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College *of* Professional Studies



Experiential Learning Theory

Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand.

- Confucius circa 450 BC





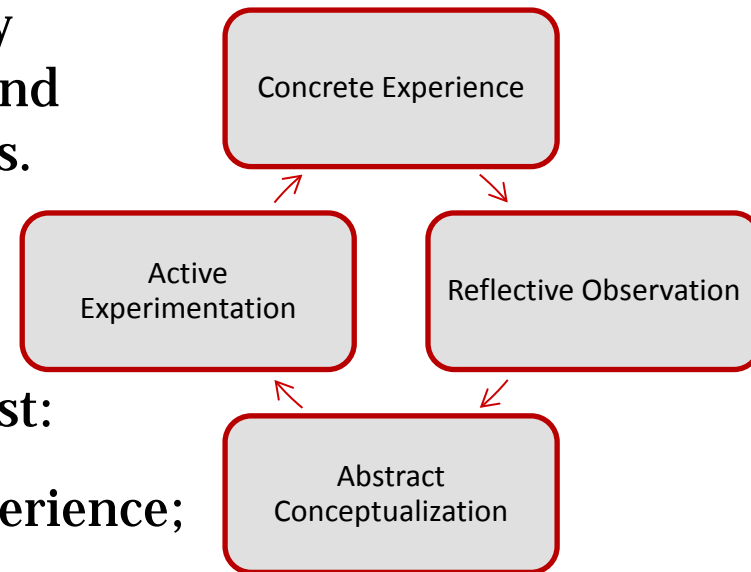
Experiential Learning Theory: David Kolb (1984)



Knowledge is continuously gained through personal and environmental experiences.

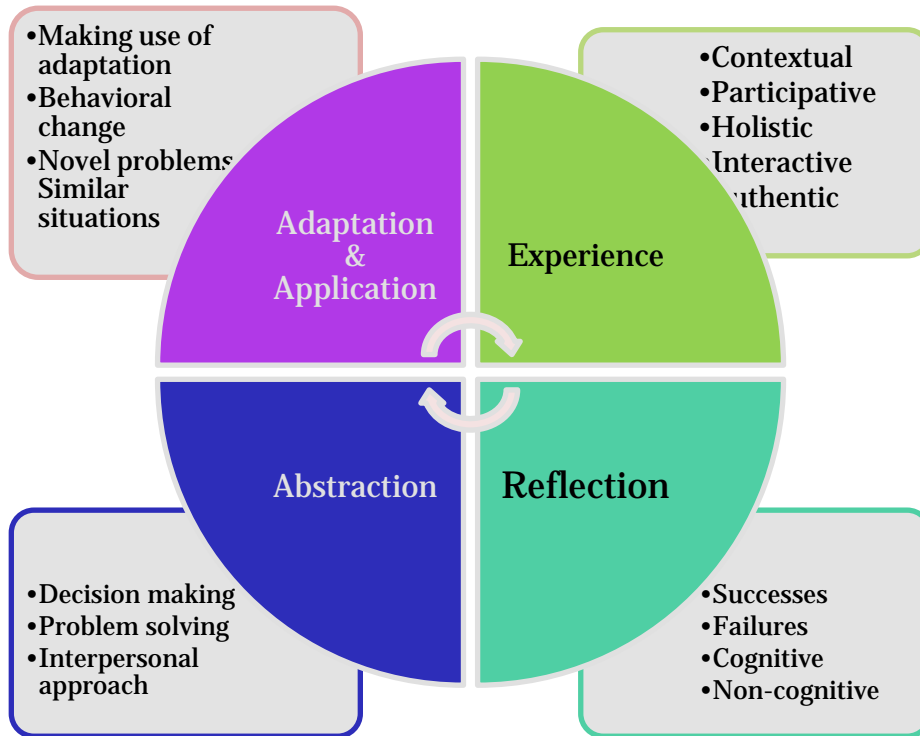
In order to gain genuine knowledge from an experience the learner must:

- Be willing to be actively involved in the experience;
- Be able to reflect on the experience;
- Possess and use analytical skills to conceptualize the experience; and
- Be able to apply new ideas gained from the experience.





Four Stages of Online Experiential Learning



1. Experience (abstract AND concrete)

- Contextual
- Participative
- Holistic
- Interactive
- Authentic

2. Reflection

3. Abstraction

4. Adaptation and Application





Integrative Experiential Learning (IEL) Course

- **Integrative** – students reflect, analyze, and synthesize their learning and apply knowledge to new contexts
- **Experiential** – allows for the creation of knowledge “through the transformation of experience” (Kolb, 1984, 41) by allowing students to implement in their current work environment
- **Learning & Learning Centered** -- engages learners in application, critical thinking, communication, and collaboration to facilitate mastery and build a set of intellectual skills critical to success in the workplace
- **Career Focused** -- positions students for career advancement by offering an expanded platform for further learning via a customized learning experience with an opportunity to engage in dialogue with and receive feedback from their peers and employers.





IEL Course Components

- Identify personal strengths and areas for improvement in motivation, influence and negotiation skills
- Establish goals in alignment with project aspirations through reflection
- Engage workplace sponsor to identify key performance area (KPA)
- Perform academic and professional research leading to KPA recommendation(s)
- Create a pilot, project plan for implementing recommendation(s)
- Implement recommendation(s) in workplace
- Present results of project implementation in a final course report





Energy Systems e-challenge: Designing a 'Green' Thermostat

Energy Systems eChallenge

Menu Glossary | Audio Transcript

Your Mission

You are an engineer for **SpencerTech**, a global technology manufacturing company specializing in industrial and consumer energy products. **SpencerTech** is considering whether to invest in a redesign of its best-selling industrial thermostat in order to market it as a means for conserving energy and reducing costs.

Your team has been tasked with analyzing whether the product could be redesigned and marketed as **green technology**. In order to do this, you must define a system and derive the mathematical statements needed to analyze it.

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Energy Systems eChallenge

Menu Glossary | Audio Transcript

Looking at Fuel Consumption

We know:

- Furnace on-time (t_b) and cycle time (t_c)

We need to consider:

- Time furnace is on over a nominal 24-hour period

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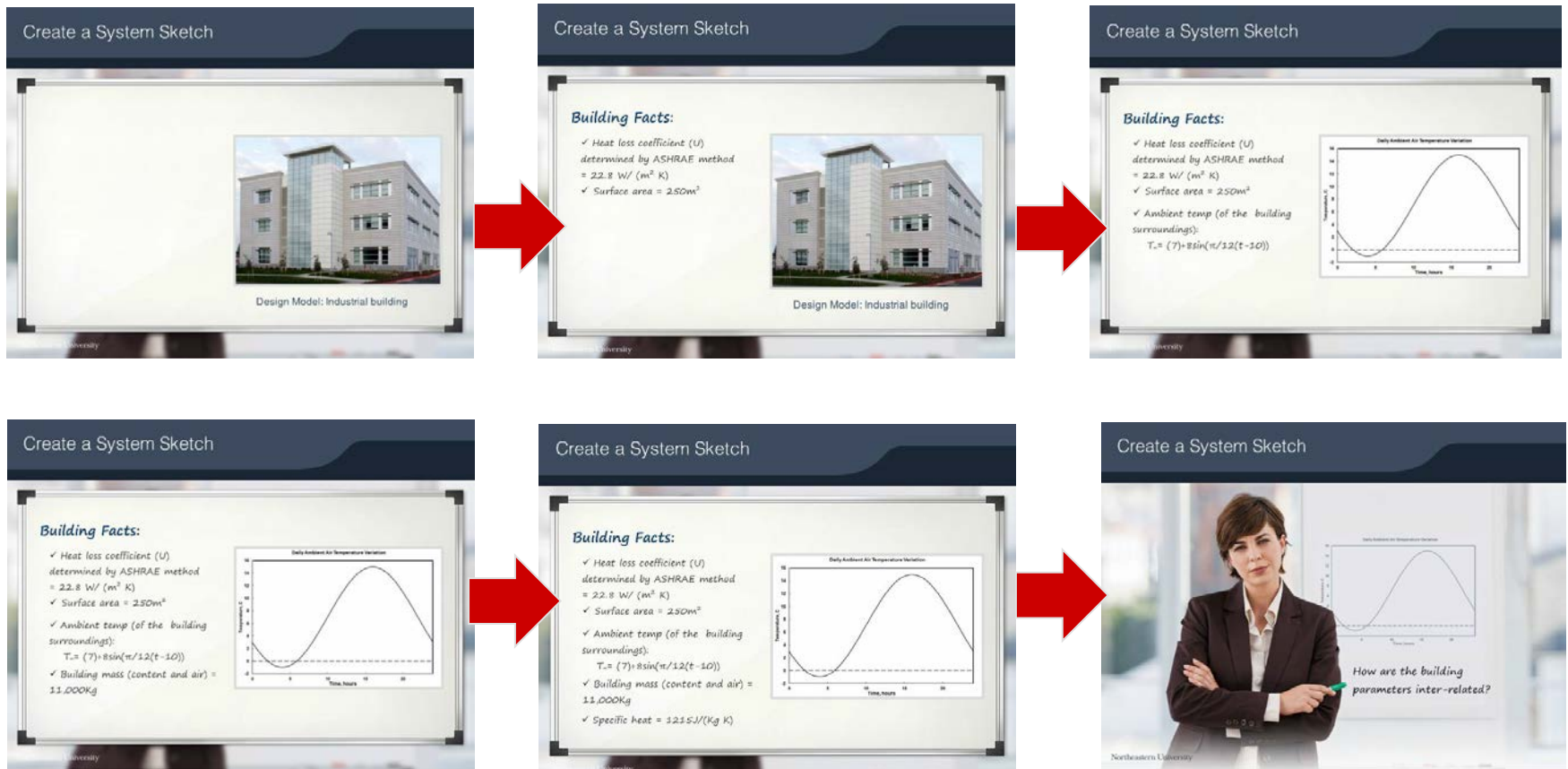
Experience:

Students gain experience in defining a system and derive mathematical statements to analyze whether a product could be redesigned and marketed as *green technology*.



Reflection:

Included in the activity is reflection on the decision making process.





Adaptation:

After the decision task is completed, students consider the decision making process and what they may have done differently.

Energy Systems eChallenge
Menu Glossary Audio Transcript

Do We Invest?

Thermostat at $T = 22^{\circ}\text{C}$	Thermostat at $T = 24^{\circ}\text{C}$
Fuel Consumption = <input type="text"/>	Fuel Consumption = <input type="text"/>
Fuel Cost = <input type="text"/>	Fuel Cost = <input type="text"/>

Should we invest?

Yes No

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Energy Systems eChallenge
Menu Glossary Audio Transcript

Meeting Adjourned

Next week, let's meet to discuss our next steps.

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Click Submit to register your completion and close the screen



Application:
Students then apply new knowledge to a subsequent, similar problem.

Step 1

Let's consider the calculated parameters for the furnace when $T_{up} = 24^\circ\text{C}$.

$$\beta = \frac{UA}{mC_{eff}} = \frac{22.8(250)}{11,000(1215)} = 4.265(10^{-4}) \frac{1}{s}$$

Step 2

From the developed relationship, we can calculate the time to reach the setpoint at Midnight (12AM) where $t = 0$ and $T_{in} = 3^\circ\text{C}$.

$$t_{c,1} = -\frac{1}{\beta} \ln \left[\frac{\alpha - (T_{set} - T_{in,1})}{\alpha - (T_{set} - T_{in,1})} \right] = 1308.4s =$$

Step 3

From the developed relationship, we can calculate the time to reach the setpoint at Midnight (12AM) where $t = 0$ and $T_{in} =$

$$t_{c,1} = \frac{1}{\beta} \ln \left[1 + \frac{\alpha(e^{\beta t_D} - 1)}{\beta(T_{set} - T_{in,1})} \right] =$$

i The formulations for t_D and $t_{c,1}$ are provided in the Excel spreadsheet and calculator.

Step 7: Fuel Consumption - Part 2

In order to find the fuel cost for the thermostat at T_{up} for the 24 hour period, we can integrate the fuel mass flow rate expression to get:

$$m_F = \int_0^{24} \dot{m}_F dt = \sum_{i=1}^{N_c} \int_{t_i}^{t_i+t_{D,i}} \dot{m}_F dt$$

When we simplify, we now have:

$$\dot{m}_F \sum_{i=1}^{N_c} t_{D,i}$$



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