High schools, community colleges need to align curricula

By Phil Ciclora
News Editor

High schools need to work with community colleges to align their curricula better and to reduce the number of students who need to enroll in remedial courses, according to a UI expert who studies community college education policy.

Debra Bragg, a professor of educational organization and leadership and the director of the Forum on the Future of Public Education at Illinois, says a major reason why college completion is not keeping pace with enrollment is that many students graduate from high school inadequately prepared for college-level work.

“It’s a systemic problem, as well as a fundamental lack of alignment between high schools and colleges, and the system’s lack of expectations and support for students who aren’t seen as high achievers as they progress through K-12,” Bragg said.

Of students attending community colleges in Illinois, “as few as half of students” are enrolled in at least one remedial course, compared to slightly more than 30 percent of students attending college-level course work at a community college before ever enrolling in a college-level class, it not only slows whatever educational momentum they have toward earning an associate’s degree or, even potentially transferring to a four-year institution, it also greatly reduces the chances of that student ever completing any college certificate or degree, a key goal of President Obama’s ambitious American Graduation Initiative, Bragg said.

“It’s a pervasive problem in that, by repeating these high school-level courses over and over, students aren’t seeing the educational momentum they have toward earning an associate’s degree or, even potentially transferring to a four-year institution, it also greatly reduces the chances of that student ever completing any college certificate or degree, a key goal of President Obama’s ambitious American Graduation Initiative, Bragg said.

Despite college enrollment being at an all-time high, the percentage of students earning college degrees has remained relatively unchanged over the past 25 years. From 2004 to 2007, less than three in 10 community college students earned any college certificate or degree, according to federal data. With other countries’ college completion rates rising, the U.S. is holding steady in real numbers but declining relative to other countries in the proportion of students with college credentials.

In Illinois, Bragg noted positive developments associated with the state’s College and Career Readiness Pilot Act, a law passed in 2007 aimed at reducing remediation in Illinois’ community colleges. One of the positive developments to come out of the bill, Bragg said, is that high schools and community colleges in Illinois are now establishing partnerships, including incorporating early college-level placement testing when students are still in high school, and having instructors share grading rubrics to better assess where students need to be when they graduate from high school and enter college.

“There was a systemic problem – seeing the K-12 and higher education systems as separate – as well as a lack of understanding between high schools and colleges about the level of competency that students need to have to graduate from high school and enter college.

College readiness Educational professor Debra Bragg says a major reason why college completion is not keeping pace with enrollment is that many students graduate from high school inadequately prepared for college-level work.

Prairie planting project to provide outdoor laboratory

By Anna K. Herkamp
Assistant Editor

A prairie planting project on more than 2 acres in Urbana will soon provide nature lovers a walk through the natural history of Illinois.

The UI-designated no-mow zone at the southwest corner of Orchard Street and Florida Avenue is growing into a conservation space consistent with prairie flora that was abundant in the area more than a century ago.

The prairie planting project began in early May when seeds from plants native to tallgrass prairie were planted. A similar project was planted last year in a no-mow zone near the College of Veterinary Medicine.

“Prairie is our ecological heritage,” said Jamie Ellis, a botanist in the Illinois Natural History Survey and one of the project’s leaders. “We say we’re in the ‘Prairie State,’ but the prairie is hard to find here in Champaign County.”

The space, which will be available to the public, also will be an outdoor lab for students in various academic disciplines.

“If we can recreate a small piece of (the prairie), it’s a resource for biology students who are learning about plants and insects, for natural resources students and for landscape architecture students who may want to incorporate (prairie plants) into projects in the future,” Ellis said.

“It’s an opportunity for students to do something tangible that results from the ideas they’ve gotten in the classroom,” said Anton Endress, a professor of natural resources and environmental sciences and co-leader of the project.

The current environment can’t allow newly planted prairie to look exactly as it did more than a century ago, Endress pointed out. Factors such as the absence of bison and an increase in carbon dioxide levels will make for a different mix of plant and animal species in the year 2010, he said.

Traditional restoration efforts have relied on the notes of researchers from a century or more ago, historic photographs and even pioneer diaries that listed plant and animal life in the area. Using information about plants that experts know were abundant, restoration efforts could result in similar mixes of plant and animal life.

Living history Illinois Natural History Survey botanist Jamie Ellis, left, and Anton Endress, a professor of natural resources and environmental sciences, are leaders of a prairie planting project at the corner of Florida Avenue and Orchard Street in Urbana. They hope the project will establish carbon neutrality to the atmosphere while educating the public and the campus about Illinois’ natural history.

Soy solution

Campus lab develops soup mix to help food bank make use of donated soy protein.

Microelectronics

UI researchers have developed a novel direct-writing method for manufacturing metal interconnects that could shrink integrated circuits.

On the Web www.news.illinois.edu/ii
By Christy Levy

100 4th Block

Although the UI continues to cope with a backlog of overdue payments from the state, the UI Board of Trustees learned at its July 22 meeting in Chicago that there were a few bright spots in the budget year that ended on April 30.

Walter Knorr, university vice president and chief financial officer, told trustees an increase in enrollment and higher student-generated revenue helped the university end the fiscal year about $16 million below its budget.

The UIC Medical Center also had a strong fiscal year, bringing in a net income of about $63 million after expenses.

The UI received about $279 million from fiscal year 2010, Knorr said.

Joe Spat said he signed a law last month that allows the UI and other public universities to take out loans covering as much as two-thirds of the unpaid state appropriations.

University administrators are looking into options for borrowing, Knorr said.

“We have to see a very slow payment cycle,” he said.

Spat’s state budget cut higher education funding by about $96 million for fiscal year 2011.

The cuts reduce the university’s fiscal 2011 appropriations by about $46 million — the amount of one-time federal stimulus funds received in March, Knorr said.

“This is really being looked at as a permanent cut that we have to deal with,” he said.

A gradual decrease in state support of higher education has been evident over the past decade, Knorr said. In 2002, the state funded $275 million for the UI. By fiscal year 2011, the amount has decreased to $164 million.

Tuition revenue has been increasing to cover the loss of state funding, he said.

Student financial aid — in the form of Pell grants, state Monetary Award Program grants and supplemental university funds — has risen with tuition. Student aid increased by $16 million in fiscal 2010, will increase to $162 million this year, he said.

Other business

The board:

• Appointed a new chair of the University Police

• Established a new committee to advise the board on health matters, which will report to the board on a quarterly basis

• Approved a new governance structure for the university

• Approved a new agreement with UI Health Care to provide health care services to University employees

• Approved an agreement with the Illinois Department of Transportation to provide maintenance of the site. Staff members and equipment from Facilities and Services were vital in keeping the site running.

“Right now, it’s a waiting game,” Ellis said.

Four Illinois professors elected ACS fellows

By Liz Ahlberg

Physical Sciences Editor

Four UI chemistry professors are among the 101 ACS fellows elected from 1200 members from the American Chemical Society. Peter Beak, Theodore Brown, Jeffrey Moore and Knorr are known for their outstanding contributions to the field of chemistry and to ACS.

Peter Beak, professor of chemistry, is an alumnus of Illinois and a fellow of the National Academy of Sciences and a fellow of the American Academy of Arts and Sciences.

Knorr, the Marvin T. Schmidt professor of chemistry, has made advances in the study of the chemical effects of ultrasonic waves, such as nano-materials synthesis and the use of stimuliresponsive compounds. He has also worked at the forefront of chemical sensing, and developed and commercialized new sensors capable of molecular recognition. He also is a professor of materials science and engineering and a member of the Beckman Institute for Advanced Science and Technology.

Inaugurated in 2009, the fellows program recognizes those among the 16,000 ACS members who have made exceptional achievements in both chemistry and society. The world’s largest professional society, ACS will honor the 2010 fellows at its annual meeting in Boston on Aug. 23.

“It’s not just the campus community, but folks in Urbana and the residents of Champaign County who are very interested and want to see this project successful. In a few years, they can look out their front windows and see the spoils with prairie wildflowers.”

Inside Illinois

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http://news.illinois.edu/illinois
The UI’s National Soybean Research Laboratory solved a big problem for the Midwest Food Bank: how to do with the textured soy protein the food bank frequently receives from ArcherDanielsMidland.

A way to increase nutritional value in recipes, textured soy protein is not a common ingredient for many cooks who find it ‘people don’t eat soy,’ said Melinda Anderson, a communications specialist with NSRL. “Unlike a can of beans or corn, if you put soy into a food basket, people couldn’t even know what to do with it.”

What was needed was an easy-to-use, prepackaged convenient mix or a recipe that would involve people who distribute the new soup, which is donated in bulk from ADM, a soy processor that would incorporate the soy, which is donoted, or otherwise do with it.

It was a network of more than 600 kitchen pantries and charitable organizations throughout the Midwest food bank serving people in need. We’re so thankful,” he said.

The lab-food bank collaboration is called Tender Mercies, and involves hundreds of volunteers who distribute new soy-based foods through the MFBB. Soy protein is a healthy form of protein that many people who benefit from food donations don’t have suitable kitchens or other health issues, such as dietary fiber.

“Low-fiber diets are linked to (many health problems),” he said. “Lower-quality foods which (although cheaper) offer the least for a healthy diet.

“Herman said the ease with which the two organizations came together to create the new soup recipes has been inspiring to see. ‘It’s wonderful when people can collaborate and focus on the needs of those who are in need. We’re so thankful,” he said. The Midwest Food Bank distributes new soup to a network of more than 600 kitchen pantries, social service organizations and other charities, which reach more than 70,000 people per month. Eventually, MFB would like to distribute 15,000 to 20,000 of the new soy-based meals per month.

The NSRL’s efforts to combat hunger reach far beyond the Midwest. Recently, with support from the Illinois Soybean Association, the lab sent more than 970,000 servings of a nutritious, soy-enhanced soup mix to Haiti for distribution by the National School Lunch Program of Haiti to many charitable organizations throughout the country.

Summer Reading

Since finishing some academic pursuits and having settled into a routine with a new baby at home, I have rediscovered reading for pleasure this summer. I read a book that even though I love reading, I did not need to grab my attention and entertain me from the very first page or they simply won’t get off the shelf.

My primary areas of interest are science fiction and action thrillers. One of my favorite authors is Dean Koontz because his books usually dive right into the action. However, in some of his more recent works such as “The Taking” and “The Darkest Evening of the Year,” I have found myself wishing that even though I love reading, I did not need to grab my attention and entertain me from the very first page or they simply won’t get off the shelf.

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Fall 2010 Publication Schedule

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Contact: Doris Dahl • dkdahl@illinois.edu • 333-2895
Your personality plays a role in your political behavior

By Craig Chamberlain
Social Sciences Editor

Our personalities play a role in every aspect of our lives, from friendships to hobbies, from whom we marry to what we do for a living.

It’s only natural, then, that personality should also play a role in our political behavior. Says Jeffery Mondak, “It’s long been understood that people just behave differently.”

In one of the first books on the subject, Mondak, a UI professor of political science, makes the case that certain personality traits can sway us to be more liberal or conservative, to be more likely to participate in politics or to be more likely to ignore politics altogether.

With the understanding that we’re born with most of those traits, this means we’re born with certain political tendencies, said Mondak, who also is a faculty affiliate of the university’s Center for Democracy.

Instead, political scientists have explained political behavior by looking at the characteristics of people’s environment, such as where they live, their income, years of schooling, or their life experience, Mondak said.

People have been considered “Manik slants,” who were “identical at the moment of birth but iden- tical at the moment that they first encountered politics,” he said.

Those environmental factors do matter, but they are not the whole story, Mondak said.

Extroverts, for instance, are much more likely to participate in political activities that involve direct interaction with others such as marches, rallies, protests, and door-to-door canvassing, Mondak said. They’re more likely, however, to give money or display a bumper sticker, he said.

People who are more responsible or conscientious are more likely to show up at a protest, but actually less likely to vote, Mondak said. It may be the non-voters among this group have thought carefully about it, believe they can make little difference, and so have decided politics is not worth their time, he said.

“Those who rank high in their openness to experience are very likely to be liberal,” Mondak said. Not everyone wants to be liberal according to Mondak. “Liberalism has served to reinforce this personality,” he said. “Some people have been characterized as ‘liberal sympathizers’ who are not really very liberal.”

Mondak’s research is based around a breakthrough in the psychological study of personality going back about two decades, known as the “five factor” or “Big Five” approach. It provides a structure for grouping what were hundreds of personality traits under five broad dimensions: openness to experience, conscientiousness, extraversion, agreeableness and neuroticism (or emotional stability).

Numerous psychological studies have served to reinforce this approach, giving researchers a practical tool for collecting information about personality traits along with other information, Mondak said.

Surveys can now include a reasonable five or 10 questions related to personality, Mondak said. Most surveys previously would have required hundreds.

“We get a sense of the whole political landscape because they felt surveyed by these five broad scale dimensions,” Mondak said.

Studying the connection between psychological characteristics and political behavior could matter for a variety of reasons, one of them being the way people view political opponents and the extremes of today’s ideological food fights. Mondak said. “If we can grasp the fact that some people just behave differently, just think differently, or are just oriented differently than others, than it would be more powerful to promote understanding, and to me that’s a positive,” he said.

Personality balanced candidates might want to note that one size does not fit all when it comes to getting people involved. Mondak said. “In between the extremes of being less likely to attend a protest march, more or less likely to ignore politics altogether.”
Business & Law Editor

By Jan Dennis

Businesses that look only at age to bridge generational gaps among workers risk losing knowledge to retirements, higher turnover and other productivity-clogging problems, new UI research has found.

The study says firms often misfire when trying to mend generational divides, relying on broad stereotypes associated with Baby Boomers or Generation X’ers rather than vast research that shows workplace splintering can be rooted in more than just birthdates.

“The challenges are complex, but the solutions being offered are too simplistic,” said Aparna Joshi, a professor of labor and employment relations who led the study. “Our aim should be to match the complexity of the problem with more nuanced solutions.”

She says an analysis of research dating back decades found that three primary factors could help breed generational factions in the workplace that can keep employees from interacting and sharing knowledge.

— Age is one factor, but goes beyond broad labels such as Baby Boomers, which spans a nearly 20-year age range, according to the study. Scholars have found that within generations, people are further defined by significant events that occur on the path to adulthood, such as World War II, President Kennedy’s assassination or the 9/11 terrorist attacks. Those events leave a lasting impression that spawns generational subgroups, making broad characterizations of entire generations risky at best.

— Generational factions also can emerge based on when employees start work with a firm, similar to the lifelong bonds formed by soldiers during boot camp or deployments, the study found. Because those factions can include workers of all ages, the study says age-based solutions to unite those workers with colleagues are ill-conceived.

— Workers can form factions based on their work duties, such as a top management team representing a generation of leaders who may be replaced by a new generation or a supervisor working with a subordinate who could ultimately take over his or her job. Those bonds also create multi-generational groups that defy age-based solutions, according to the study.

Joshi calls the study a first step that redefines generational challenges in the workplace and how to spot them. She says follow-up research will include interviews with workers to further explore the findings and to seek solutions.

“What we are headed toward is creating a better understanding of the complexities of generations in the workplace and, we hope, more realistic solutions,” she said. “Businesses need to make targeted diagnoses like a doctor diagnoses an illness, rather than just prescribing penicillin for every ailment.”

Knocking down walls that divide workers can pay off big for companies, Joshi said. Institutional knowledge would be passed along, rather than disappearing through retirement. New workers would be more engaged, reducing costly turnover.

“It’s human nature that workers interact with their cohorts, seeking out their own,” she said. “Figuring out ways to bring them together will allow companies to tap into all of those knowledge silos and reach full potential.”

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**music**

5 Thursday
Krahnert Uncorked. Main & Co., world music. 5 p.m.
Krahnert Center lobby.

**dance**

20 Friday
Dance for Parkinson’s Disease. Caregivers and friends of patients with Parkinson’s Disease are welcome to join in this free movement session with live music. Marianne Jarvits, Kate Kuper, instructors. 10 a.m.
Dance rehearsal room, 102 Meat Sciences Lab, 1503 N. Sixth Street.

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**calendar of events**

Here are some events for the week of Aug. 5 - 22:

- **Music**:
  - Every Thursday: Krahnert Uncorked. Main & Co., world music. 5 p.m. Krahnert Center lobby.
  - **Dance**:
    - **20 Friday**: Dance for Parkinson’s Disease. Caregivers and friends of patients with Parkinson’s Disease are welcome to join in this free movement session with live music. Marianne Jarvits, Kate Kuper, instructors. 10 a.m.
      
      **Other events include**:
      - **Art and Culture**:
        - **Art Exhibitions**:
        - **Library and Museum Tours**:
          - Tours: 3 p.m. daily, meet in main lobby, krahnertcenter.com
          - **Tours of the Center’s Archives and Library**: Available every Thursday, 2-5 p.m.武 Five different tours: 217-244-9934.
          - **Tours Self-guided of Exhibits**: go to Information Desk for price list and specials.
      - **Food and Drink**:
        - **Bevier Café**: Open at 5 p.m. most Thursday afternoons and after performances. Closed at 7 p.m. on non-performance nights and until after the performance on show nights. Hours: Monday–Thursday: 10 a.m.–3 p.m. and 6–8 p.m.
        - **Promenade gift shop**: weekends from 90 minutes before until after performances. Hours: 7:30 a.m.–7:30 p.m. Monday-Friday; 10 a.m.–4 p.m. Saturday-Sunday.
      - **Other Services**:
        - **AARC**: 201 E. Peabody Drive, Champaign. 217-333-6068.
        - **Charge Room & Manuscript Library**: Open daily, 9 a.m.–5 p.m. daily.
        - **Center for Teaching Excellence**: Assisting faculty, academic units and teaching assistants in improving instruction.
        - **Kinkead Pavilion**: Closed through Aug. 15.
      - **Library**:
        - Main Library: Hours: Through Aug. 7: 11 a.m.–3 p.m., Monday–Friday. For reservations: 217-333-0690; walk-ins welcome.
        - **Kinesiology and Community Facilities & Services**: go to Information Desk for price list and specials.
      - **Music**:
        - **Bevier Café**: Coffee shop. 8 a.m.–3 p.m. weekdays with full breakfast until 10:30 a.m. Café: 11:30 a.m.–1 p.m. weekdays.
        - **Campus Recreation**: ARC: 201 E. Peabody Drive, Champaign. 217-265-0474. By appointment with a fitness professional.
        - **Flato’s Piano Café**: 7:30 a.m.–3:30 p.m. Monday–Thursday; 7:30 a.m.–2:30 p.m. Friday.
      - **Other Events**:
        - **Fallon Data Practice Group**: Meetings: Wednesdays beginning mid-year. 405 Union. More info: 217-244-2571.
        - **Urbana Community Calendar**: Allerton Park & Retreat Center: Noon-5 p.m. Tuesday; 9 a.m.–5 p.m. Wednesday-Friday; 10 a.m.-4 p.m. Saturday; Noon-2 p.m. Sunday.
        - **Secretariat**:
          - **Book Club**: Every Thursday: 1:30 p.m. First Thursday monthly, location varies.
        - **Library**: Main Library: Hours: Through Aug. 7: 11 a.m.–3 p.m., Monday–Friday. For reservations: 217-333-0690; walk-ins welcome.
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Small wires make big connections for microelectronics

By Liz Ahlberg

Engineers at the UI have developed a novel direct-writing method for manufacturing metal interconnects that could shrink integrated circuits and expand microelectronics.

Integrated chips are made by wiring multiple transistors and electronic components together to perform complex functions. The connections between chips and circuit boards traditionally are made from pre-fabricated metal wires that connect to a designated bonding pad on a chip.

“Integrated functions require many wire connections. It’s tedious and time-consuming to make and increases cost,” said Min-Feng Yu, a professor of mechanical science and engineering at Illinois.

In addition, the bonding pad for traditional wire bonds takes up a substantial area of space. As technology has moved to smaller electronics, shrinking wiring and expand microelectronics.

Integrated chips are made by wiring microelectronic devices much smaller than the required 50-by-50 micron square bonding area, prohibiting integrated functions on the very small scale.

“There’s no existing cost-effective technology that would allow you to wire-bond microstructures,” said Yu. “So let’s get rid of those wires, and instead, why not directly produce them on-site between the connection points?”

Yu and graduate student Jie Hu developed a direct-write technique that produces tiny pure metal wires much smaller in diameter than traditional wires and requiring two orders of magnitude less bonding area. In a paper appearing in the July 16 edition of Science, they demonstrate as many as 20 of their new wires bonded to a single standard bonding site.

“This technique means the pads can be much smaller than what’s needed for traditional wire-bonding technology,” Yu said. This reduction in area could allow manufacturers to produce more chips per wafer of semiconductor material. It could also enable more complex integrated functions in microelectronics.

The pair have demonstrated their technique with both copper and platinum wires, and plan to explore the technique with other metals.

Yu likens their technique to writing with a fountain pen. “People’s mindset is that you draw a line on a surface, but what we’re doing is writing in 3-D space,” he said.

The duo loaded a micropipette – a device that dispenses tiny amounts of liquid – with a copper electrolyte solution. When the pipette comes into close contact with the surface, a liquid bridge forms between the pipette tip and the bonding pad.

The researchers then apply an electric current, which causes the copper in the solution to deposit as solid metal. As the tip moves through space, copper continues to deposit from the solution in the pipette, like ink from a pen, creating a wire. The challenge for Yu and Hu was calculating the correct speed to move the pipette tip to maintain the liquid bridge between the nozzle and the growing wire.

“It’s liquid, so it can easily be shaped,” Yu said. “As long as you maintain your speed within a certain range, you will always be able to produce uniform, high-quality wires.”

They also had to figure out how to “write” the wires laterally for chip-to-chip bonding. Typical micropipette nozzles are flat at the end, but too much tilting breaks the liquid contact. The Illinois duo found that a notched nozzle, with a 90-degree cut in the side, allowed lateral movement, meaning that the wires can arc from one bonding site to another, even if the chips are stacked or tiered.

The process is automated, so Yu hopes to develop arrays of micropipettes to produce wire bonds in bulk for more efficient manufacturing.

“An advantage is that you can do this in parallel,” he said. “Instead of one nozzle, suppose you have 10, 20 or 100 working simultaneously. In one step, you can make tens or hundreds of bonds, and that is cost-saving.”

In addition to wire bonds, the technique could produce a myriad of metal microstructures for various applications.

“The ability to fabricate metallic structures in 3-D can open up many other opportunities,” Yu said. “It has lots of desirable properties aside from the electrical ones. You can imagine the structures that take advantage of the different properties of metal.”

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