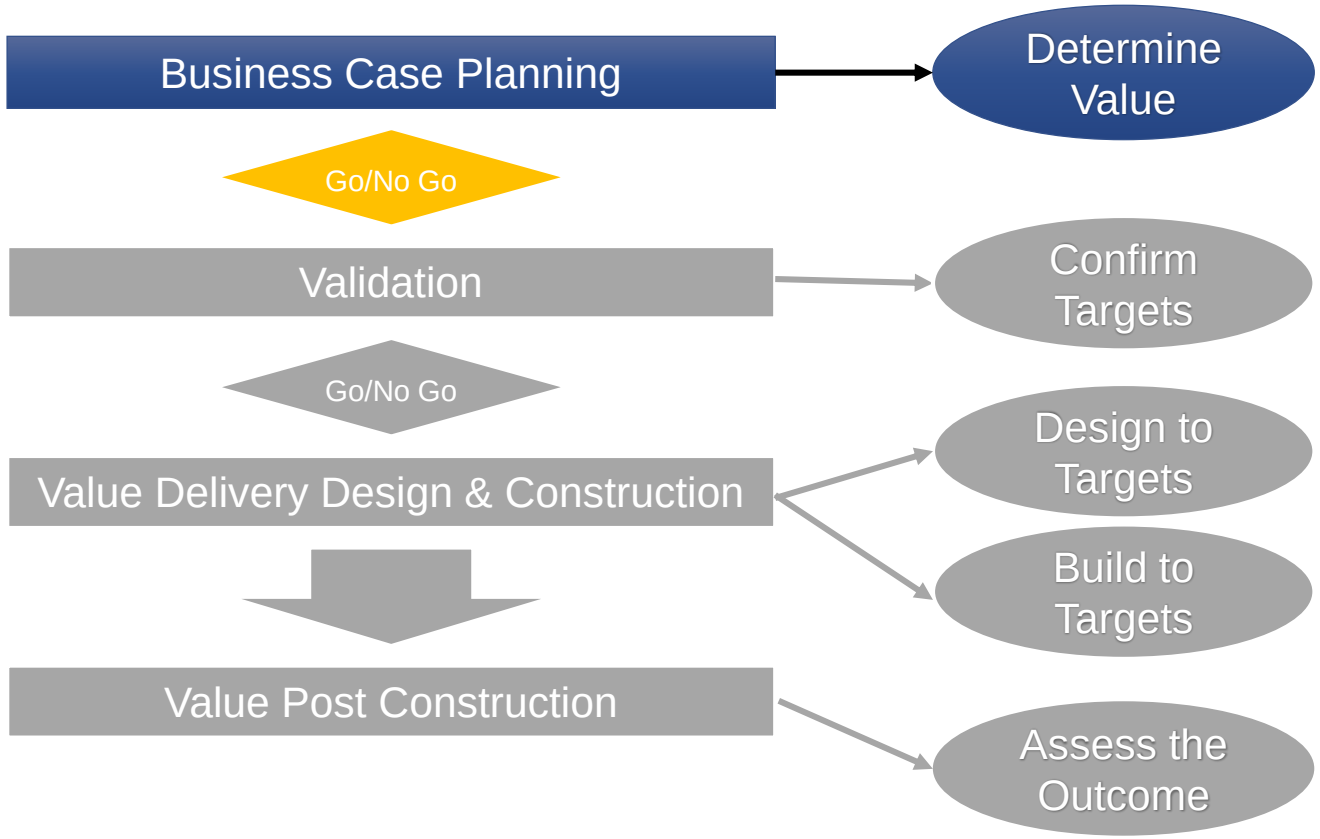
TVD Phases Overview

Lean Construction Institute
Immersive Education Program

The output of the ***Business Case Planning Phase*** includes:

- Value Definition Statements
- Allowable Cost
- Time Frame
- Other Relevant Information

Target Value Delivery Phases



Validation Phase

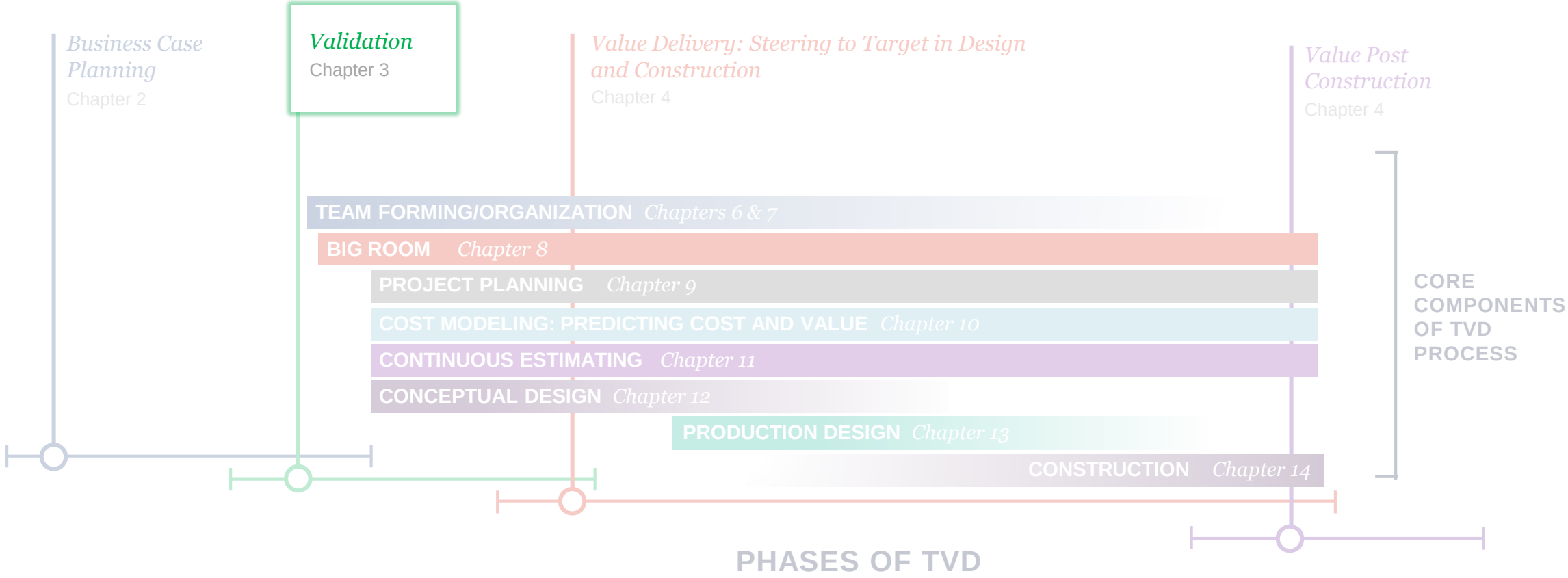


Image courtesy of InsideOut Consulting & Southland Industries

Validation Phase

The project team determines whether the project is viable based on the outputs of the ***Business Case*** Phase.

- Output is the team understanding and alignment:
  - Scope definition
  - Value Definition & Conditions of Satisfaction
  - Expected Cost
  - Target Cost

Conditions of Satisfaction (CoS):

Lean Construction Institute
Immersive Education Program

- Are developed by the team informed by the ***Value Definition Statements***.
- Measurable statements that inform a project team about which tests a project must pass to be accepted as a success.
- Inform the decision-making process of the team.
- Are developed by the team including the owner.

Lean Construction Institute
Immersive Education Program

Expected Cost

Is an expression of the team's best estimate at the conclusion of the ***Validation Phase*** of what current best practice would produce as a price for the facility reflected in the accompanying basis-of-design documents.

Typically will also be supported by benchmarking or other market data to calibrate the Expected Cost in light of the market context.

Expected Cost

Lean Construction Institute
Immersive Education Program

Target Cost

- Is the cost goal that a project team is striving to achieve for its design and delivery efforts.
- Should be either equal to or less than the **Allowable Cost** and **Expected Cost.**
- Should be set at less than best-in-class past performance.
- Creates a sense of necessity to drive innovation and waste reduction into the design and construction process.

Target Cost

Lean Construction Institute
Immersive Education Program

TVD Cost Terminology

Allowable Cost

The amount the owner is willing to spend for the total project.

Business Case Planning Phase

≥

Expected Cost

The best estimate that the team projects the project will cost

Validation Phase

≥

Target Cost

The team goal for the total project.

Validation Phase

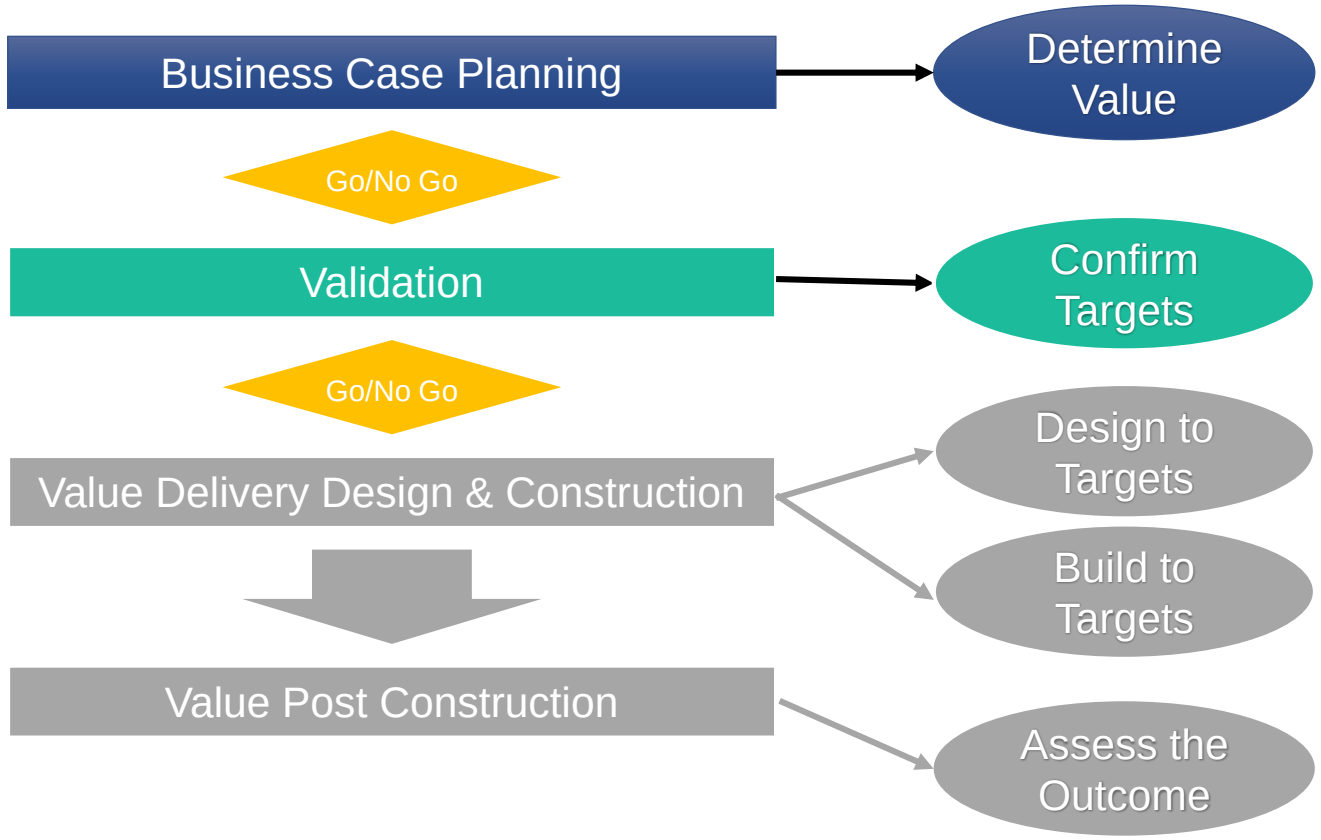
TVD Phases Overview

Lean Construction Institute
Immersive Education Program

Output of the ***Validation Phase*** includes:

- Team alignment and understanding of the **Targets**, and confidence in delivering to the **Targets.**

Target Value Delivery Phases



Value Delivery: Steering to the Target

Lean Construction Institute
Immersive Education Program

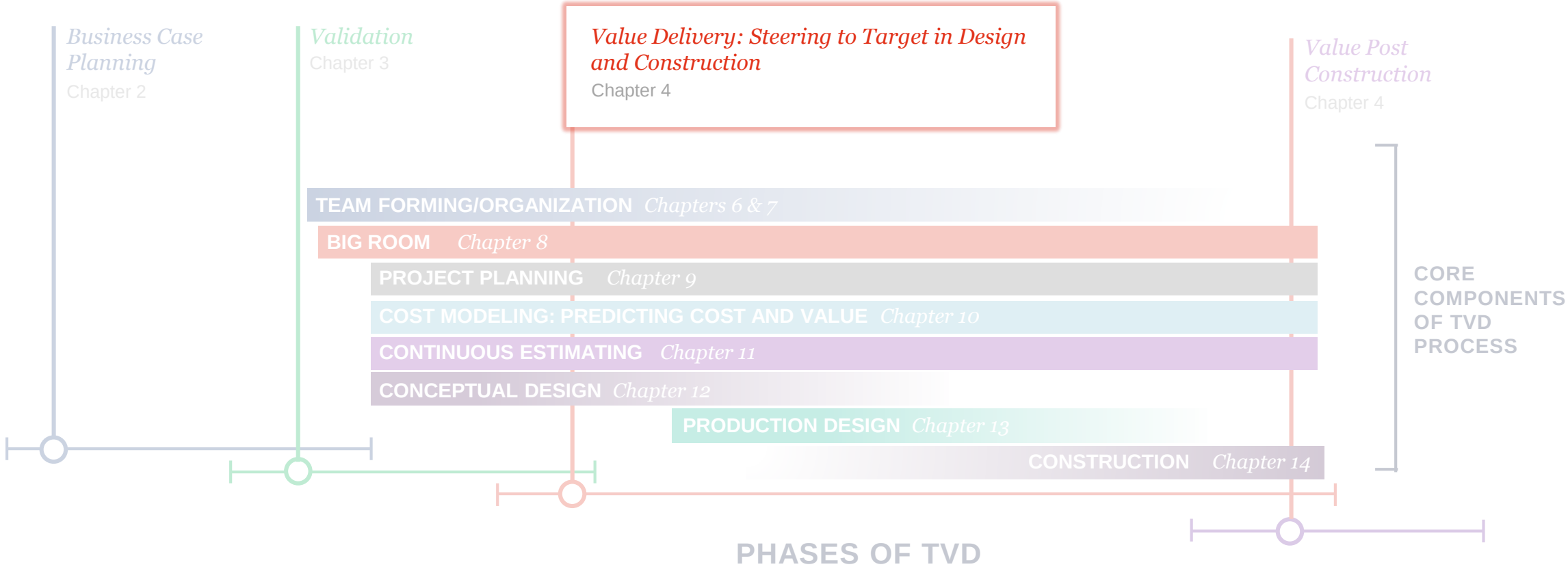


Image courtesy of InsideOut Consulting & Southland Industries

Value Delivery Phase

Work progresses in small batches toward intermediate milestones/decision points.

- The design is continually evaluated to the *Target Cost & CoS.*
- Teams explore innovative ways to achieve goals and add more value.
- An output of the phase is the *Actual Cost.*

TVD Cost Terminology

Lean Construction Institute
Immersive Education Program

Allowable Cost

The amount the owner is willing to spend for the total project.

Business Case Planning Phase

≥

Expected Cost

The best estimate that the team projects the project will cost

Validation Phase

≥

Target Cost

The team goal for the total project.

Validation Phase

≥

Actual Cost

The final cost at the end of the project.

Value Delivery Phase

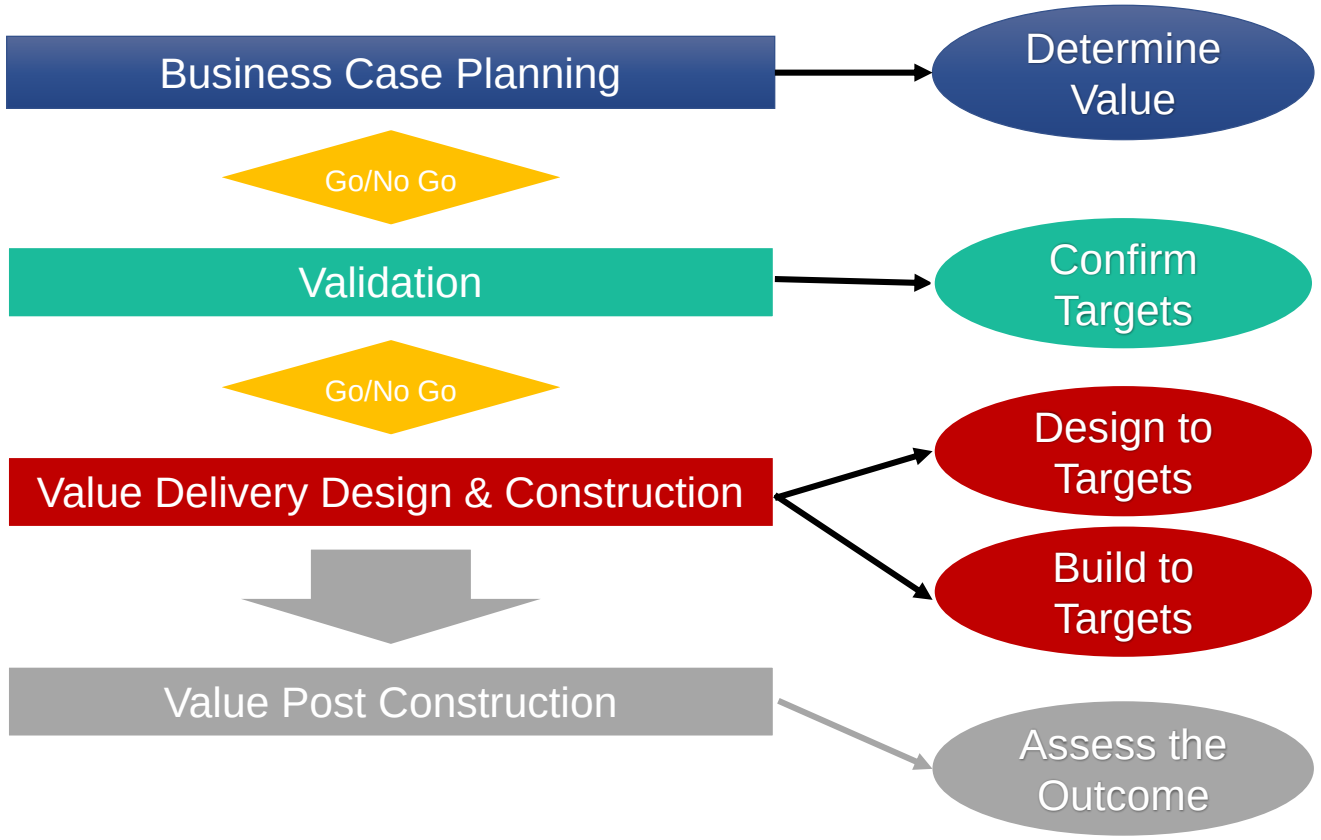
TVD Phases Overview

Lean Construction Institute
Immersive Education Program

The output of the ***Value Delivery Phase*** includes:

- Turnover of the actual finished project.
- The **Actual Cost** of the project.

Target Value Delivery Phases



Value Post Construction

Lean Construction Institute
Immersive Education Program

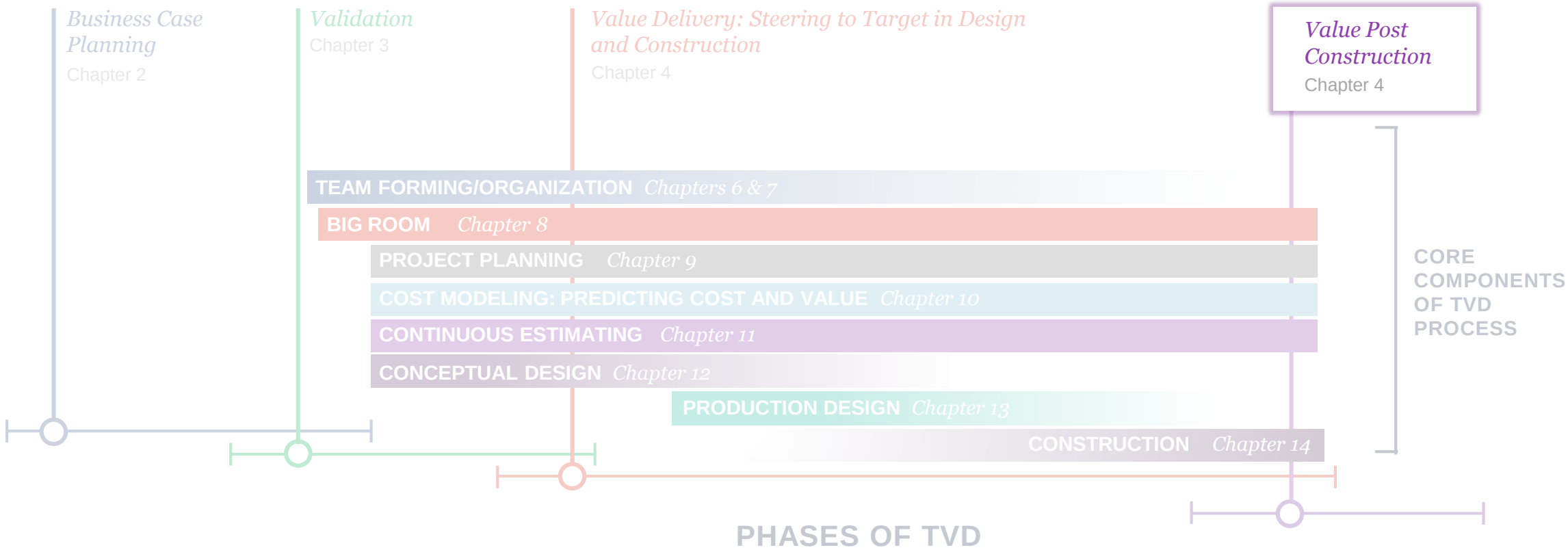


Image courtesy of InsideOut Consulting & Southland Industries

Value Post Construction

Lean Construction Institute
Immersive Education Program

- For the owner, value is realized only after the facility is constructed and serving its intended purpose.
- The business case and values are reviewed for actual outcomes.

Measuring Outcomes

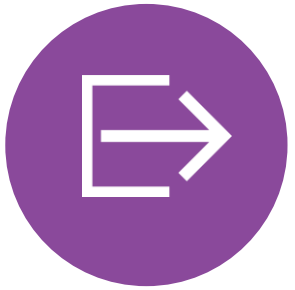
Lean Construction Institute
Immersive Education Program

Business outcomes

- Final cost of design & construction
- Final schedule
- Operational performance of finished building
- Quality & use

Project process outcomes

- Project quality, safety & appropriate integration of stakeholder input



Value outcomes

- Revisit the value-based decisions team made throughout process

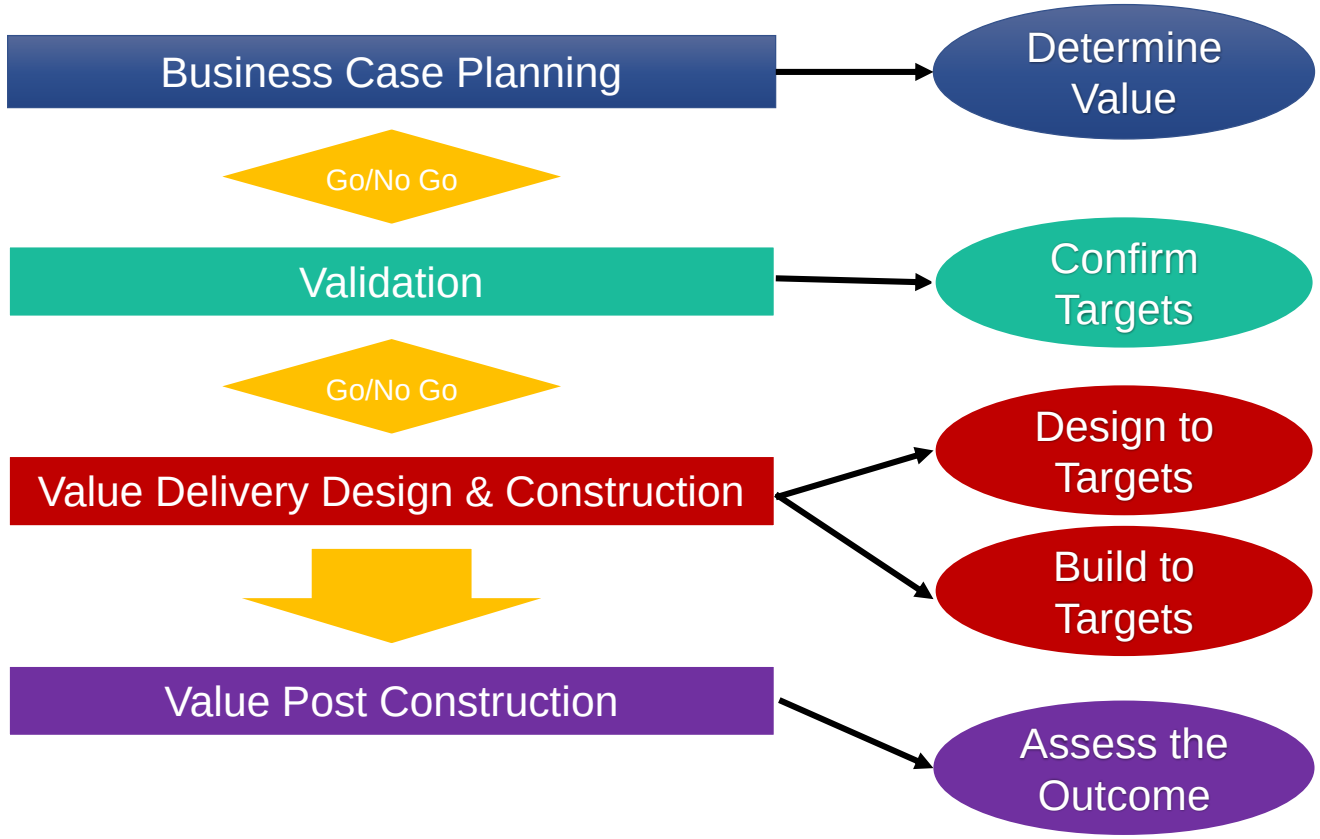
TVD Phases Overview

Lean Construction Institute
Immersive Education Program

The output of the ***Value Post Construction Phase*** includes:

- Assessing the outcome to the business case plan expectations.

Target Value Delivery Phases



Lean Construction Institute
Immersive Education Program

10 Minute Break

Learn in Action

Lean Construction Institute
Immersive Education Program

Target Value Delivery Game

CIAC+TAMU

Acknowledgements

For the design and preparation of these slides, we gratefully acknowledge the generous sponsorship of the **Construction Industry Advisory Council** of the **Department of Construction Science**, **Texas A&M University**, as well as assistance from the following graduate students:

- **Josh Hullum**
- **Aditi Kulkarni**
- **Manish Munankami**
- **James Smith**

We also wish to acknowledge the contributions of:

- **Darren Smith, Cima Strategic Services**
- **Manish Munamkami**
- **Zofia K. Rybkowski, PhD**

Department of Construction Science
College of Architecture
Texas A&M University
College Station, TX

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Objectives

The main objective of this game is to help participants understand *basic principles of Target Value Design* (TVD) within the Integrated Project Delivery (IPD) process.

The game applies TVD processes to Peter Skillman and Tom Wujec's "Marshmallow Challenge."

(*See*: http://thebuildnetwork.com/team-building/team-building-what-a-marshmallow-reveals-about-collaboration/)

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Set-up Instructions

1. Divide into teams of 6-10 people each.
2. Within each team, form the following groups:
    - Owners
    - Designers
    - Constructers
3. Instructions to all teams:
    - “The Owner wants to design and build a tower that is 2’-0” tall which can hold a marshmallow at the top and
    - that is no more than 2” out-of-plumb and
    - must be constructed with supplied materials and
    - must be free- standing (i.e. cannot be taped to a table).

CIAC+TAMU

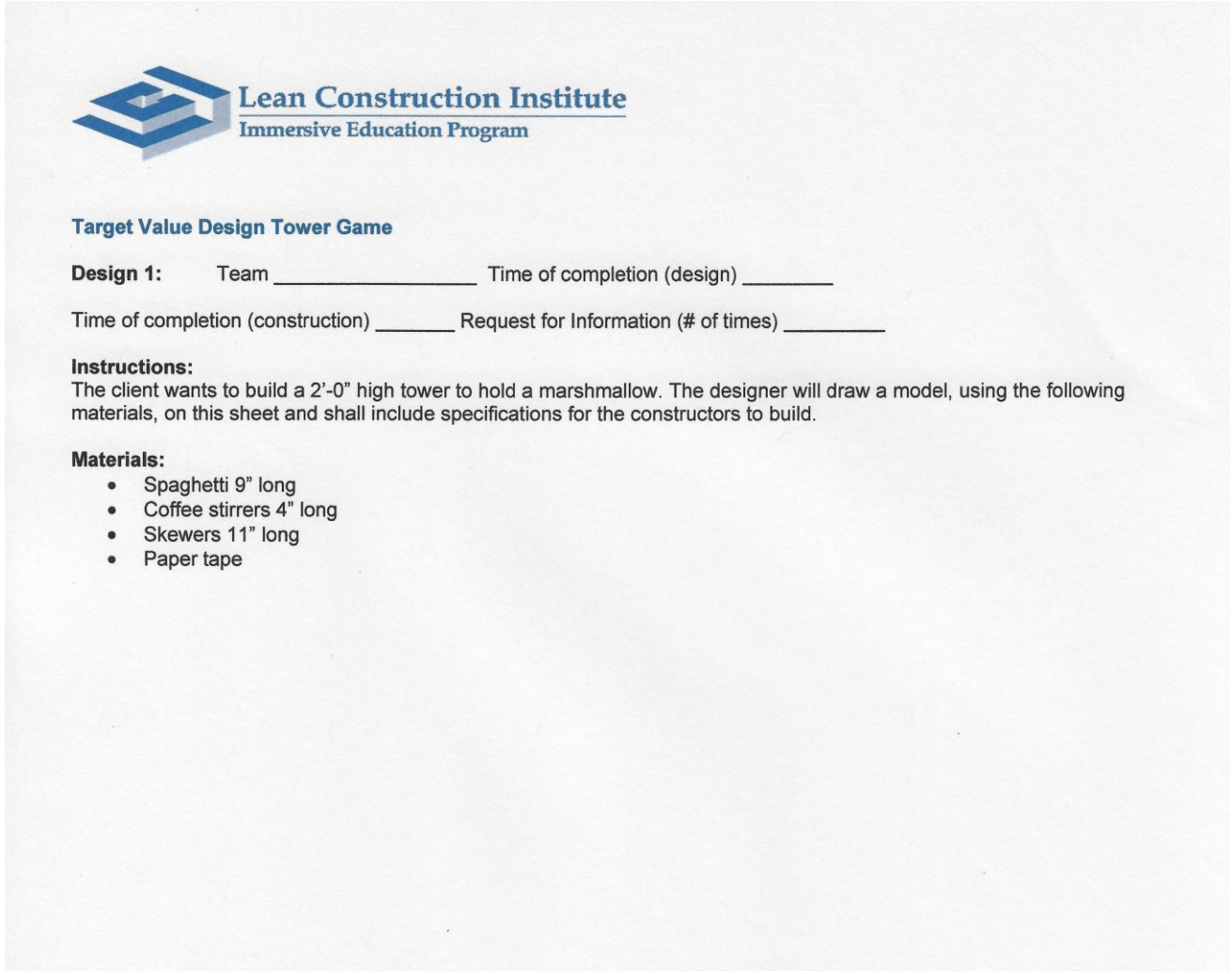
Tower 1 Instructions

1. Designers to design the tower

2. Constructors to construct the tower according to the design

3. Track:
   - Time of completion for the design
   - Time of completion for the construction
   - # of Requests for Information (Questions)

CIAC+TAMU



Lean Construction Institute
Immersive Education Program

Target Value Design Tower Game

Design 1: Team _____ Time of completion (design) _____

Time of completion (construction) _____ Request for Information (# of times) _____

Instructions:
The client wants to build a 2'-0" high tower to hold a marshmallow. The designer will draw a model, using the following materials, on this sheet and shall include specifications for the constructors to build.

Materials:
- Spaghetti 9" long
- Coffee stirrers 4" long
- Skewers 11" long
- Paper tape

Lean Construction Institute
Immersive Education Program

Tower 1 Costing

After construction is complete, calculate the cost of the tower using specified unit costs.

Tower 1 Costing

Team Name_____

Item	Unit cost	Number of units	Subtotal
Spaghetti sticks	$1.00		
Coffee stirrers	$5.00		
Drinking straws	$2.00		
Bamboo skewers	$3.00		
Masking tape (per joint)	$0.50		
Profit (10%)			
		Total Cost:	

CIAC+TAMU

Debrief

What happened?
What could be improved?
How is this like what happens on projects?

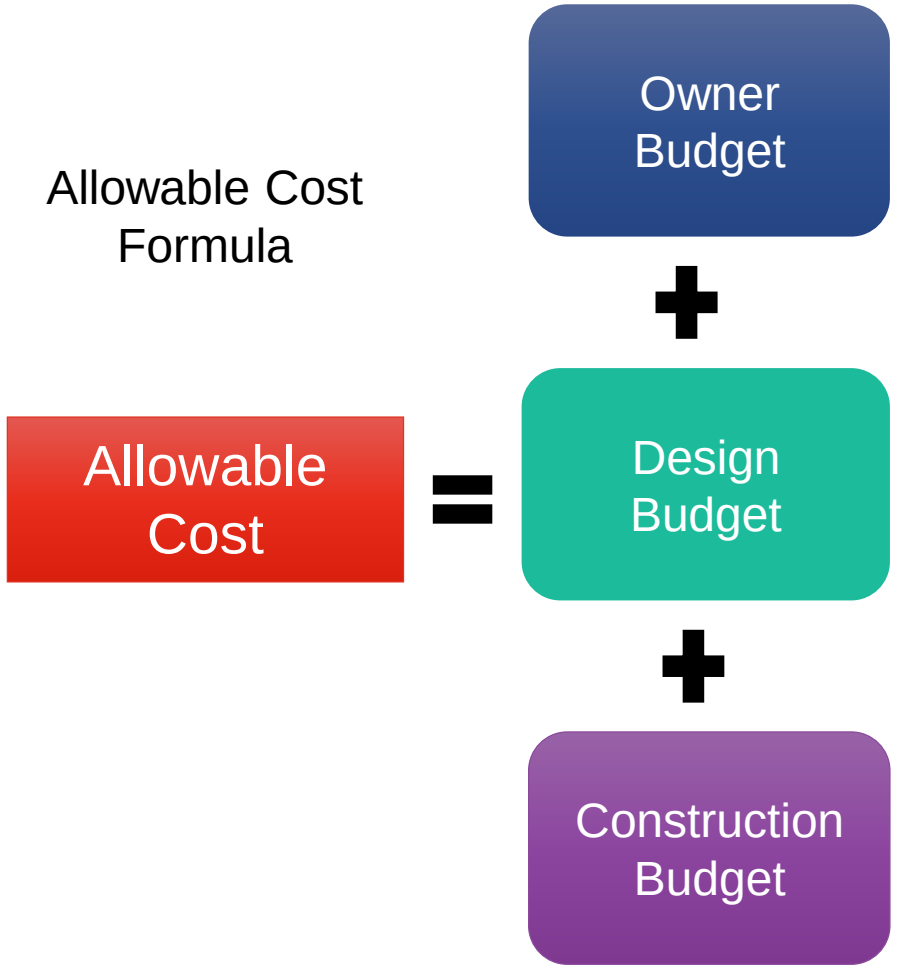
Large Group Discussion

Determining the Target Cost

1. Expected Cost is set at the average cost of all the towers built during Round 1.

2. Allowable Cost is preset by the Owner's budget for this simulation.

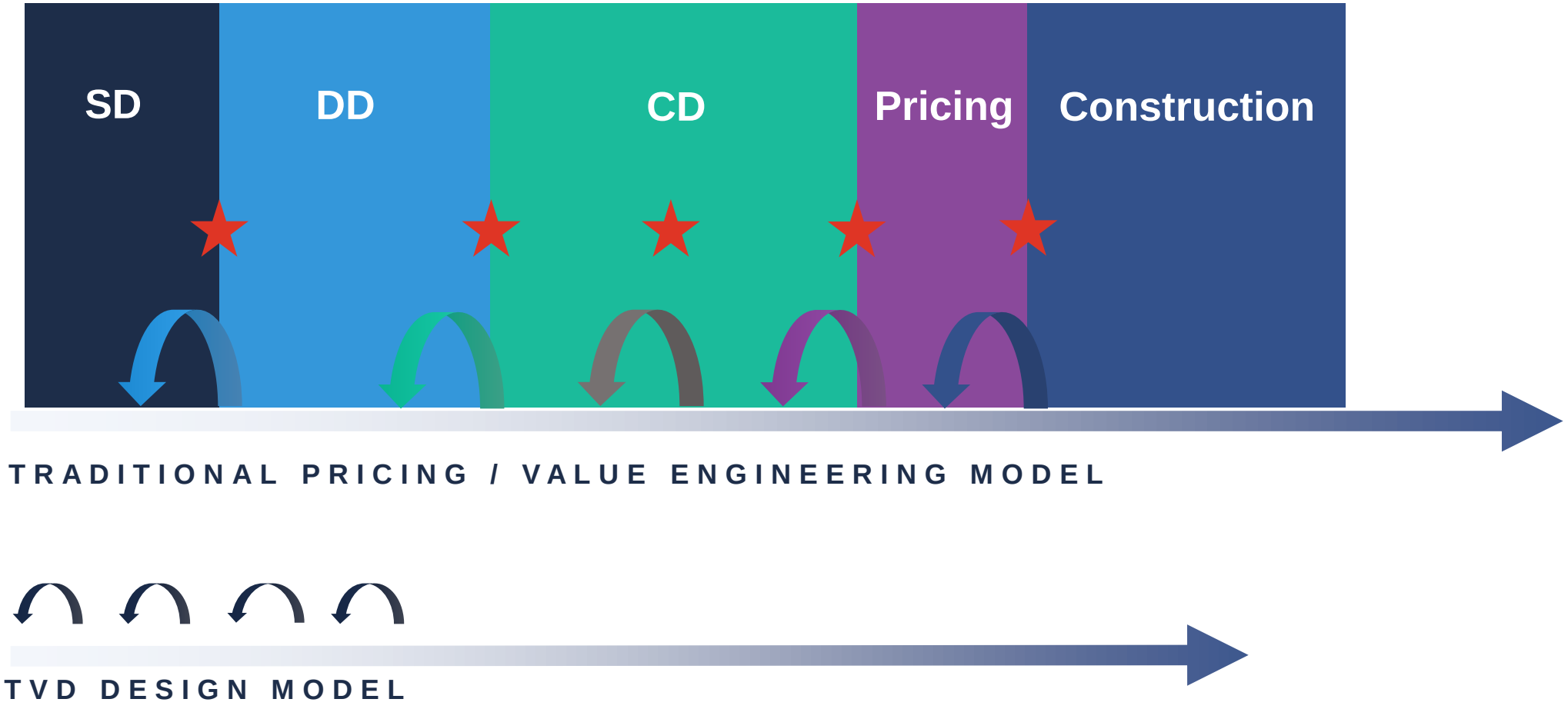
3. Target Cost is set by team members. Target cost is 20% less than allowable cost.



CIAC+TAMU

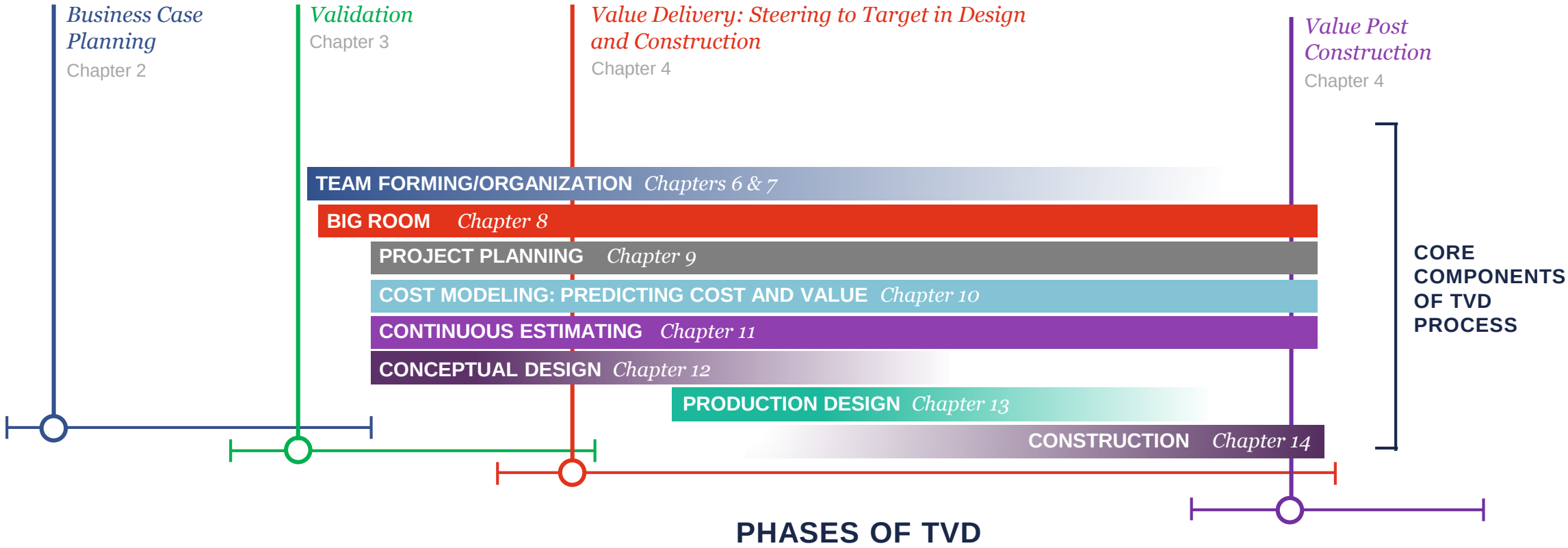
TVD Continuous Estimating Model

Lean Construction Institute
Immersive Education Program



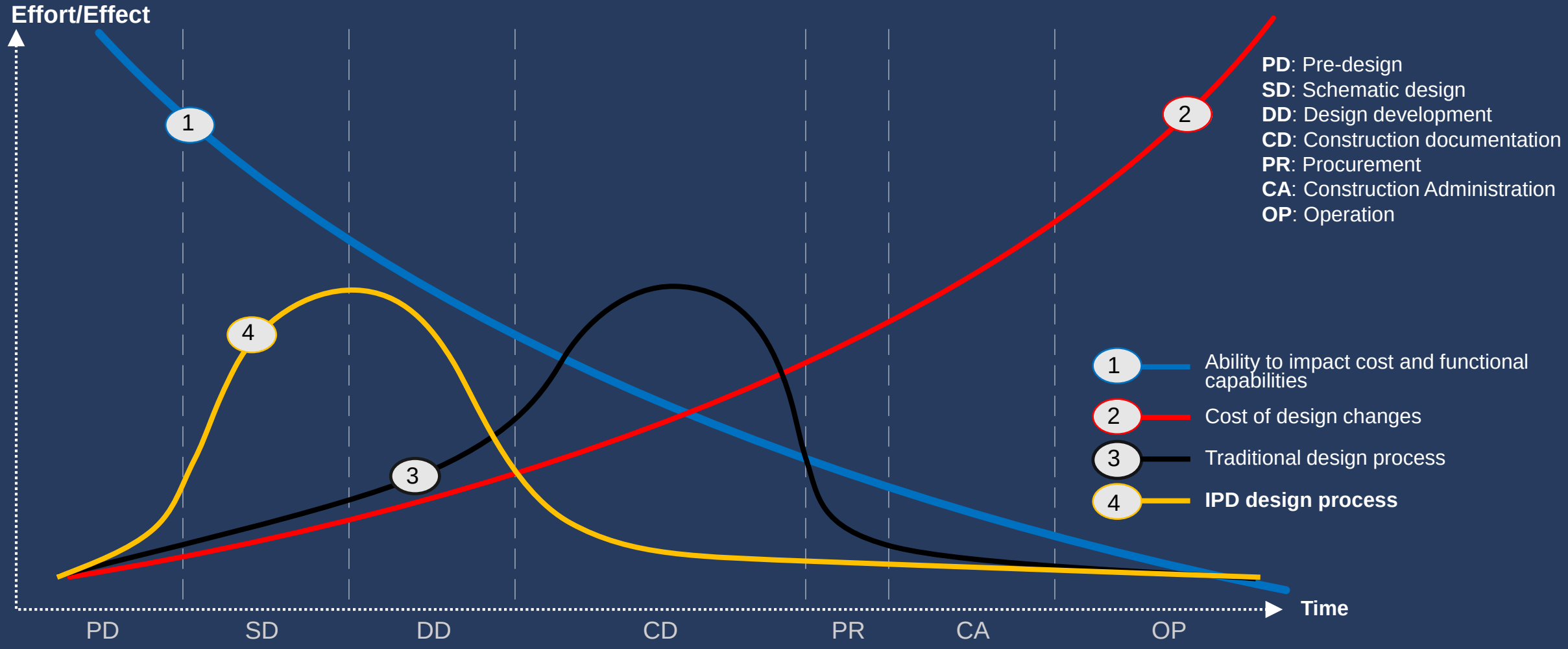
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



Team Formation

Lean Construction Institute
Immersive Education Program



Graphic courtesy of Patrick MacLeamy AIA / HOK

Lean Construction Institute
Immersive Education Program

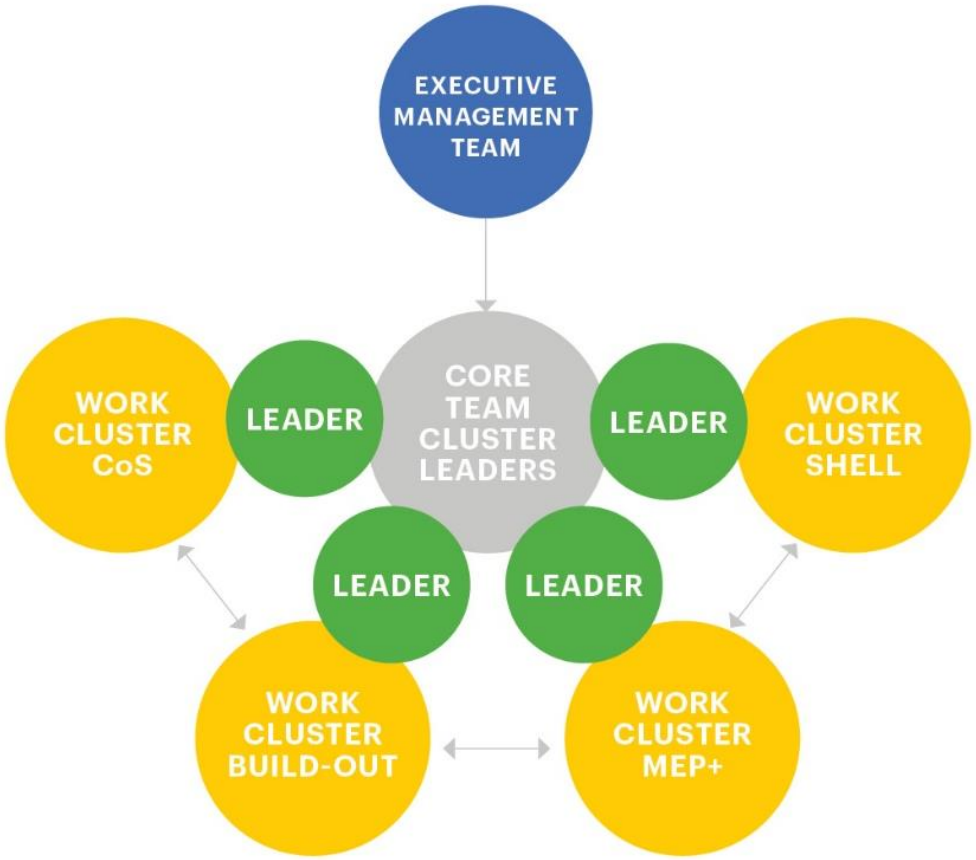
Work Cluster Organization

Executive/Senior Management:
- Not involved in day-to-day of team
- Resolve conflicts

Core Team:
- Day-to-day leaders of the team

Work Clusters:
- Leader
- System oriented
- Cross discipline
- Stakeholder representation
- Form as need

Work Cluster Leader:
- Coordination between work cluster & core team



Lean Construction Institute
Immersive Education Program

Big Room

Big Room refers to a project approach of bringing key individuals together to:

Collaborate, plan, update, solicit resources, invite feedback, demonstrate accountability, and schedule events in order to:

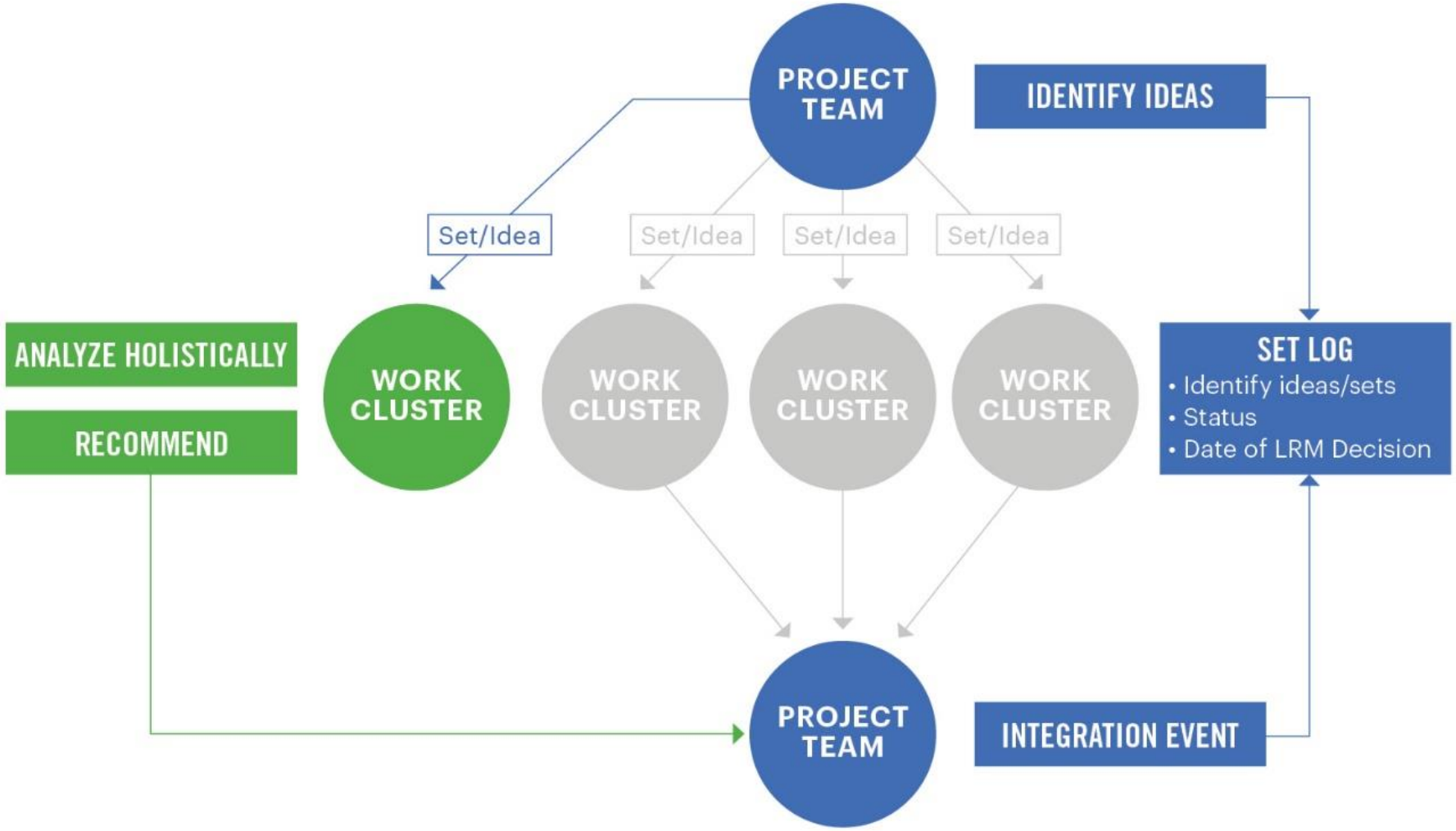
- Speed communication and decision-making.
- Reduce siloed thinking or approaches.
- Compare the project's current state to the published goals or Conditions of Satisfaction.

Lean Construction Institute
Immersive Education Program

Big Room

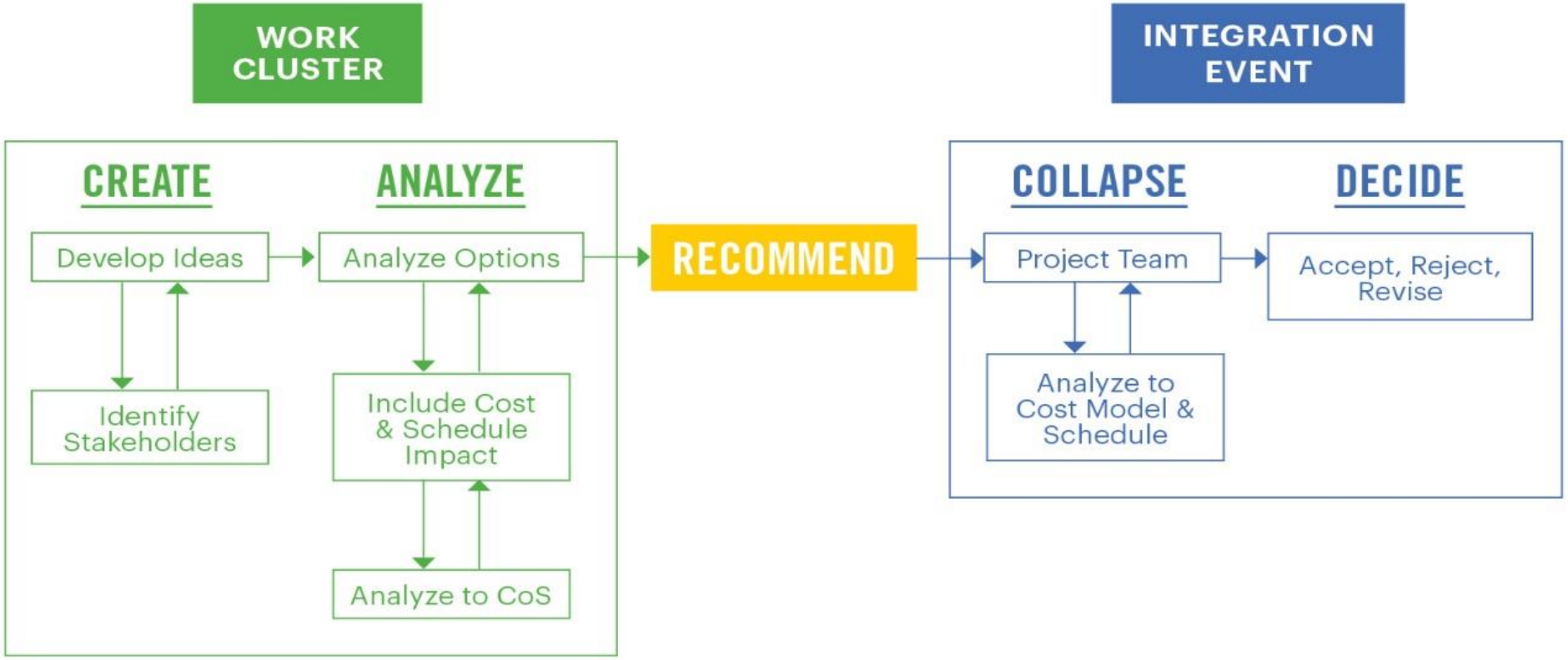
Big Room is a commitment to a project, the team and to working together!

Work Cluster Flow in Big Room Setting



Decision Flow Model

Lean Construction Institute
Immersive Education Program



Resource

Integration Event

From CPR Program

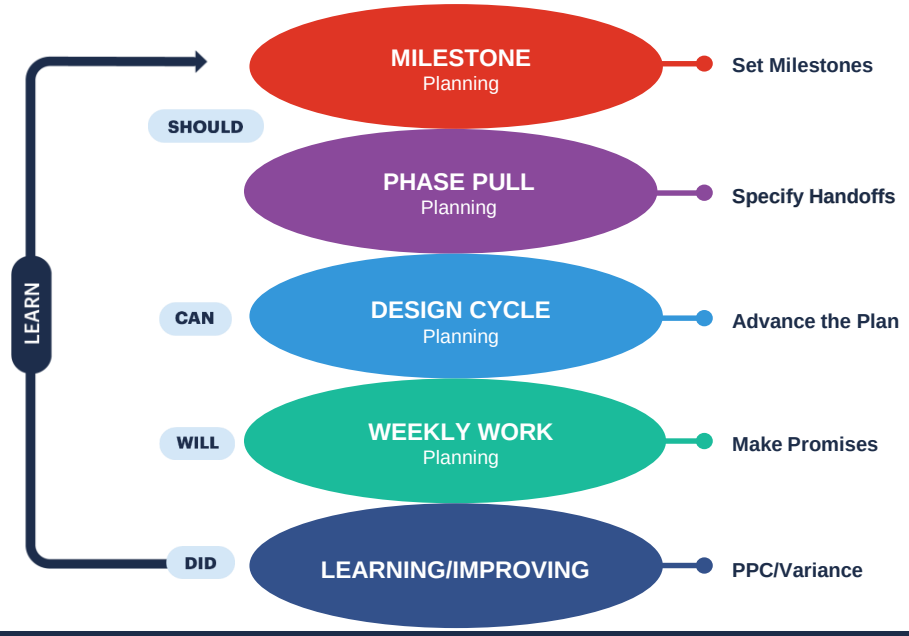
Lean Construction Institute
Immersive Education Program

Project Planning

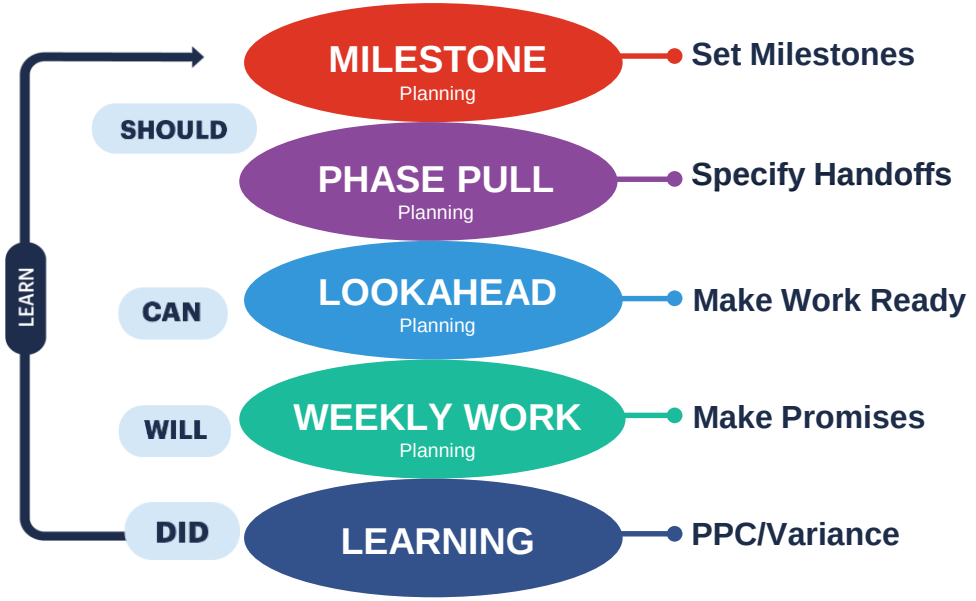
LPS® 5 Connected Conversations Design through Construction Phases

Identify Major Decisions vs. Depending on Traditional Design Milestones

LPS Design Phase



LPS Construction Phase



Lean Construction Institute
Immersive Education Program

Cost Modeling: Predicting Cost & Value

The cost modeling process begins in the ***Business Case Planning Phase*** with benchmarking estimating to determine the **Allowable Cost**.

Allowable Cost

The amount the owner is willing to spend for the total project.

Project Cost Model

The Allowable Cost process informs the development of the initial **Project Cost Model.**

- The initial cost model should be developed *before* the design team makes the first quantifiable decision.

- Before any design begins, the team must collectively understand the preliminary cost model for the project.

Types of Estimating

Lean Construction Institute
Immersive Education Program

1. Benchmarking
2. Conceptual
3. Production

Lean Construction Institute
Immersive Education Program

Continuous Estimating

Continuous estimating is the effort of regular, frequent updating of the estimate, while also tracking specific variances from the last update.

This practice

- Integrates the cost professionals for ongoing cost input to the design development and decision-making
- Cost professionals understand the potential ramifications to the cost model from collaborative conversations not highly developed deliverables

Types of Estimating

Lean Construction Institute
Immersive Education Program

1. Benchmarking
2. Conceptual
3. Production

Conceptual Estimating

Lean Construction Institute
Immersive Education Program

- Process of projecting likely costs of components supporting program needs, *without detailed documentation*.

Level of Accuracy: Best +/- 5% Good +/- 10%

Conceptual Design

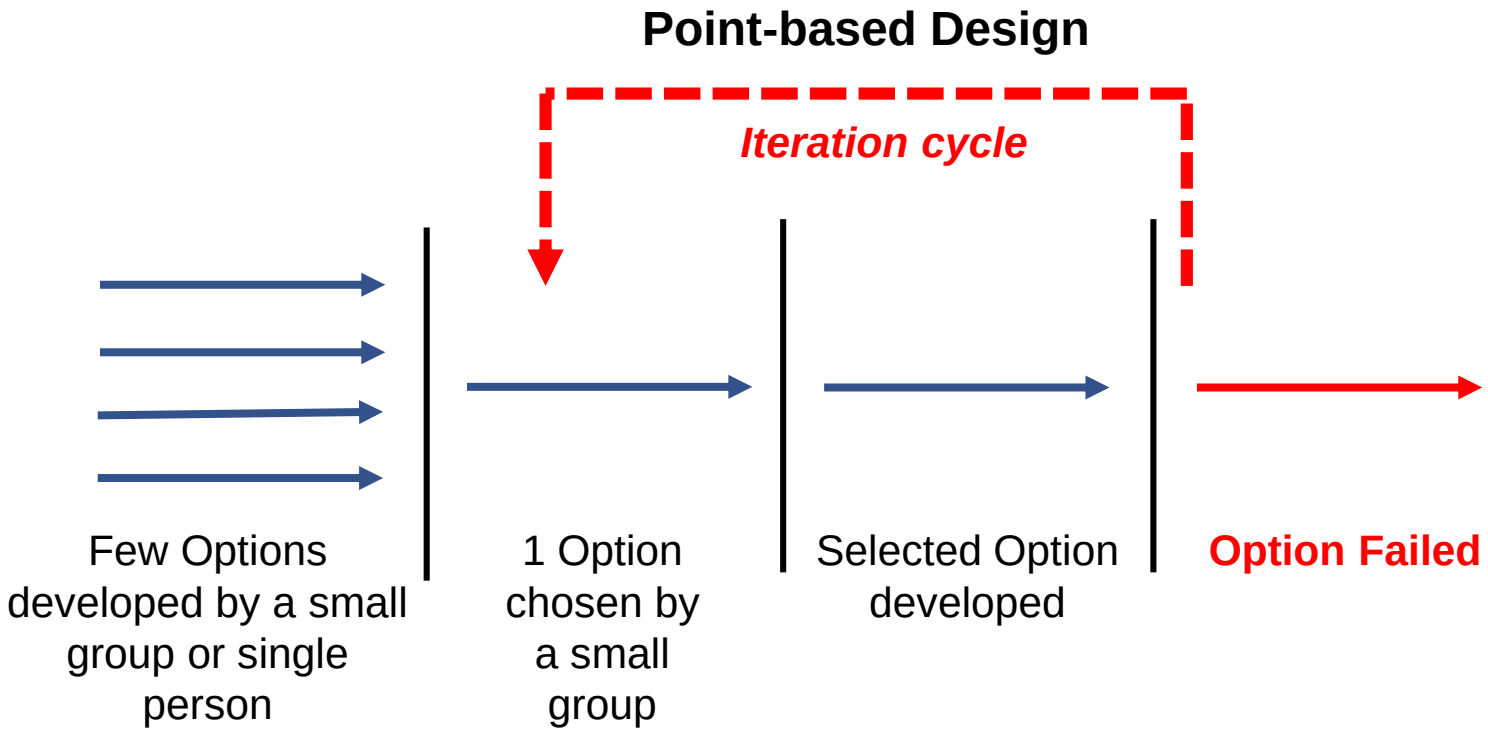
Lean Construction Institute
Immersive Education Program

1. Criteria development
2. Organize information
3. Set-based design
4. Integration

UHS Temecula Valley Hospital Team

Lean Construction Institute
Immersive Education Program

Point-based Design

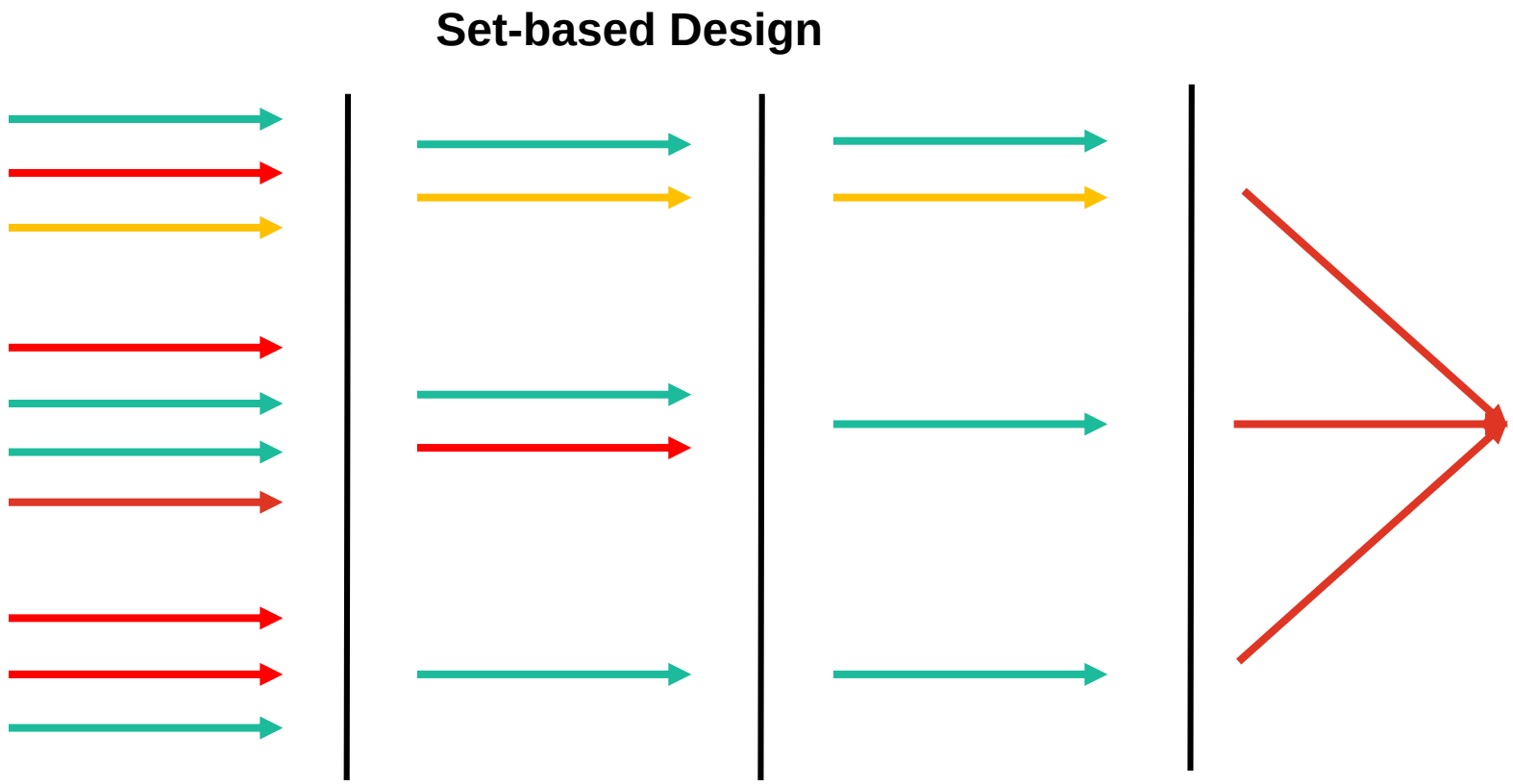


Lean Construction Institute
Immersive Education Program

Set-based Design

1. Many options developed by a diverse group for subsystems.
2. Evaluate against risks and in consideration of the project as a whole.
3. Weaker options are eliminated
4. Options are continually evaluated and narrowed.
5. Final options selected

No iterative cycles!



Courtesy of HMC Architects

Types of Estimating

Lean Construction Institute
Immersive Education Program

1. Cost Benchmarking
2. Conceptual
3. Production

Production Estimating

- Most traditional form of estimating.
- Driven by what *has been* documented in the design phase and confirms estimates developed during earlier conceptual stages.

Level of Accuracy: Best +/- 1% Good +/- 3%

Production Design

Production Design start when the design concepts are:

- Accepted by the project team, including owners and users
- Have been validated as aligning with the CoS and cost model.

Allowable Cost

The amount the owner is willing to spend for the total project.

≥

Actual Cost

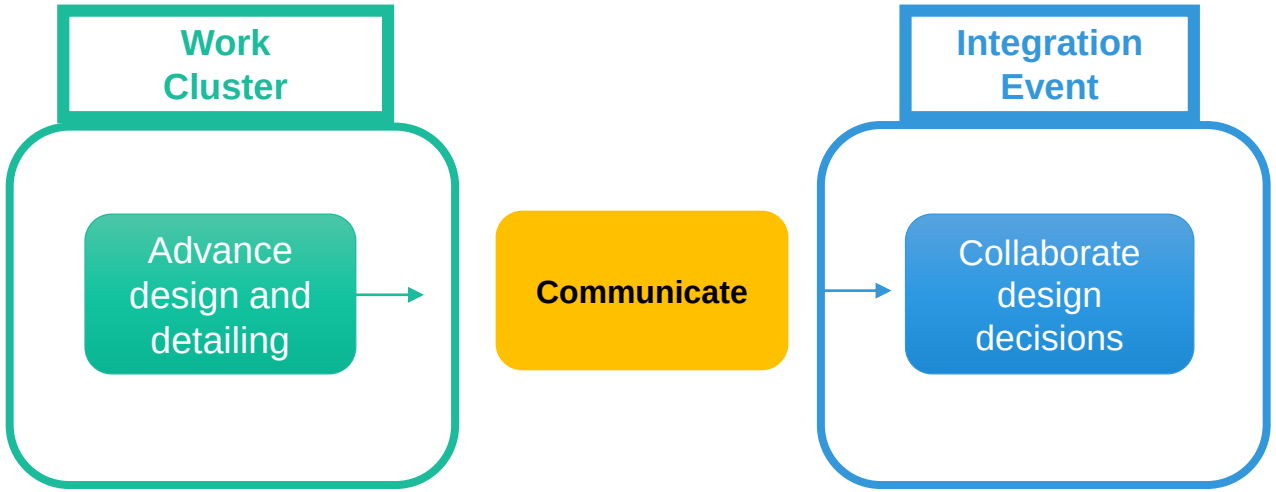
The final cost at the end of the project.

Confidence that the ***actual cost*** will be at or below ***allowable cost***

Production Design

The framework for production design:

- Is like conceptual design
- Typically takes the form of offline work clusters and regularly scheduled integration events in the Big Room
- Intentional about which entity is producing the work
- Detailing and/or modeling by trades



Lean Construction Institute
Immersive Education Program

Production Design to Construction

- **Production Design** starts to release work to the field
- The focus transitions to supporting the Last Planners® in execution of the work
- Measuring actual execution against targets.

Lean practices and approaches including:

- Prefabrication
- Team tracking of labor productivity
- Last Planner System®
- Continuing to implement a Big Room approach
- Eliminating waste in the construction process
- 5S Implementation

Construction

Lean Construction Institute
Immersive Education Program

As **Production Design** starts to release work to the field the focus of the Target Value Delivery (TVD) process transitions to supporting the Last Planners® in execution of the work and measuring actual execution against targets.

In the **Construction Phase,** TVD is supported by and Lean practices and approaches including:

- Prefabrication
- Team tracking of labor productivity
- Last Planner® System
- Continuing to implement a Big Room approach
- Eliminating waste in the construction process
- Reimagining the role of the designer during construction
- 5S Implementation

Lean Construction Institute
Immersive Education Program

10 Minute Break

Learn in Action

Lean Construction Institute
Immersive Education Program

Target Value Delivery Game
Tower 2

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Tower 2 Instructions

- Now that you have the Allowable Cost from the Owner and the Target Cost, let's try again.
- Owner, Designers and Constructors may all work together as a single team.
- Conditions of Satisfaction (CoS)
    - Build a tower that is 2'-0" tall which can hold a marshmallow at the top
    - No more than 2" out-of-plumb
    - Must be constructed with supplied materials
    - Must be free- standing (i.e. cannot be taped to a table).

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Tower 2 Instructions

1. Team delivers a tower to the CoS.

2. Track:

- Time of completion for the design
- Time of completion for the construction
- # of Requests for Information

Lean Construction Institute
Immersive Education Program

Target Value Design Tower Game

Tower 2: Team _____ Time of completion (design) _____

Time of completion (construction) _____ Request for Information (# of times) _____

Instructions:
The client wants to build a 2'-0" high tower to hold a marshmallow.

Materials:

- Spaghetti 9" long
- Coffee stirrers 4" long
- Skewers 11" long
- Masking tape

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Example Costing Sheet

Tower 1

		Spaghetti	Coffee Stirrer	Straw	Skewer	Paper Tape	Profit-10%	Total Cost
	Costs	**$ 1.00**	**$ 5.00**	**$ 2.00**	**$ 3.00**	**$ 0.50**	**10%**	
Team 1	Qty	0	2	4	8	1		
	Costs	$ -	$ 10.00	$ 8.00	$ 24.00	$ 0.50	$ 4.25	$ 46.75
Team 2	Qty	0	4	5	8	1		
	Costs	$ -	$ 20.00	$ 10.00	$ 24.00	$ 0.50	$ 5.45	$ 59.95
Team 3	Qty	0	4	3	7	7		
	Costs	$ -	$ 20.00	$ 6.00	$ 21.00	$ 3.50	$ 5.05	$ 55.55
Team 4	Qty	6	4	6	6	18		
	Costs	$ 6.00	$ 20.00	$ 12.00	$ 18.00	$ 9.00	$ 6.50	$ 71.50
Team 5	Qty	4	6	2	1	7		
	Costs	$ 4.00	$ 30.00	$ 4.00	$ 3.00	$ 3.50	$ 4.45	$ 48.95
Expected Cost								**$ 47.12**
Allowable Cost								**$ 40.00**
Target Cost - 20%								**$ 32.00**

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Tower 2 Costing

After construction is complete, calculate the cost of the tower using specified unit costs.

Tower 2 Costing

Team Name_____

Item	Unit cost	Number of units	Subtotal
Spaghetti sticks	$1.00		
Coffee stirrers	$5.00		
Drinking straws	$2.00		
Bamboo skewers	$3.00		
Masking tape (per joint)	$0.50		
Profit (10%)			
		Total Cost:	

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Tower 2 Additional Instructions

(1) Design tower to owner's requirements and calculate the total cost. If it exceeds the Allowable Cost, see if you can redesign it until you reach Allowable Cost.

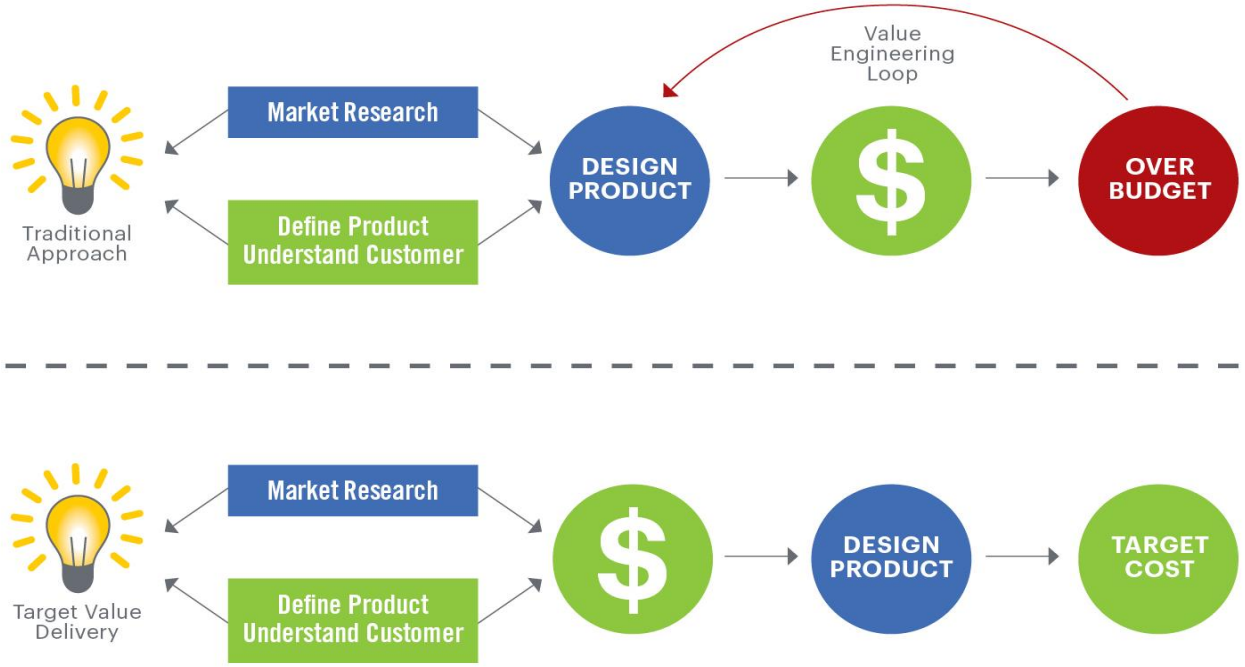
(2) If your estimate is below the Allowable Cost, see if you can redesign to reach the Target Cost.

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Traditional vs. Target Value Delivery

Cost is an *output* of design



Cost is an *input* of design

Courtesy of HKS Architects

Tower 1 Examples

(RED TEAM)

(BLUE TEAM)

(GREEN TEAM)

(YELLOW TEAM)

CIAC+TAMU

Tower 2 Examples

(YELLOW TEAM)

(RED TEAM)

(GREEN TEAM)

(BLUE TEAM)

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Discuss Results

1. What were some basic differences between two rounds?
2. How did the decision-making processes differ between the two rounds?
3. Which round was more stressful to you? Less stressful?
4. Which round offered better cooperation?
5. In which real-life circumstances might Round 1 be more appropriate? How about Round 2?
6. How might these process be applied to your real-life projects?

CIAC+TAMU

Discussion Question

Lean Construction Institute
Immersive Education Program

What new actions or ideas that you learned today can you take back to your project?

Learning Objectives Review

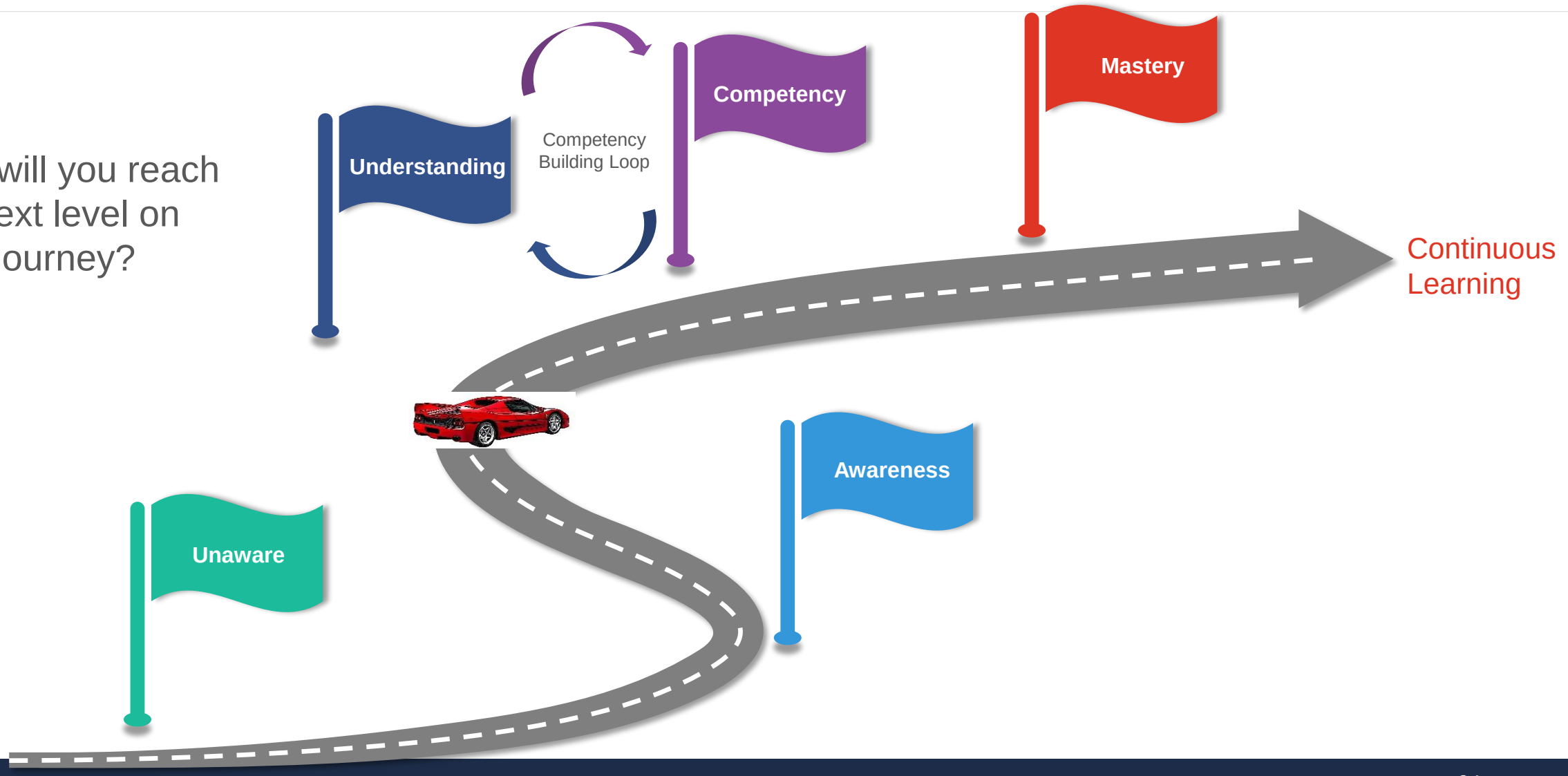
Lean Construction Institute
Immersive Education Program

- ☑ Define the meaning of Target Value Delivery and understand the intent of the approach.
- ☑ Identify the four phases, including the actions and outputs of each phase.
- ☑ Identify key Core Components of TVD.
- ☑ Discover how implementing TVD approaches improves project outcomes.

Lean Journey to Mastery

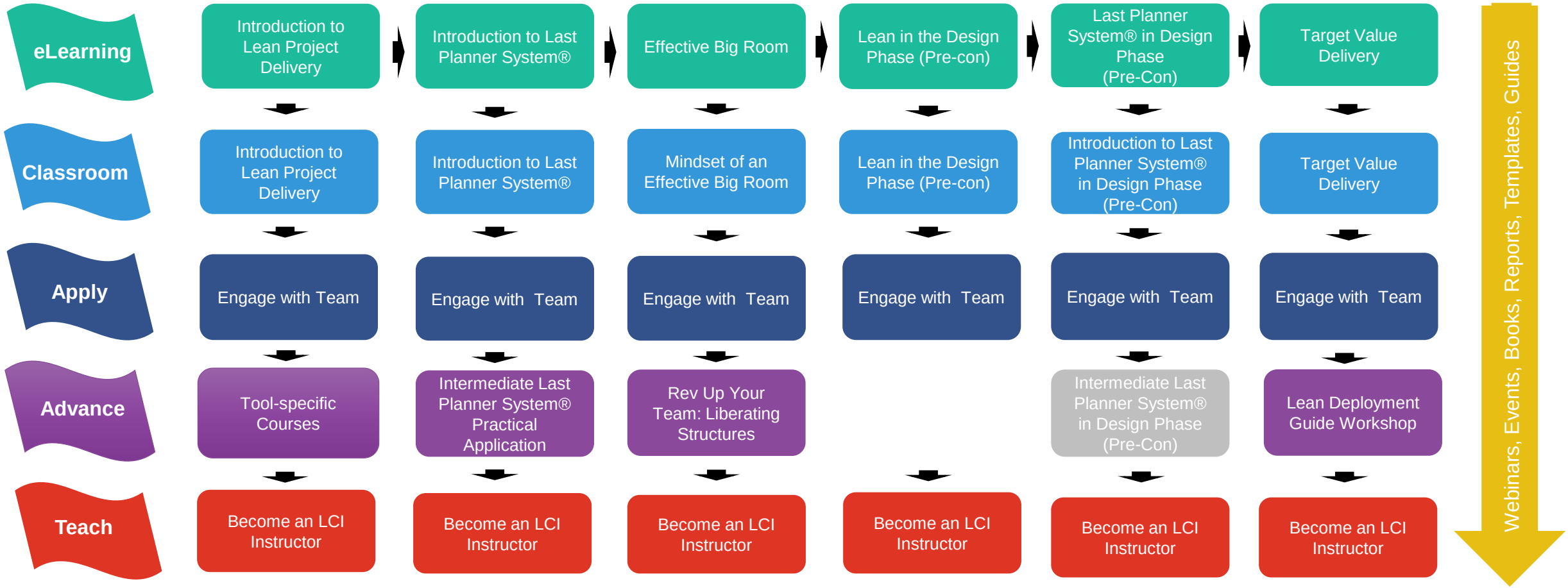
Lean Construction Institute
Immersive Education Program

How will you reach the next level on your journey?



Define Your Journey

Lean Construction Institute
Immersive Education Program



Lean Construction Institute
Immersive Education Program

LCI Certification

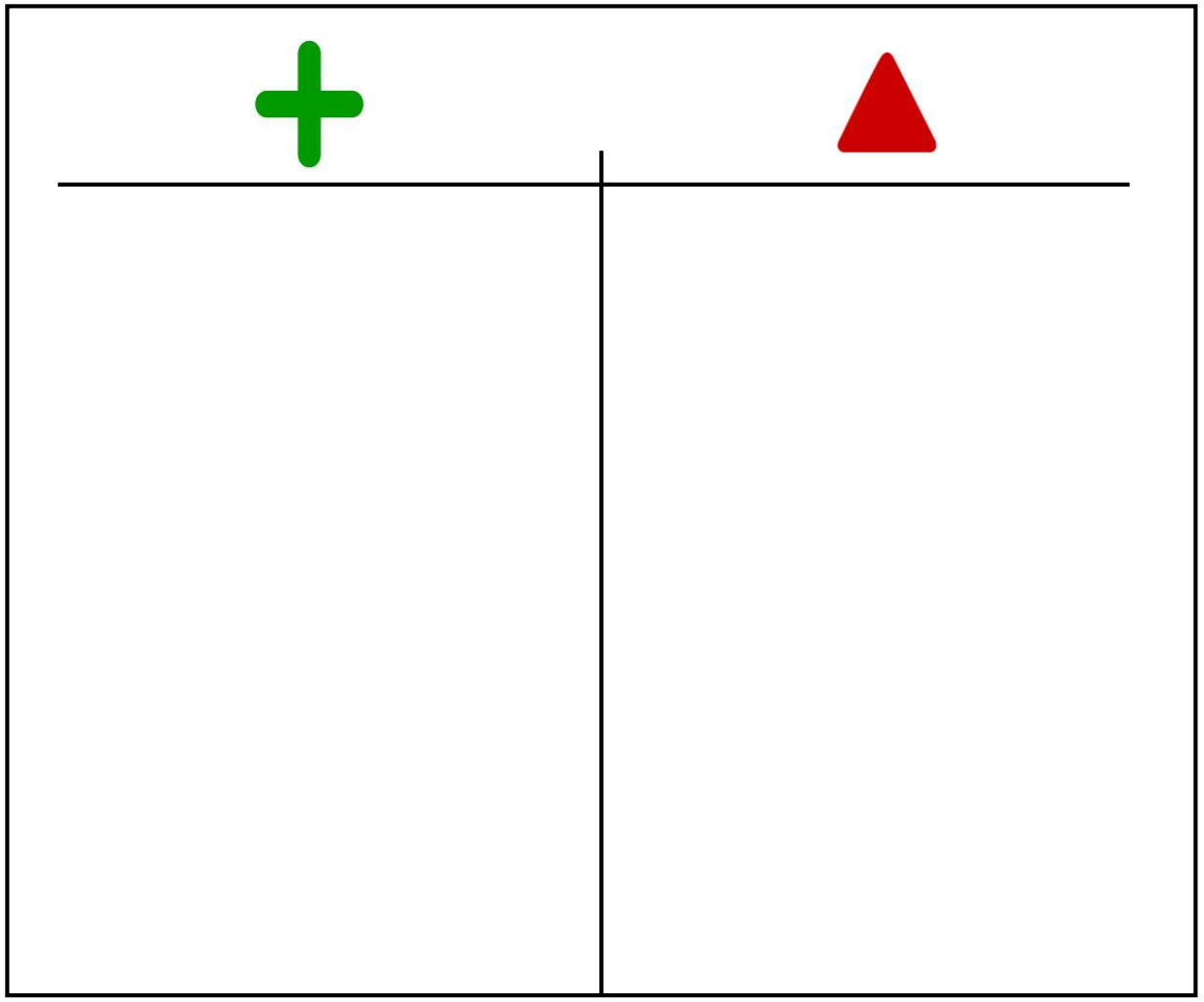
https://leanconstruction.org/lean-certification/

Questions?

Conduct Plus/Delta

Plus: What produced *value* during the session?

Delta: What could we *change to improve* the process or outcome?



Presenter Contact Information

Lean Construction Institute
Immersive Education Program

Presenter may add photo, logo, website, email, phone and other contact information here.

Lean Construction Institute
Immersive Education Program

LCI Website Information

www.LeanConstruction.org