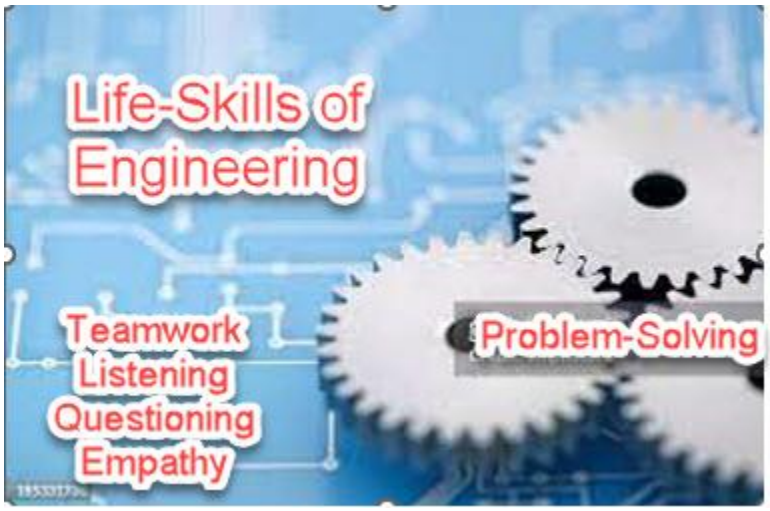


Title: "Engineered Excellence: A Guide to Applying Engineering Principles to Life Skills for Young Adults"

1.0 Introduction:-***ChatGDP***

In the grand tapestry of life, every individual is an architect, an engineer of their destiny. As young adults stand at the beginning of their independence, they are presented not only with the challenges of navigating the complexities of the world but also with the opportunity to approach life as masterful engineers. This article, "Engineered Excellence," is an exploration into the application of engineering principles to the canvas of life skills, offering a blueprint for young minds eager to construct a future of purpose, resilience, and success.

Engineering, a discipline often associated with building bridges, designing circuits, or launching spacecraft, is, at its core, a systematic approach to problem-solving, teamwork, communications, and innovation. ***What if these principles, ingrained in the minds of engineers, could be translated into a guide for young adults as they navigate the twists and turns of adulthood?*** "Engineered Excellence for Society" seeks to do just that, bridging the gap between the engineering world and the landscape of personal growth and development.

In these pages, we will delve into the foundation and culture of engineering and how these principles can be harnessed to construct a life of fulfillment and accomplishment for society. From the planning of projects to the iterative process of learning from failures, from the optimization of resources to the collaborative spirit of teamwork, each will unravel a facet of engineering wisdom and demonstrate its application to the challenges and opportunities that lie ahead for young adults.

The journey through "Engineered Excellence for Society" is an invitation to view life through the lens of an engineer – to approach every obstacle as an opportunity for innovation, to construct a life plan with the precision of an

architect, and to recognize that, much like in engineering, success is not only in the destination but in the mastery of the journey.

As we start on this exploration of engineered process, let us open our minds to the possibilities that arise when we blend the principles of engineering with the needs of society. May "Engineered Excellence" inspire a generation to build a life that is not only functional and resilient but also a masterpiece of purpose, passion, and perpetual progress.

Engineers use problem solving, teamwork, communication skills for designing major projects, how can they teach young adults to better their lives in society?

2.0 Outline of the process of extraction of the engineering life skills to be use for learning by society's young adults.

- Historical background- Bernie Gordon, The Need.
- Define the Engineering Design process.
- Examine each phase for Life-Skills used.
- Examples of learning these skills

3.0 Why Engineering?

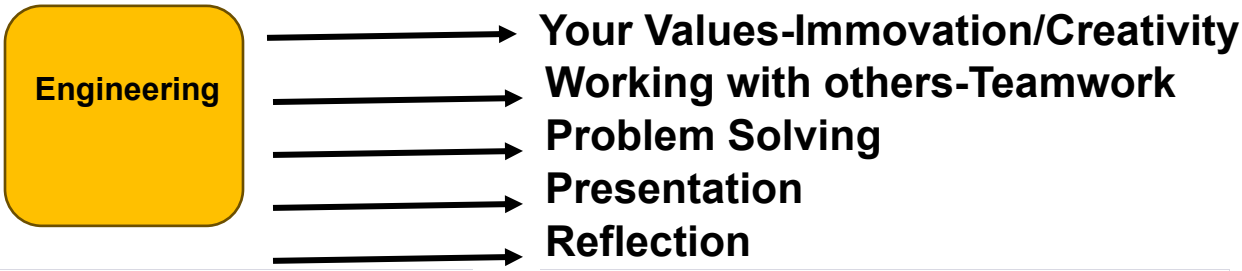
Engineering is **ACADEMIC GLUE** – it binds complex math and science concepts to real-world experiences and leads to learning sticks with students.
Engineering is **CREATIVITY** – it brings out the best ideas from th students.
Engineering is **GROUP WORK** –students learn to communicate work together while they learn math and science
Engineering is **EVERYWHERE** –students learn that engineers ha designed, created or modified nearly everything they touch, wear see and hear in their daily lives

4.0 The Need

What is an Engineer … Bernard Gordon

Real Engineer is someone who has not only the skills of Math & Science but also the skills to provide leadership in developing solutions to society's program and be able to communicate these life-skills to others. We will focus on these skills in the Engineering Mind-set. We will demonstrate using these skills by showing students how they can improve the use of the internet tools.

Bernie Gordon says engineers need better communication and interpersonal skills, a sense of economic discipline and an "interdisciplinary" approach that will enable them to conceptualize solutions and follow those solutions through the manufacturing process. Gordon emphasized the immediacy of the engineering problem in a keynote address, ***"What Is an Engineer?" presented to the European Society for Engineering Education Annual Conference in 1984, and now in its fourth printing***.
Here he proposes that the future depends in large measure on educating "real" engineers. A "real" engineer, according to Gordon, is not the "geek" or "nerd" who has sacrificed intellectual breadth and social ease for narrow expertise and introversion. Rather, it is a person who, because of his or her broad education and habit of thought, "can conceive and invent, who does not wait to be told to initiate, but imagines, conceives, proposes, pleads and debates for a cause and an impossible dream. Takes risks..
https://en.wikipedia.org/wiki/Bernard_Marshall_Gordon



5.0 Engineering Process

The engineering design process is a series of steps that engineers follow to find a solution to a problem. The steps include problem solving processes such as, for example, determining your objectives and constraints, prototyping, testing and evaluation, working with others and communication skills.

Building Resilience in the face of challenges exploring ethical considerations and making decisions aligned with engineering ethical principles. Navigating life's uncertainties with an adaptable mindset, mirroring the flexibility seen in engineering. Integrating engineering principles for self-optimization and continuous improvement.

Encouraging creative thinking and innovation as catalysts for personal and professional advancement. Embracing global awareness and cultural competence to thrive in an interconnected world. Harnessing networking skills for personal and professional growth, drawing parallels with engineering collaboration. Understanding the importance of collaboration, Effective teamwork, and communication in personal and professional relationships.

5.1 We are creating a new kind of society member… Ownership mindset

- Customer focus & process design
- End to end design, Understands using measurements in the process
- Inter-personal skills/ team player/ problem solver
- Ably to handle constructive criticism
- Focus on hard work and results
- Desire to learn and excel
- Team-work and thinking outside the box
- Good communications and non-verbal skills
- Thinking skills (Critical & Creative thinking, Questioning and System thinking)

• Eager to work out issues
• The bigger the problem the bigger the opportunity

Developing people for the new economy

5.2 List of thoughts for the Engineering Mind Set

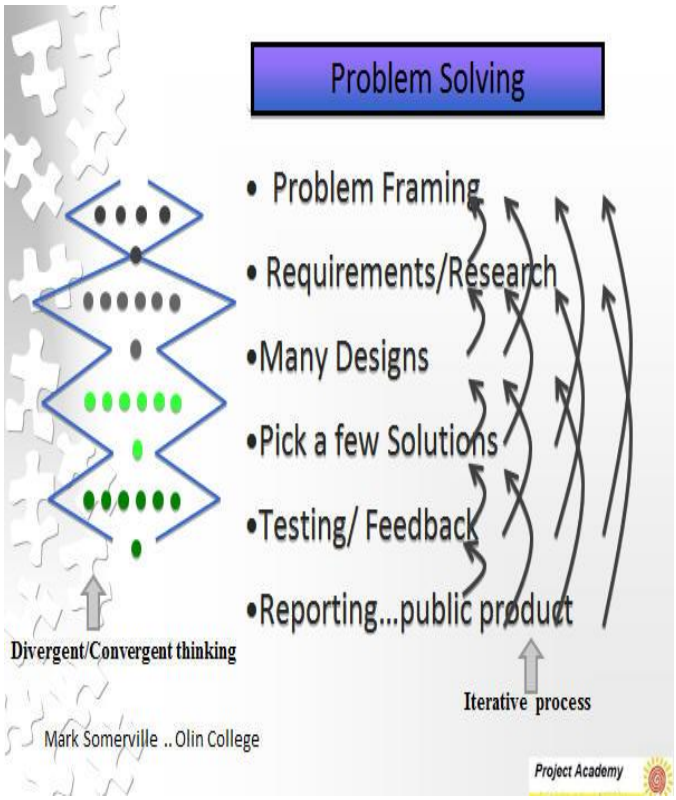
Break problem into smaller manageable pieces
Find the real problem
Understand the needs of the customer
The bigger the problem the bigger the opportunity- Vinod Khosla
Map the items of the problem
Life-skills needed to deal with the community
Managing yourself
Applying Leadership skills when needed
Problem Solving process
System View
Public presentation of the results
Provide measurements and feedback during the process
Focus on reducing errors alone the process … Quality process

6.0 The Process we follow is below:

Examine each Phase.

Break each phase into its components and analyze them for their skills.

Basic process:



Modules to analvze

6.1 Example of the process

Skills related to the process:

Elements of Engineering mind-set

Culture:

- Values/ norms/ communities
- Negotiation
- Decision making
- Collaboration
- Excellence

Project Formation:

- Creative and Critical thinking
- System view
- Questioning
- Customer needs
- Financial controls

Planning and Scheduling

- Time management
- Measurements/ Feedback
- Quality systems

Problem Solving / Process

- Innovation
- Risk taking
- Prototyping and iteration
- Entrepreneurship

Public reporting

- Reflection
- Testing idea
- Presenting

Attitude

- Positive
- Flexible
- Doing your best
- Being a leader when necessary

All parts of the process

Process	Skills
Ice breaker/ Intro.	Greeting skills, Eye contact, non-verbal skills
Forming the team	Diversity, Values of a culture, Time management Listening skills, Collaboration Character development
Picking the project	Team work, Handling adversity Project planning, Scheduling
Problem solving	Thinking skills. Self-reflection Problem-solving structure Decision making, Sorting
Testing & writing	Feedback, Iterations, Communication (without phones) Elevator pitch,
Public dialogue/ Celebration	Metacognition, Presentation skills, 

6.2 Breaking down the Modules in our process:

About Yourself…Your skills

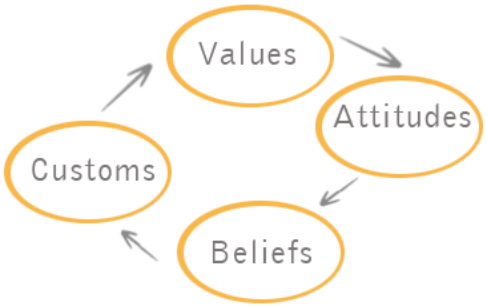
Module	Detail
About self Leadership Skills Branding… who you are	**Your Goals, strengths, non-verbal communications, Ownership mindset, Be a lifelong Learner**

Working Together…Teamwork

Module	Detail
Team work link to teamwork method on resources	**Create Charter, Purpose- What's our Culture, Norms, Values, Teamwork Communication, Dealing with conflict, Leadership**

Creating teams- Like a Sports/Music team:
… Listen to each other; become a learning team… What is our culture?

- Overview of the project
- Measurable team goals, roles, deliverables



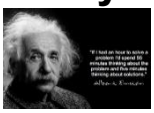
Create a team charter, The Charter Covers:

- Goals (Fun, ….),
- How will we be measured at the end,
- Roles that the team will do, (Scribe, Captain, Planner, Advisor, Tester, Public reporter,)
- Our values, … Curiosity, Trust, Flexibility ,,,
- Deliverables?
- How will we handle conflicts?

teaching students to work in teams is one of the most important goals of a twenty-first-century teacher

- How should it operate?
- How does it compare to a sports team?
- What are our roles?
- How am I successful?
- How do we communicate and collaborate together?

Communication

Module	Detail
Analyzing direction. 	**Identify the Need, Research the issue, Find the root cause, Framing the issue, Requirements**
Questioning…. ***Getting the Team / Individual to create their own questions***	**Braining storming-Divergent, Convergent-3 best, What makes a good question?** ***A question is an invitation to keep on thinking***
Connection Themes	**Follow-up after process Continuous learning**

Problem Solving --- Process

Module	Detail
Tools **Some Specifics:** **Business & Learning tools** **Interpersonal skills** **Thinking skills** **Supply-chain innovation.**	• Info-Mapping --- Makes the document easier to read • **Mind-Mapping---A mind map is a diagram** **Process Sheets--- lists the exact sequence of operations needed to**

Process management. **Distribution infrastructure** **Customer focus, Quality Management** **Digital tools (cloud, social)** **Social media, Google docs**	**complete the job of operations** • **Flow Map--- represents a workflow or process** • **Quality Processing--- tools to improve and continuous improvement** • **Balance Score card --- measurement in 4 buckets** • **6-Sigms--- Motorola's measurement of errors** • **Material-Flow JIT --- The just-in-time (JIT) inventory system** • **Financial Literacy … The riches man in Babylon by George S. Clason**
Problem-solving process 	**Brain writing-many designs, Converging, Shaping your design**(Mundane, Stretch, Magical), **decision making, Meeting requirement**
Reflection/learning from mistakes.	**Testing, re-design, What have you learned?**
Reporting/ Metacognition	**Presentation, Reaching out to others, Celebration, Meta-cognition (Thinking of your process)**

Who is your customer?
What are the issues and or needs ?
Discuss and develop possible fixes
Break the problem into its parts, if time or complexity is a factor
Why is being positive, being flexible and doing your best; part of a good attitude?

How is Trust, Honesty, Curiosity, and Listening skills part of a good des process?

7.0 Summary- Other Skills as part of the process:

Module	Detail
Overall Skills 	**Trust, Respect, Empathy, Listening, Independence, Collaboration, Kindness, Thinking skills, taking Risk, Creativity, Communications, Problem solving, Questioning , Life-long Learning**

- Project based learning. *Doing versus caulk & talk*
- Ownership. *Act like an owner*
- *Outcomes/ Reflection / Measurements-The Balance Score card*
- Industry needs. *What skills does business want?*
- Technology future.

8.0 Social values of Life Skills

Community Attributes:

Thoughts	Life-Skills / Actions
Wisdom: good decisions and taking the path that provides value to all (society)	Thinking skills (creative, critical, system), SEL learning, Decision making, Reflection, Innovation
Community: People and relationships count	**Listening skills, communication skills, teamwork, Interpersonal skills, Relationship, Measurements, Trust, Honesty, Empathy**
Social justice: leaving the world a better place than you found it	Problem solving skills, positive outlook, Curiosity, Process skills, Executive functions
Purpose: Sense of direction that you achieve, the goals you set	Put first things first, Pro-active outlook, Begin with the ends in mind, and Win-Win for all, Time-management, Project planning,

9.0 Life-Skill Training

Let's Discussion: Life skill extraction …Define, Look-up Write down, Discuss with your learning buddy each of the life skills and values.

We all need a set of core life skills (or, adult capabilities) to manage work, family, and relationships successfully

Life Skills	Values
Collaboration	Trust,
Taking Risks	Empathy
Critical Thinking, Creativity	Kindness,
Life-long Learning	Work ethics
Collaboration	Metacognition
Communication skills	Curiosity
Decision making	Listening,
Financial literacy	Respect,
Time management	Boldness
Team work	Independence
Problem solving	
Reporting	

Respectful dealing with others (Professionalism)

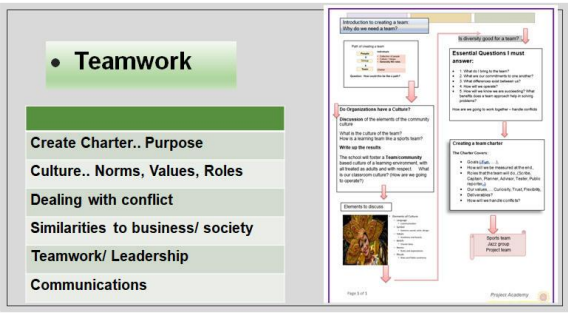
Brain Plasticity … we continuously can learn new things

Gratitude, Flexibility

9.1 How to learn Life Skills with your partner

- Using your web browser, search the title life of the skill or value for information about the topic.
- Discus with your partner how it would fit into your situation -- …describing a definition for the topic and its use in your project
- Use questions of What, How, Where, to understand its use.
- Discus your thoughts with your team
- Write down your summary of what you decided and how to use it.

Life Skills	Link
Taking Risks	*Taking risks demonstrates self-confidence. We learn to make decisions quickly and effectively i complex situations. *Lack of risk blocks innovation. Risks can lead creativity and also help us to learr new things all the time.
Critical Thinking, Creativity Creativity-module	The skills of innovation and creativity can be lumped into a mysterious set of processes that human beings use to make sense of their world; they enter a dark tunnel of confusion and reemerge with a solution. How this occurs no one knows. How we teach the process we're not quite sure Assessing the journey through this dark tunnel and evaluating the end product are even more difficul Think of judging a piece of modern art. It's that subjective
Life-long Learning	
Collaboration	Be able to ask or describe who, what, when, where, why & how of a project

Life Skills	Link
	Don't forget that a company's environment needs to be a good fit for you too.
Communication skills	Communication Skills for Workplace
Decision making	Link
Financial literacy	**Financial Literacy … The richest man in Babylon by George S. Clason**
Questioning	Self-learning-using-questions
Time management	
Forming a learning team You can take a number of actions to develop performance standards and direction: 	Insist on Norms at the beginning of the project, set expectations and lay the foundation for a working team function. Expect teams to operate by agreements and norms. At the same t recognize that this process is ongoing. Early in the project, all team members should be able to answer the following five questions: 1. ***What do I bring to the team?*** 2. ***What are our commitments to one another?*** 3. ***What differences exist between us?*** 4. ***How will we operate?*** 5. ***How will we know we are succeeding?***
Problem solving Students will focus on one of the world projects and develop a plan	Link

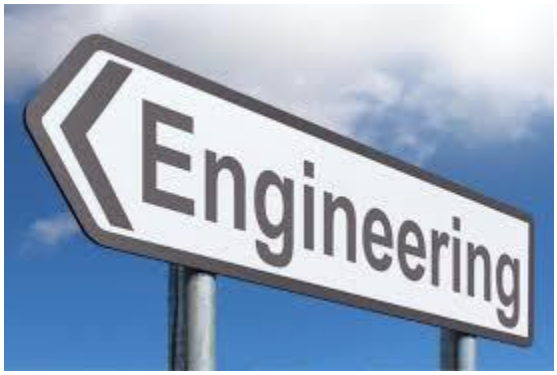
Life Skills	Link
to solve the problem. It will contain the following sections: • What learning strategy did we use to solve the problem? • What obstacle's were faced in developing the solution? • What "Life Skills" did I need? • What is the problem we are solving? • What were my references? • If people on the team completed the "Business Class", Add a business plan • If people on the team completed the "Design Class", Add a design plan	
Reporting	

9.2 Values:

Links	Values
An **empathetic** person appreciates others, regardless of background, cul gender, or similar reasons for bias. The larger strength is the ability to love and feel compassion	Trust, Respect, Empathy
link-listening,	Listening, Independence
	Kindness, Boldness
	Work ethics
Thinking about our thought process	Metacognition Metacognition

Curiosity is an intrinsic desire for experience and knowledge, plus an active pursuit of challenging activities	Curiosity
Persistence is the voluntary continua of a goal-directed activity in spite of obstacles, difficulties, or discouragement. Nothing defines a g learner more than this strength.	Persistence
Non-verbal-conversation	Link- non-verbal

10.0 Skills transferred from Engineering to Society



- **Learning about yourself**
- **Teamwork & Communication skills**
- **Problem solving & Thinking skills.**
- **Decision making**
- **Failure is an opportunity to learn & grow.**
- **Reflect on your work.**
- **The bigger the problem, the bigger the opportunity**
- **Be curious and be a lifelong learner.**
- **Present your work to others**
- **Know & respect your customer.**

11.0 Outcomes:

Be able to see and use the life skills, tools and values from the engineering processes in society and business:

You can use Bloom's taxonomy to identify verbs to describe your learning.

- Knowledge/Remembering: define, list, recognize
- Comprehension/Understanding : characterize, describe, explain, identify, locate, recognize, sort
- Application/Applying: choose, demonstrate, implement, perform
- Analysis/Analyzing: analyze, categorize, compare, differentiate
- Evaluation/Evaluating: assess, critique, evaluate, rank, rate
- Synthesis/Creating: construct, design, formulate, organize, synthesize

Thank You … billw@projectacademy.org