

Core Concept: Decision Making

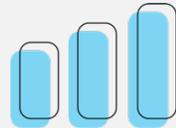
Engineering Literacy Dimension: Engineering Practices

Practice: Engineering Design

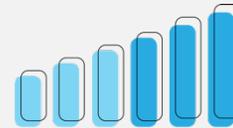
Overview: *Decision Making* is the process of making a logical choice from a variety of options through the gathering of information and assessment of alternatives. Within the practice of Engineering Design, Decision Making includes (a) *making evidence/data/logic-driven decisions*, (b) *the application of Engineering Knowledge for justifying a design decision*, (c) *balancing trade-offs between conflicting design criteria and constraints*, (d) *using decision making tools, such as a decision matrix*, and (e) *functioning within a group setting to make team-based decisions*. This core concept is important to the practice of Engineering Design as engineering professionals are decision makers. They make multiple decisions throughout the design process that impact the outcome of the process which can have variety of consequences to themselves, their employer, society, public health, and the environment.

Performance Goal for High School Learners

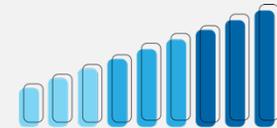
I can successfully make informed (data/evidence/logic-driven) choices within a design scenario through the application of *Engineering Knowledge* and the use of decision-making tools to converge on a decision within a team-setting.



Basic



Proficient



Advanced

EVIDENCE/DATA/ LOGIC-DRIVEN DECISIONS

I can identify relevant information using a variety of information gathering tools necessary for a design task.

I can evaluate the reliability and quality of data necessary for making accurate design decisions based on the context of the information/author.

I can synthesize multiple sources of accurate and trustworthy data to make a design decision.

APPLICATION OF ENGINEERING KNOWLEDGE

I can apply a given engineering concept to make a design decision.

I can identify which engineering science, mathematics, or technical concepts can be used to make a design decision based on what I have learned in other school subjects.

I can apply Engineering Knowledge that is scientific, mathematical, and technical in nature in the process of making and justifying a design decision.

BALANCE TRADE-OFFS

I can identify design criteria or constraints in a trade-off relationship.

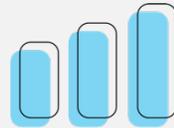
I can analyze a trade-off relationship between conflicting criteria or constraints and the impacts of trade-off on my possible solutions.

I can conclude an optimal point of a certain trade-off relationship between conflicting criteria or constraints.

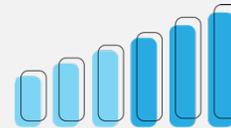
Core Concept: Decision Making Cont.

Performance Goal for High School Learners

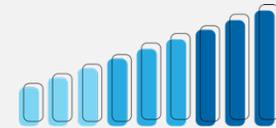
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Advanced

USE DECISION MAKING TOOLS

I can select a basic decision matrix tool to weigh pros and cons of my decisions.

I can construct a decision matrix tool that takes into account the pros and cons analysis.

I can prioritize decisions that take into account the pros and cons analysis.

TEAM-BASED DECISIONS

I can describe my ideas to my group and provide inputs into the final decision.

I can participate in discourse with my group members, actively listening to them and adding my thoughts into our decisions.

I can lead active and productive discourse with my group members to solicit their contributions to collect various opinion into one decision.