

Comparative Analysis of Design Models

Mike Mahoney

teachengineering.org	NASA Design Process	Dartmouth Design Process	Mike's Preferred Design Process
1. Ask: Identify the need & constraints	1. Identify the problem	1. Define the problem	1. Define the problem
		2. Restate the problem	2. Identify constraints & specifications
	3. Identify criteria and constraints	3. Develop constraints/criteria/specifications	3. Brainstorm possible solutions
4. Research the problem	4. Brainstorm possible solutions	4. Brainstorm ideas	4. Research most promising solutions & identify criteria for each solution
5. Imagine: Develop possible solutions	5. Generate ideas	5. Research alternatives	5. Analyze possible solutions by criteria in trade-off matrix to identify the best solution
6. Plan: Select a promising solution	6. Explore possibilities	6. Analyze alternatives by a trade-off matrix	6. Design the solution
		7. Identify a potential solution	7. Construct a prototype
	8. Select an approach	8. Research in detail the potential solution	8. Test and evaluate prototype
9. Create: Build a prototype	9. Build a model or prototype	9. Design a potential solution	9. Refine design as needed
		10. Construct a prototype	Synthesized model: adds trade-off matrix and prototype testing.
11. Test and evaluate prototype	11. Refine the design	11. Evaluate prototype	
12. Redesign as needed		12. Reiterate if necessary	
		13. Simplify if possible	
Good for short term projects. Assumes design phase.	Best for experienced problem solvers. Assumes design phase and prototype testing.	Best for long term, detailed, and complex projects. Gives students criteria to decide on best solution (trade-off matrix).	

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Notes: Engineering design is also an exercise in compromise. Brainstormed ideas can be combined or parted out. The trade-off matrix can help curb arguments over the best design.