

Empowering Students Through Authentic Experience

Presenter: Cathy Redson
ImagineSolar Career School
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Cathy Redson: Bio

- ★ Cathy is a Senior Instructor and Curriculum Specialist with ImagineSolar in Austin, TX. She holds a BS in Economics from The Wharton School, an MS in Education from Florida International University, and NABCEP Certification as a PV Installer and in PV Technical Sales. Cathy's background includes 10 years in corporate sales and finance for IBM and 12 years as an educator. In 2005, she was voted Teacher of the Year in Miami, FL. As a coach, a leader, and a motivator, Cathy will share what has worked for her to inspire learning by creating opportunities for self-directed mastery.

Abstract

- ★ Learning happens through guided discovery and authentic experience. “Spray and pray” methods of bombarding students with information, believing that if content is “covered” it is learned (otherwise known as death by PowerPoint), are largely ineffective—especially with performance-based skills attainment.
- ★ This presentation covered Authentic Learning and its application to training for careers in Solar PV and development of solar PV curricula.

In 12 minutes or Less....

- ★ Authentic Learning

- ★ What it is
- ★ What it involves
- ★ Why it works



- ★ Opportunities in “Clean Energy” Workforce Education

- ★ Sample Project Ideas

Authentic Learning

- ★ Students Learn through Experience
 - ★ What I hear I forget....
 - ★ What I see I remember....
 - ★ What I do I learn!
 - ★ *What I practice, I do well*
- ★ “Doing” must be in context of actual workplace
- ★ Intertwined with judgment, exploration, manipulation and analysis, evaluation and reflection

ImagineSolar Career School

- ★ Texas 1st and only Texas Workforce Commission licensed Career School dedicated solely to training for Solar Technology
- ★ Founded 2002 by Micheal Kuhn
- ★ Partnered in 2004 with Austin Community College to design and teach one of the nation's first Solar PV Training Program and Renewable Energy Associate's Degree Program
- ★ NABCEP's leading provider of the Alternate Experience Pathway program training Licensed Electrician's to prepare them to sit for PV Installer Certification Exam

Learning Activities & Assessment

- ★ Focus is on **real-world** complex problems and their solutions
 - ★ Role – Playing
 - ★ Problem – based activities
 - ★ Case Studies
 - ★ On-the-Job Training – Apprenticeships & Internships
- ★ Brings students into meaningful contact with future employers, customers, and colleagues that will have a stake in their success



Motivates Learners

- ★ Aligns learning with the way the human mind turns information into useful transferrable knowledge
 - ★ Involves learner on a personal level – “What’s in it for me?”
 - ★ Requires figuring out what do I know, what do I need to know, what do I do with it, and how do I know I am on the right track
 - ★ Forms attachments between content, application, decision-making, analysis, and evaluation
 - ★ Creates opportunities for immediate feedback – *failure* as well as success
- ★ Stimulates skills of inference, exploration, and refinement
- ★ Students OWN the problem, process and solution

Authentic Assessment

- ★ Competency-based: Can you DO the job
- ★ Students decide the level of competency that they want to achieve based on their own goals and what they want out of the learning experience
- ★ **Assessment tools more difficult to develop**
 - ★ Rubrics
 - ★ Performance-based exam – “Field Test”
- ★ Evaluation occurs naturally over the course of the project
- ★ Learners become “legitimate peripheral participants” in a community of practice.

Opportunities for Authentic Education in “Clean Energy”

- ★ Authentic Learning exercises expose the messiness of real-life decision making
- ★ Its not the destination, but the journey that matters
 - ★ Thinking/reasoning skills
 - ★ Assembling/organizing information
 - ★ Innovative thinking/creativity
- ★ Not just “thinking outside the box”, but often “What Box?”

The Imperfection of Reality!

- ★ Students must become comfortable with complexities of
 - ★ Ill-defined real-world problems
 - ★ Wrong, misleading or missing information
 - ★ Imperfect systems
 - ★ Imperfect people
 - ★ Defining what it means to be “finished”
- ★ Innovation is borne of necessity
- ★ Leadership is borne of confidence

Hands On PV Labs

- ★ Use real PV equipment!
- ★ Use real tools used in the field!
- ★ Use real product spec sheets
- ★ Let students do the lab!



What to Bring to Class...

- ★ If you want to be able to work in a job, bring a client to class!
- ★ Use the class as access to an experienced coach and mentor
- ★ “Figure it Out”
 - ★ Help them define the problem
 - ★ Guide them to sources of information
 - ★ Challenge them to develop what they see as a workable solution and a way to test and evaluate it
- ★ Recognize and reward the effort

PV Design Project

- ★ Individual Student Project – requires minimum 3-4 week class meeting format
- ★ Map Assignments to Curricula – Basic Format:
 - ★ Client Selection – Appropriate for simple Grid-tied PV system
 - ★ *Simple Energy Audit – cheapest energy is the energy we don't use!*
 - ★ Site Assessment – shading analysis, orientation & tilt
 - ★ System sizing & equipment selection – Keep it Simple!
 - ★ Electrical & Mechanical Design – Expedited Permit Process
 - ★ PVWATTS Production/Performance Analysis
 - ★ PV System Layout

Case Study

- ★ Same scenario – instructor-led case
- ★ Students need immediate interaction with a real – world contextual scenario
- ★ Adult learners *must* have stimulation of prior knowledge
- ★ Need to “see themselves” in the scenario and “relate” to the problem at hand
- ★ They and the content become part of the same story
- ★ Stimulates problem-solving & “survivor” skills

“Keep it Real”

- ★ Invoke ALL 5 senses in the learning experience
- ★ Feedback, feedback, feedback
- ★ Answer a question with a question ??
- ★ Let it Happen
- ★ “A teacher is someone who makes themselves increasingly unnecessary”

Resources:

- ★ Lombardi, Marylin M., “Authentic Learning for the 21st Century: An Overview”, Educause Learning Initiative ELI Paper 1: 2007, May, 2007
- ★ Blackburn, George L., “Teaching, Learning, Doing: Best Practices in Education”, American Journal for Clinical Nutrition, 2005;82 (suppl): 218S-21S., 2005
- ★ Hmelo-Silver, C. E., Duncan, R.G., & Chinn, C.A, “Scaffolding and Achievement in Problem-Based and Inquiry Learning: A Response to Kirschner, Sweller and Clark (20-6), Educational Psychologist, 42(2) 99-107, Copyright 20007, Laurence Erlbaum Associates, Inc.

Thank You!

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