Meeting 07 • 20 April 2010 • Tuesday

Version: 4/20/10

People: Fischer; Ireton; Konrad; Moore

Today

(X') = anticipated time in minutes
(0001) etc.=item in document collection on CD-ROM
Key to notes added AFTER the class meets:
√ = topic / activity that was adequately dealt with during the class
+ = topic needs more attention & will be resumed at next / subsequent meeting(s)
- = a topic / activity that was proposed but not carried out - will be taken up later
~~Struckthrough text like this~~ = a topic / activity that was proposed but ~~not included is not going to be taken up after all~~
Italic green text like this = comments after the meeting

Week 4: wrapping up Project 1; thinking toward the next CBI project: the sub-structure of standards and thematic units	
	materials: lesson plans from free on-line resources (see handout from previous meeting) work samples of projects created in previous versions of the course
	(45') Project 1 as group effort. Putting boundaries on the projects - some questions to illustrate the need for that: 1) What will the learners have done / learned by the end of the project? (in the content area? in the language?) Specific examples: 2) Will they use two sizes of pizza pan (simulation) or three (real-world situation), and which linguistic features does that difference imply? 3) Will they reach the level of learning (developing) a formula that generalizes the size-price relationship, or "just" learn that it is difficult to gauge area, compared to one-dimensional comparisons? 4) Will the project include learning about (deceptive? smart?) packaging and marketing (consumer issues, etc.)? Now some nuts & bolts: What will be in the "box" (for teacher, for students?) Initial walk-through to survey the activities and the language they might employ. Mapping the project onto the language (at which level?) Timing the activity. Advanced question: How could the project include resources to adjust it to learners with higher-level language skills, or allow the learner identity to be something other than an individual pizza purchaser?
	(30') Initial thoughts about Projects 2 & 3, using CBI-course work samples and the FLA article (0712) about the course that combines German and hydraulic engineering
	(20') The Holocaust as a CBI possibility - but how?? (Link to WBF presentation)
	(15') SpeakEasy issues? Humboldt possibilities?

Upcoming class meeting(s): #8 & #9 (22 & 27 April)

1) finish Project 1
2) Continue Stryker /Leaver (or Kasper)
3) Starting to think about projects 2 & 3
4) More on-line lesson plan resources (see "Schedule", week 2)
5) Calendar-appropriate "mini-ideas": income tax, literature.
6) Issues of team-based and project-based learning. Maybe: engagement, community-based

9 April '2

OUT AND ABOUT GREEN

City of Beaverton "Living Greener" Summit: Learn how to be sustainable at home on a budget at this event featuring presenters and exhibits from more than 40 local organizations. Children can make crafts out of recycled material. Presentation topics include water conservation in gardening and electric vehicles. 9 a.m.-12:30 p.m. Sat, April 10. Beaverton City Hall, 4755 S.W. Griffith Drive, Beaverton; free; 503-526-2380

Green Gardening Fair: Learn about sustainable gardening techniques such as composting, low pesticide use and efficient watering. Also a native plant sale with more than 100 species of trees, shrubs and perennials. Sponsored by the Tualatin Hills Park & Recreation District. 10 a.m.-2 p.m. Sat, April 10. Tualatin Hills Nature Park, 15655 S.W. Millikan Way, Beaverton; free; www.thprd.org or 503-629-6350

Build a Solar Oven: Students build and take home their own solar oven. Registration required. 10:30 a.m.-12:30 p.m. Sat, April 10, or Wed, April 14. Lents Park, Southeast 92nd Avenue and Holgate Boulevard; $37; 503-760-3000

Water to the Weather Workshop: Learn how to protect your watershed by reducing pollution and how to water based on weather patterns. Registration required. 10:30 a.m.-noon Sat, April 10. Community Energy Project, 422 N.E. Alberta St.; free; 503-284-6827, ext. 109

"Let's Retake Our Plates" Film Series: The Hollywood Whole Foods Market presents this film series on the food supply. Proceeds benefit Ecotrust. 1 p.m. Sat or Sun, April 10 or 11: "Tapped,"

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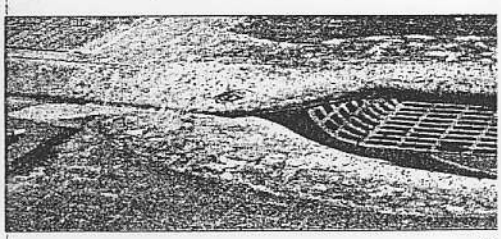

Please don't feed the whales | A mural painted
Nye Beach Turnaround in Newport gets across a
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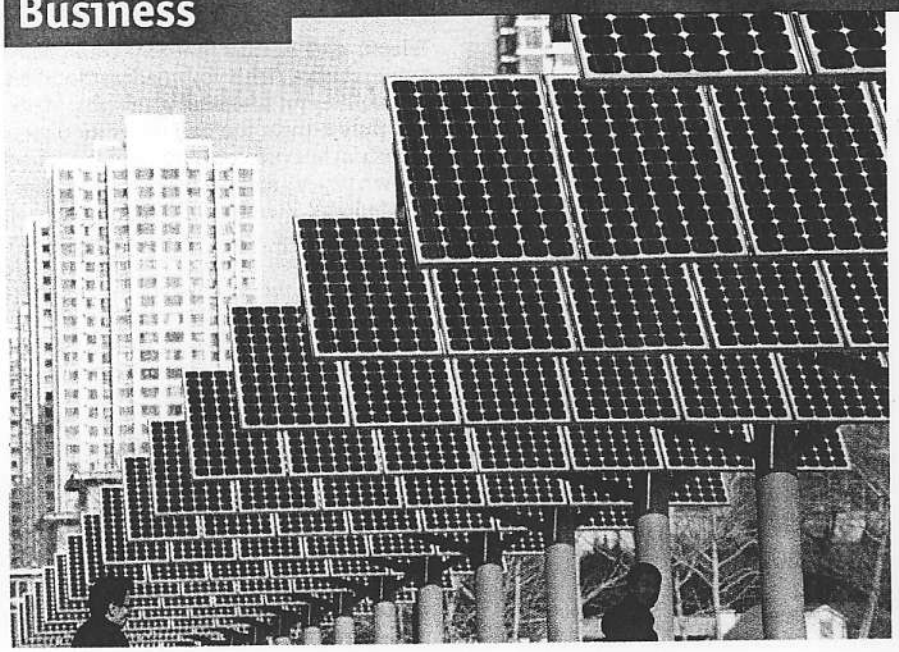

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The rise of Big Solar

Growing pains

The price of solar panels is falling fast enough to hurt Western manufacturers, but it is not yet low enough to make the sun a competitive source of electricity

SOLAR power has become an unlovely adolescent. It used to be a sweet little thing, shiny and new and full of promise. One day it will doubtless grow into a solid citizen, quite possibly a person of substance. At the moment it is stuck in between; no longer a child to be coddled and pampered, but not yet able to pay its own way. This presents a challenge both for the governments who want to see it grow up big and strong, and the companies that have been making money out of its progress to date. No one doubts that it will continue to grow; the question is who will suffer most from the growing pains.

Solar energy is popular because it is clean and abundant. The problem is that it remains expensive. According to recent calculations by the International Energy Agency, power from photovoltaic systems (solar cells) costs $200-600 a megawatt-hour, depending on the efficiency of the installation and the discount rate applied to future output. That compares with $50-70 per MWh for onshore wind power in America, by the IEA's reckoning, and even lower prices for power from fossil fuels, unless taxes on greenhouse-gas emissions are included. The costs of solar are dropping; in some sunny places it may, in a few years, be possible to get solar electricity as cheaply from a set of panels as from the grid, and later on for solar to compete with conventional ways of putting electricity into the grid. But for the moment there would be no significant market for solar cells were it not for government subsidies.

Given that there are subsidies of various sorts in various places, some of which have been very generous, there is a market, and a fast-growing one. According to Bloomberg New Energy Finance, a research firm, there will be demand for 10.5 gigawatts of new photovoltaic-energy systems in 2010, up from just 1.7GW in 2006. The consistent engine of growth over those four years has been Germany's feed-in tariffs, a guaranteed price for solar power that makes every panel installed in the country a profitable investment, at the expense of electricity consumers. For a fair part of that time, global supply was only just keeping up with demand, and prices for solar modules—the assemblies of cells that you might put on a roof, in a field or on a patch of desert—stayed fairly stable.

Last year, though, prices began to drop. One reason for this is that the supply of silicon, from which most photovoltaic cells are made, has increased. Another is that more and more Chinese companies with low costs are coming into the market. When the California Solar Initiative, a scheme for getting solar panels onto roofs, got under way in 2007, just 2% of the modules used were Chinese. In the fourth quarter of 2009, according to Nathaniel Bullard of New Energy Finance, the figure was 46%. Yingli Solar, a Chinese manufacturer which has been making cells for less than a decade, expects to ship a gigawatt's worth in the coming year.

The lower the price of a module, the more attractive a feed-in tariff looks. As prices came down, installations of solar cells in Germany shot up. The country accounted for roughly half of new installations around the world last year. As a result, the feed-in tariff has been reduced, and will be reduced again this summer, dampening demand and favouring low-cost producers. Q-Cells, Germany's largest wafer manufacturer (the wafer is the step between the refined silicon and the finished solar cell) has seen its market value drop by half over the past year. Margins for cell producers seem to have fallen even more dramatically. An increasing number are outsourcing production to China.

Some companies, such as Germany's SolarWorld, which does everything from refining silicon to installing panels, have respected brands that allow a bit of premium pricing. But for most, solar panels are more or less a commodity, which favours big producers with access to cheap capital. "Cost of capital is now king," says B.J. Stanbery, an industry veteran who founded a novel solar-cell manufacturer called HelioVolt.

The king seems to live in China. According to Mark Pinto, corporate technology officer of Applied Materials, which is the biggest supplier of machines to make solar cells, half of the world's production capacity is already in China. Manufacturing capacity, he says, will grow faster than his company had expected this year, and two-thirds of the growth will be in China. The company has just opened a new research and development centre in Xi'an.

Cheaper panels have led to a renewed interest in power-plant-sized installations. When Spain introduced a generous feed-in tariff in 2007 it triggered the first boom in ▸▸

these "utility-scale" projects, with two gigawatts installed before the blindsided government capped the tariff. Since then the utility market has slumbered, but if cells are cheap it does not take much to make stacking them up in the sun look attractive. When that happens, as Spain's example shows, it can be done quickly.

The company with the largest utility-scale pipeline is First Solar, one of the pioneers of what are called "thin-film" cells. These use less silicon than their thicker cousins, or none at all, and can be cheaper to make, but they are often less efficient; better for deserts, or sunny lots on the edge of town, than for roofs where the area available is limited. First Solar's panels, which use cadmium telluride instead of silicon, cost less than a dollar a watt to make, which makes them cheaper than any silicon-based rivals. Its output is about a gigawatt a year. Last year it signed a deal to start manufacturing in China and entered *Forbes* magazine's list of fast-growing tech companies in the top slot.

But some hedge funds have been shorting First Solar on the basis that plummeting prices for normal cells will undermine its advantage. It is also possible that it will be leapfrogged. There are various start-ups looking to make even cheaper thin films, such as Nanosolar, in California, and HelioVolt, though they have yet to show that they can reliably produce efficient cells on a large scale. Mr Stanbery says that now First Solar has proved the disruptive capability of such approaches, larger companies looking to enter the solar business are interested—and leading makers of silicon cells, preferring to disrupt than be disrupted, are hoping to add similar technology to their portfolios.

The utility market also serves to highlight the flaws and expense of solar power. A typical utility-scale installation produces power at only a fifth of its maximum capacity, thanks to clouds, night-time, dirty panels and so on. To replace a one-gigawatt coal plant running at 70% of capacity with solar panels would require about half of the 6GW installed worldwide last year.

This is one of the arguments for looking instead at another solar technology, solar thermal, which uses mirrors to concentrate heat, produce steam and thus drive turbines. Efficient solar-thermal plants can in principle be built on the same sort of scale as gas-fired power stations, a few hundred megawatts at a time. Such big plants are harder to finance than small photovoltaic installations, and require more planning permissions and infrastructure, such as transmission lines. But they produce a lot of power. Brightsource Energy, based in California, recently received government loan guarantees for a project in the Mojave desert which, if completed, could deliver more power than all the photovoltaic cells installed in America last year. ■

Pay-television in Italy

Scowls and moans

Silvio Berlusconi's Mediaset is in open war with Rupert Murdoch's Sky Italia

THIS week's *Sorrisi e Canzoni* ("Smiles and Songs"), Italy's biggest-selling guide to what's on television, advises readers that although News Corporation's Sky Italia, a pay-TV platform, has won exclusive rights to broadcast the 2010 football World Cup, the match is not over yet. Mediaset, Italy's biggest private media firm, which is controlled by Silvio Berlusconi, the prime minister, could still win some rights if it prevails in a forthcoming court case in Paris, notes the magazine, which is also controlled by Mr Berlusconi. The conflict over the World Cup is the latest battle in an intensifying war between the media empires of Mr Berlusconi and Rupert Murdoch, News Corp's boss.

When News Corp bought Telepiu and Stream, two struggling pay-TV businesses, merged them and relaunched them in 2003 as Sky Italia, Italian media executives expected the new firm to fail. They were, after all, losing money, and conventional wisdom had it that Italian consumers, who tend to shy away from long-term contracts, were unlikely to pay for television.

In fact, there turned out to be plenty of demand for programming outside the Italian norm of variety, game and reality shows, all heavily laden with singing and dancing. Sky Italia now has 4.7m subscribers. To encourage the emergence of a competitor in pay-TV, the European Commission ruled as a condition of the merger of Telepiu and Stream that Sky could only buy exclusive rights to broadcast football by satellite, not across all platforms. Mediaset duly bought football rights for digital terrestrial television in 2005 and launched its own pay-TV service.

Mediaset Premium is winning lots of customers with cheaper packages. It has moved squarely onto Mr Murdoch's turf, offering Hollywood films as well as football, and shifting from a pay-per-view strategy to a subscription model. It has 4.1m paying customers, though many of these have pay-per-view cards rather than full subscriptions.

On top of competition from Mediaset, Sky has suffered a number of regulatory setbacks. The most damaging was a move by the government at the start of 2009 to double the rate of value-added tax on pay-TV to 20%. A weak economy, the VAT hike and Mediaset Premium's advances together contributed to Sky's loss of 63,000 subscribers in the fourth quarter of last year—its first ever decline. The business chalked up an operating loss of $30m in the same period. Two other recent rulings could also hurt Sky. From 2012 advertising on pay-TV must take up no more than 12% of each viewing hour, down from 18% currently, according to a new government decree (the proportion allowed on free television will actually rise, to 20%). The same decree also forbids adult programming on pay-TV during the day. All the changes affect Mediaset as well as Sky, but hit Sky harder because Mediaset remains chiefly a free-to-air business.

"A reasonable regulator could have taken any one of these steps," says Claudio Aspesi, European media analyst at Bernstein Research, a brokerage firm, "but because Mediaset is owned by Silvio Berlusconi there is always a suspicion that the moves are not being made solely for the public interest." Italian courts have sometimes proved hapless. Mediaset's refusal from August last year to continue carrying advertising for Sky, says Tom Mockridge, Sky's chief executive, "has had a big impact since it's the main route to market in Italy". Although a court has judged Mediaset's refusal unlawful, it has not been able to enforce the decision, he laments.

Should News Corp retreat from Italy? Having invested a total of €9 billion ($12 billion) in the country, Mr Murdoch has a strong incentive to stay. From next year Sky will be free to buy football rights across all platforms, putting it in a far stronger negotiating position relative to Mediaset, points out François Godard of Enders Analysis, a research firm. Because Italy is an underdeveloped market, with only 30% of households paying for television, says Mr Mockridge, there is plenty of room for both Sky and Mediaset Premium to grow. At half-time, with both sides having scored, there is everything still to play for. ■

A Problem-Based Learning Approach to Integrating Foreign Language Into Engineering

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Abstract: *Problem-based learning (PBL) is an instructional methodology placing primary emphasis on students solving realistic problems in a team-oriented environment. Here we discuss using PBL to integrate a language for specific purposes (LSP) track into an undergraduate biological engineering curriculum as a way to prepare students for an engineering career requiring job-specific foreign language skills. In Part I we review PBL theory and anticipate problems that may arise when merging it with an LSP track. In Part II we detail the development of a PBL/LSP module, including module performance objectives and assessment instruments. Areas of potential future research also are highlighted.*

Key words: *engineering, language for specific purposes, problem-based learning*

Language: *Relevant to all languages*

A Case for Using Problem-Based Learning to Integrate a Language for Specific Purposes

In an effort to put a halt to declining foreign language enrollments, which Welles (2004) notes have dropped from 16.1 per 100 institutional enrollments in 1960 to 8.6 per 100 institutional enrollments in 2002, foreign language departments nationwide have begun to initiate language for specific purposes (LSP) courses. Von Reinhart (2001), for example, reports that since the inception of the International Engineering Program at the University of Rhode Island, the number of German majors at the university has increased from 5 in 1987 to 91 in 2000. This has allowed the German program to offer more upper-division courses in German culture and literature, graduate more students with context-specific language skills and cross-cultural competence, and cultivate relations with international companies seeking graduate students with highly demanded skills.

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TABLE 1

Learner and Context Analysis

	Area	Target Population Characteristics
Learner analysis	Entry behaviors	**German:** Four semesters of undergraduate German; intermediate to early advanced knowledge of German grammar and syntax; intermediate speaking and listening skills, possibly low reading and writing skills
		Biological Engineering: Introductory physics, chemistry, biology, calculus
	Prior knowledge	**German:** Minimal familiarity with German business environments, may have taken a Business German course
		Biological Engineering: Uncertain prior knowledge of hemodialysis and possible misconceptions that must be corrected
	Attitude toward instructional format	**German:** Possible hesitation that an online format is conducive to learning German communicatively; students may have the attitude that online learning is no substitute for face-to-face communication
		Biological Engineering: Engineering lends itself to PBL and students are familiar with popular culture depicting engineers as problem solvers having to construct solutions in short times with minimal resources; however, if this is their first PBL course, additional scaffolding may be needed
	Group characteristics	**German:** Some students may possess greater German competency or have spent more time in German-speaking countries than other students
		Biological Engineering: Students have all taken the same prerequisite courses; some students may have prior work or internship experience
Context analysis of learning environment	Adaptability of module to simulate the workplace	**Biological Engineering:** Dependent upon the selected problem space; the hemodialysis module is appropriate for most major universities in terms of required facilities, tools, and equipment
		German: Replicating the German workplace environment will be difficult as complete language immersion is not possible
	Learning site constraints	**Both:** Students will meet in main German section 2 times a week, in main biological engineering section 3 times a week Students will meet in tutorial sessions twice a week for 90 minutes, once for German and once for biological engineering
Context analysis of performance setting	Physical aspects	**Both:** Adaptability is key here, as students must train for a variety of potential employers in a broad field such as biological engineering Fundamental skills and knowledge of commonly encountered equipment and instrumentation are core
	Social aspects	**Both:** Employers will clearly look for both individual and team skills as employees must be self-reliant yet capable of contributing to and interacting with the larger group
	Relevance of skills to workplace	**Both:** The aim of university educators is to prepare students for a variety of careers within their field of study, thus fundamental concepts must be embedded in all the context-specific PBL modules so students can transfer this knowledge to potentially new settings PBL in engineering and languages is not vocational training for a predefined or foreseen task

TABLE 2

Overview of a Sample PBL/LSP Semester

(cf. Figure 1)

Module	Subject	Instructional Goals	Artifacts and Supplemental Activities
1.	Introduction to hemodialysis and related human physiology; articulation of problem space and development of potential solutions	Historical development of hemodialysis and its physiological impact; research methods and materials	8- to 10-page team design brief in German; 3- to 5-page student paper in German on the history of hemodialysis and its physiological impact; student and team journals; biological engineering and German quizzes; module debriefing
2.	Short- and long-term hemodialysis complications	Sterilization methods, bacteria, biocompatibility, and microbiology	3- to 5-page student paper in German on bacteria and sterilization methods; student and team journals; biological engineering and German quizzes; module debriefing
3.	2D membranes and 3D hollow fibers	Modeling and optimization of design; material science, mass transport, ultrafiltration, and surface chemistry	3- to 5-page student paper in German on ultrafiltration and surface chemistry; student and team journals; site visit or virtual tour of Fresenius Medical Care North America; biological engineering and German quizzes; module debriefing
4.	FDA; economics and health care; future of hemodialysis and regenerative medicine; intellectual property and patents	Macrolevel analysis and economic feasibility; cell cultures	8- to 10-page team project summary in German; 3- to 5-page student paper in German on German health care system; student and team journals; video; biological engineering and German quizzes; module debriefing
5.	Capstone experience	Synthesis of prior knowledge	8- to 10-page team capstone summary in German; student and team journals; semester debriefing