

Estimating Resource Requirements for Work Activities

23CEB302 – CONSTRUCTION MANAGEMENT

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Learning Objectives



Understand resource estimation concepts



Apply Design Thinking methodology



Develop resource planning skills



Implement estimation techniques



Validate and optimize resource allocation

Recap: Previous Topics

The parts of a project management plan

1. Scope statement



Project Planning

Defining project scope and objectives

3. Project schedule



Activity Definition

Identifying project work packages

5. Resource planning



Cost Estimation Fundamentals

Basic principles of cost calculation and budgeting

7. Resource planning

9. Resource planning



Resource Management

Basics of resource allocation



Work Breakdown Structure

Decomposing project into tasks

6. Stakeholder list

8. Stakeholder list

Introduction to Resource Estimation


Definition

Process of determining type and quantity of resources required for each work activity

Step 1

Key Importance

-  Ensures project success

-  Controls budget effectively

-  Prevents costly delays

Resource Types

Human Resources

Skilled workforce and labor

Materials

Construction supplies and goods

Equipment

Machinery and tools

Time & Cost

Duration and budget allocation

Design Thinking - Stage 1: Empathize

Understanding Resource Needs

Gain deep insight into stakeholder requirements and project context through systematic analysis

Identify User Needs

Understand stakeholder expectations

Analyze Requirements

Determine essential resource types

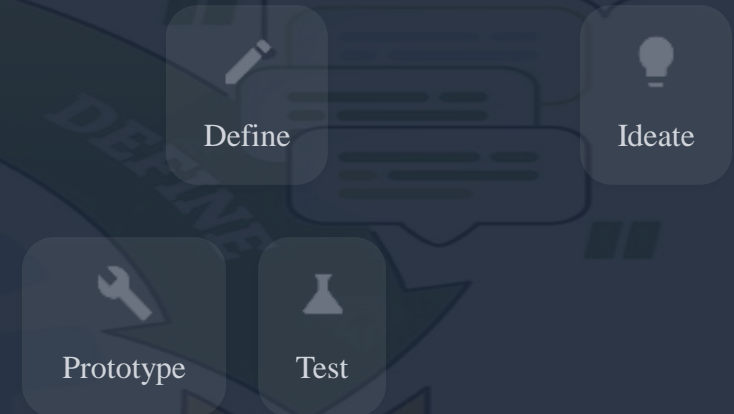
Understand Constraints

Budget, time, and regulatory limits

Gather Real Data

Field observations and research

Design Thinking Process



Empathize Phase Goal

Deeply understand user perspectives and context to inform resource estimation decisions

Design Thinking - Stage 2: Define

Defining Resource Requirements

Transform insights into clear, actionable problem statements and quantitative resource needs

Clear Problem Statement

Define resource challenge precisely

Quantify Resource Needs

Determine exact quantities required

Prioritize Requirements

Rank resources by critical importance

Establish Criteria

Set measurable performance metrics

- User Interviews
- User Journeys
- Data Analysis

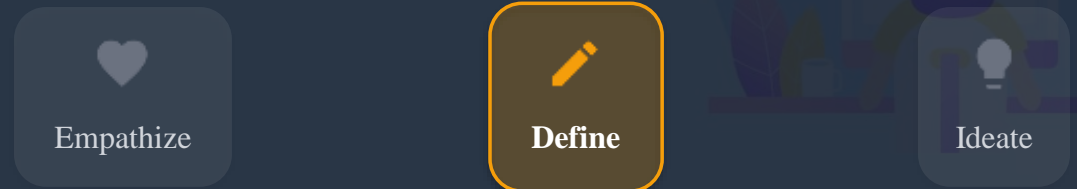
- Personas
- Empathy Map
- User Journeys

- Information Architecture
- User Flows
- Card Sorting
- Design Principles

- paper Prototype
- Mockups
- Wireframes
- High Fidelity Design

- Usability Testing
- A/B Testing
- QA
- Performance Testing
- Heuristic Evaluation

Design Thinking Process



Define Phase Goal

Create clear problem statements and establish quantitative resource requirements for accurate estimation

Design Thinking - Stage 3: Ideate

Design Thinking Process

Brainstorming Resource Solutions

Generate diverse, creative solutions for resource allocation and optimization

Generate Multiple Alternatives

Explore various resource options

Creative Problem Solving

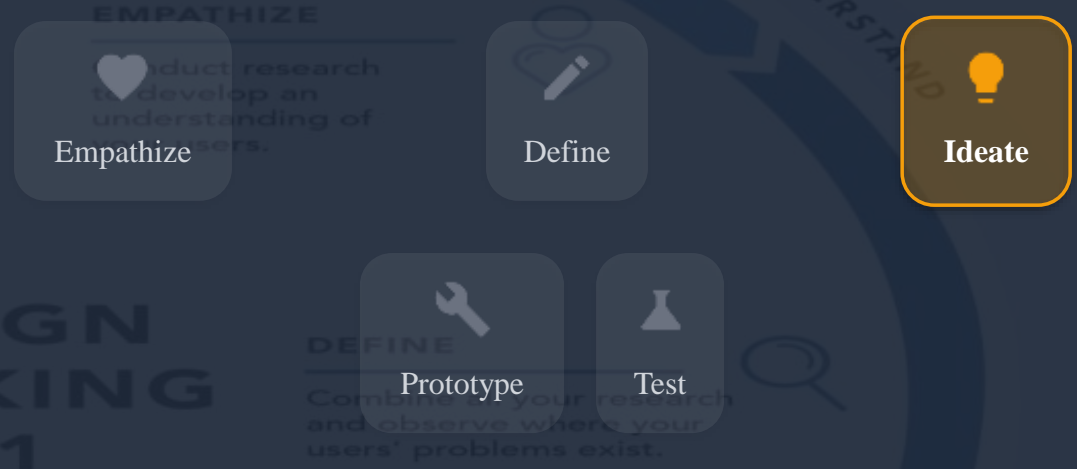
Think outside conventional approaches

Explore Innovative Approaches

Leverage new technologies and methods

Collaborative Brainstorming

Engage team and stakeholders




Ideate Phase Goal


Generate a wide range of creative solutions to optimize resource allocation and overcome constraints


Design Thinking - Stage 4: Prototype

Developing Estimation Models

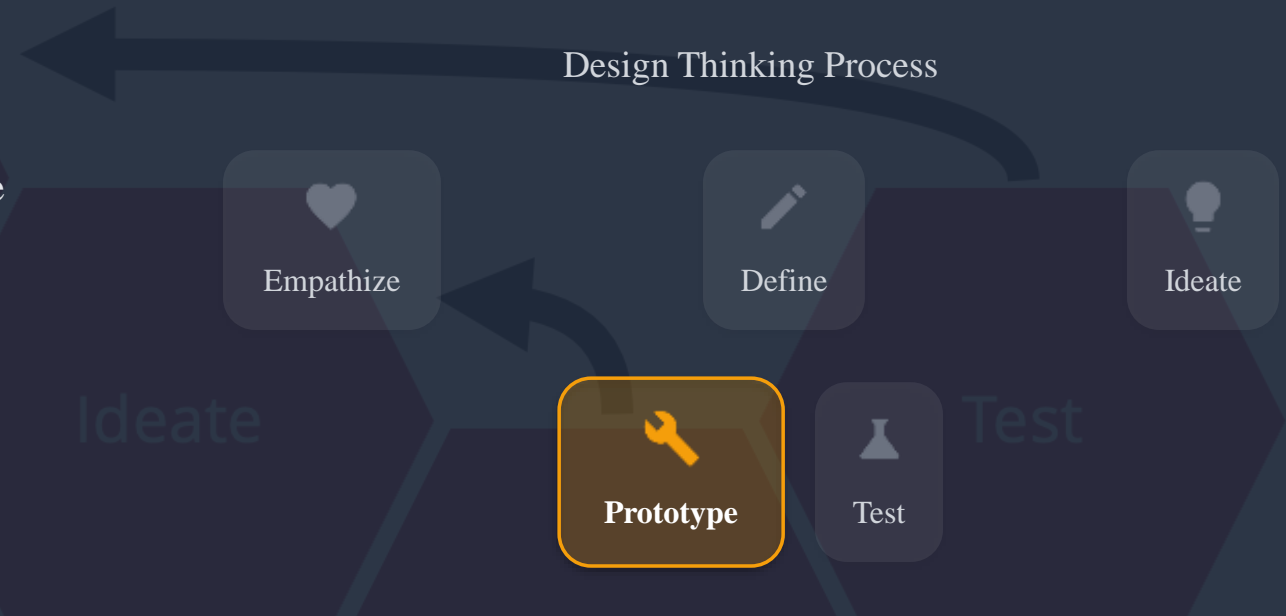
Create tangible frameworks and models to test resource estimation approaches

 **Create Estimation Frameworks**
Structure estimation process

 **Develop Calculation Models**
Build quantitative formulas

 **Build Testing Prototypes**
Develop practical test cases

 **Design Resource Matrices**
Create allocation tables



Prototype Phase Goal

Develop working models and frameworks to test and refine resource estimation methods

Design Thinking - Stage 5: Test

Validating Resource Estimates

Systematically test and validate estimation models to ensure accuracy and reliability

Conduct Trial Runs

Execute practical simulations

Validate Assumptions

Confirm estimation premises

Analyze Results

Review performance metrics

Refine Estimates

Adjust based on feedback

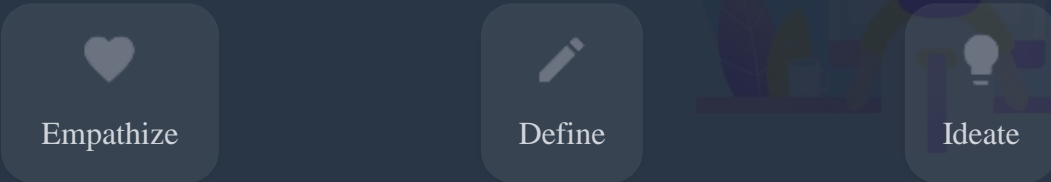
- User Interviews
- User Surveys
- Data Analysis

- Personas
- Empathy Map
- User Journeys
- Story Boarding

- Information Architecture
- User Flows
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- Design Principles

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Test Phase Goal

Validate estimation models through systematic testing and iterative refinement for optimal accuracy

Resource Estimation Mind Map



Resource Types

- Human Resources
- Materials
- Equipment

Key Factors

- Cost Control
- Time Management
- Quality Assurance

Estimation Methods

- Analogous
- Parametric
- Bottom-up

Design Thinking

- Empathize
- Define
- Ideate
- Prototype
- Test

Conclusion: Recap and Key Takeaways

Summary & Key Takeaways



Critical for Success

Resource estimation ensures project completion within budget and timeline constraints



Structured Approach

Design Thinking provides systematic framework for resource planning



Stakeholder Analysis

Understand requirements through comprehensive stakeholder engagement



Develop Models

Create accurate estimation frameworks and calculation models



Continuous Validation

Validate assumptions and refine estimates through iterative testing and feedback cycles