

SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC-UGC with 'A' Grade

Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE NAME: 190E116 - PRODUCT DESIGN AND DEVELOPMENT

III YEAR / VI SEMESTER

Unit 2 - Concept Generation and Selection

Topic 1 – Task







Concept Generation and Selection:

It is a critical stage in the product development process, where innovative ideas are created, evaluated, and refined to find the best solution for a given problem.

This process ensures that the final design meets the project's requirements efficiently and effectively.









This stage involves brainstorming and developing multiple ideas or solutions. The goal is to explore a wide range of possibilities before narrowing them down.







Steps in Concept Generation:

Define the Problem: Clearly outline the design objectives, constraints, and requirements.

Research and Gather Information: Study existing solutions, market trends, and technological advancements.

Brainstorming: Encourage creative thinking through brainstorming techniques like mind mapping, SCAMPER (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse), and morphological analysis.





Idea Sketching and Prototyping: Visualize concepts using rough sketches, flowcharts, or simple physical/digital prototypes.

Group Discussion and Refinement: Collaborate with team members to refine and expand on ideas.







2. Concept Selection:

Once multiple concepts are generated, they need to be evaluated to select the most suitable one. This ensures that the chosen design is feasible, cost-effective, and meets user needs.







Steps in Concept Selection:

Screening Concepts (Initial Filtering): Eliminate ideas that do not meet basic requirements using simple "go/no-go" criteria.

Criteria Development: Establish evaluation criteria based on functionality, cost, feasibility, performance, environmental impact, etc.







Pugh Matrix (Decision Matrix): Compares concepts against a baseline design using weighted scores. Analytical Hierarchy Process (AHP): Breaks down complex decisions into hierarchical comparisons.

Prototyping and Testing: Develop early-stage prototypes to test key functionalities.

Final Decision and Refinement: Choose the best concept and refine it for further development.







Key Considerations in Concept Selection:

- . User Needs and Market Demand Ensure the concept aligns with customer expectations.
- . Technical Feasibility Verify if the technology exists or can be developed within constraints.
- . Cost and Resources Evaluate the affordability and availability of resources.
- Scalability and Manufacturability Consider production constraints and long-term feasibility.
- Sustainability Ensure minimal environmental impact.





Conclusion:

Concept generation and selection help in making informed decisions that lead to efficient and innovative product development.

A structured approach using evaluation techniques ensures the best idea is selected while minimizing risks and inefficiencies.







1. Tasks in Concept Generation:

Identify the Problem Statement – Clearly define the challenge or need.

Gather Background Information – Research existing solutions, technologies, and user needs.

Brainstorm Potential Solutions – Use creative techniques like mind mapping and SCAMPER.





Develop Initial Concepts – Sketch ideas, create flowcharts, or use CAD software for basic models.

Analyze Feasibility – Assess the practicality of each concept.

Collaborate and Refine Ideas – Discuss with stakeholders and refine based on feedback.

TASK / 190E116 – PRODUCT DESIGN AND DEVELOPMENT / S.KASTHURI / AP / AI&DS / SNSCE







Tasks in Concept Selection:

Establish Selection Criteria – Define factors such as cost, feasibility, performance, and sustainability.

Screen Out Weak Concepts – Eliminate ideas that don't meet basic requirements.

Use Evaluation Methods – Apply Pugh Matrix, AHP, or weighted scoring techniques.







Prototype and Test Key Concepts – Build small-scale prototypes to validate the best ideas.

Compare and Finalize the Best Concept – Choose the most suitable concept for further development.

Document the Selection Process – Keep records of decisions, evaluations, and reasoning.

TASK / 190E116 – PRODUCT DESIGN AND DEVELOPMENT / S.KASTHURI / AP / AI&DS / SNSCE







Thank You...

