TESTING SENSORS AS SAFETY NET FOR SENIORS AT HOME

In this May 22, 2013 photo provided by the University of Missouri, Bob Harrison prepares a snack in his TigerPlace apartment in Columbia, Mo., at different sensors mounted near the ceiling record activity patterns. The sensor technology is unobtrusive and does not interfere with his everyday tasks. Researchers at the University of Missouri are studying high-tech monitoring systems that promise new safety nets for seniors living on their own. (AP Photo/University of Missouri, Shoshana Herndon)

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It could mean no more having to check up on Mom or Dad every morning: Motion sensors on the wall and a monitor under the mattress one day might automatically alert you to early signs of trouble well before an elderly loved one gets sick or suffers a fall.
Research is growing with high-tech gadgets that promise new safety nets for seniors determined to live on their own for as long as possible.

"It's insurance in case something should happen," is how Bob Harrison, 85, describes the unobtrusive monitors being tested in his apartment at the TigerPlace retirement community in Columbia, Mo.

Living at home — specialists call it aging in place — is what most people want for their later years. Americans 40 and older are just as worried about losing their independence as they are about losing their memory, according to a recent survey by the Associated Press-NORC Center for Public Affairs Research.

Common-sense interventions like grab bars in bathrooms and taping down rugs to prevent tripping can make homes safer as seniors deal with chronic illnesses. Technology is the next frontier, and a far cry from those emergency-call buttons seniors sometimes wear to summon help.

Already, some companies are offering monitoring packages that place motion sensors on the front door, a favorite chair, even the refrigerator, and then send an alert to a family member if there's too little activity over a certain period of time. Other gadgets can make pill bottles buzz when it's time for a dose and text a caregiver if it's not taken, or promise to switch off a stove burner that's left on too long.

Researchers at the University of Missouri aim to go further: Their experiments show that certain automatic monitoring can spot changes — such as restlessness in bed or a drop in daytime activity — that occur 10 days to two weeks before a fall or a trip to the doctor or hospital.

"We were blown away that we could actually detect this," said nursing professor Marilyn Rantz, an aging-in-place specialist who is leading the research. She compares it to "a vital sign of my physical function."

Why would the gadgets work? That monitor under the mattress can measure pulse and respiratory patterns to see if heart failure is worsening before someone realizes he or she is becoming short of breath. More nighttime bathroom trips can indicate a brewing urinary tract infection.

A change in gait, such as starting to take shorter or slower steps, can signal increased risk for a fall. Basic motion sensors can't detect that. So Rantz's team adapted the Microsoft Kinect 3-D camera, developed for video games, to measure subtle changes in walking. (Yes, it can distinguish visitors.)

The researchers installed the sensor package in apartments at the university-affiliated TigerPlace community and in a Cedar Falls, Iowa, senior complex. On-site nurses received automatic emails about significant changes in residents' activity. One study found that after a year, residents who agreed to be monitored were functioning better than an unmonitored control group, presumably because nurses intervened sooner at signs of trouble, Rantz said.

The bigger question is whether simply alerting a loved one, not a nurse, might also help. Now, with a new grant from the National Institutes of Health, Rantz will begin expanding...
the research to see how this monitoring works in different senior housing and this time, participants can decide if they’d like a family member or friend to get those alerts, in addition to a nurse.

Rantz says embedding sensors in the home is important because too many older adults forget or don’t want to wear those older emergency-call buttons, including Rantz’s own mother, who lay helpless on her floor for eight hours after tripping and badly breaking a shoulder. Rantz said her mother never fully recovered, and six months later died.

“When we started this team, I said we are not going to make anybody wear anything or push any buttons, because my mother refused and I don’t think she’s any different than a lot of other people in this world,” Rantz said.

Monitoring raises important privacy questions, about just what is tracked and who has access to it, cautioned Jeff Makowka of AARP.

To work, the high-tech approach has to be “less about, ‘We’re watching you, Grandma,’ but ‘Hey, Grandma, how come you didn’t make coffee this morning?’” he said.

Sensor prices are another hurdle, although Makowka said they’re dropping. Various kinds already on the market can run from about $70 to several hundred, plus monthly service plans.
As policy makers demand more accountability from higher education, a group of higher-education leaders has been conducting an ambitious experiment in turning existing data into a set of five college-performance gauges that might make sense, and make good policy.

Over the past two years, the Voluntary Institutional Metrics Project has brought together the presidents of 18 institutions, including huge state universities, for-profit companies, and community colleges, to consider ways to develop measures that would give government officials a more accurate and nuanced understanding of how colleges and universities are doing.

A report released on Wednesday details the project's progress toward establishing the five new metrics, which would measure repayment and default rates on student loans, students' progress and program-completion rates, institutional cost per degree, employment outcomes for graduates, and learning outcomes at the program level, as measured by data like "core skills" evaluations and professional qualifying examinations.

College leaders already stagger under a data-reporting burden, but they also grouse about the one-size-fits-all statistical measures that sometimes result.

"I have a problem with the burden, but I have a bigger problem with data elements that aren't representative of what I do," said Ed Klonoski, president of Charter Oak
State College, a public online institution in Connecticut that participated in the metrics project.

Charter Oak was joined by a diverse group of institutions of various sizes and sectors, including the University of Missouri at Columbia, the University of Maryland University College, for-profit companies like DeVry University and Capella University, and two-year colleges like Anne Arundel Community College. The institutions may have differing missions and financial models, but they share a dilemma.

"There's a lot of data collection, but there's not a lot of good, useful information," said Michael J. Offerman, an independent consultant who helped coordinate work on the project. It was supported by the Bill & Melinda Gates Foundation, though no money went to participating institutions.

Comparable Metrics
The participating institutions shared their own data, as reported to both governments and nongovernmental organizations, and tried to find ways to create metrics that would be comparable across institutions of different sizes, revenue sources, and missions. (None of the real institutional data used by the project were included in the report.)

For the student-loan repayment and default-rate metric, for example, the project started by using data from the Education Department's Integrated Postsecondary Education Data System, or Ipeds, to predict an individual institution's likely repayment and default rates, "input adjusted" for the nature of the students the institution serves. A college with a high percentage of Pell-eligible or first-generation students would not be expected to have the same successes as an elite private institution.

Then, the report proposes, the predicted rates would be compared side-by-side with the actual rates in a dashboard format (see an example) to help create "a credible set of measures that you should look at holistically," Mr. Offerman said.
The more detailed and nuanced sort of statistics proposed by the project reflect metrics that the participating presidents consider important but also more fair.

During the project, "I recall there being a conversation to the effect of, 'If we're going to have measures out there, let us define them so that they make sense," Mr. Oferman said.

The current metrics available to policy makers, even when statistically accurate, don't always provide a true picture of how individual institutions are performing, Mr. Klonoski said. Charter Oak boasts an admirable 66-percent six-year graduation rate, but in practical terms "that's not a real number," he said. His students are predominantly adults transferring from other institutions—a group that also happens to be invisible in the federal Ipeds data, which focus on first-time, full-time students who start and finish at the same college.

**Performance-Based State Support**

The quality of such metrics is increasingly important as more states consider allocating their support for higher education on the basis of individual colleges' performance. Tennessee has already enacted such a law.

"The reality is, performance funding is here, and it's not going away," Mr. Klonoski said. Crude measures might penalize colleges that enroll students who are less likely to graduate and reward colleges with a better-prepared and better-motivated student body. If legislators looked at the sort of comprehensive set of metrics proposed by the Voluntary Institutional Metrics Project "and you saw my institution move up in categories where it needed to improve and stay strong in categories in which it was good, it would be much easier to say, yes, they are performing across multiple metrics," Mr. Klonoski said.

But the project's report is candid about the challenges faced in trying to create workable metrics beyond the bounds of a small-scale experiment. Calculations of institutional cost per degree could not include an institution's capital costs, among a number of other complications involving college budgeting. Reliable gathering of data
on postgraduation employment is "not widespread, consistent, or well documented," the report says.

The report even acknowledges defeat in coming up with a workable metric for learning outcomes. Plans to collect data from a variety of sources down to the program-specific level were eventually shelved. "We couldn't find enough existing data that works in multiple institutions to be comparative," Mr. Klonoski said.

Mr. Offerman considers the project a success, though he added that making the proposed metrics a reality would involve "some real heavy lifting" by institutions and governments to improve the available data without unduly increasing the reporting burden. At least the report will "carry the message forward that there is a way to make sense of all the data," he said.

But such metrics—and the effort involved in creating them—would prove rewarding for higher education in many ways, Mr. Klonoski said. Not only would they offer "some internal comfort about how performance funding, or whatever you want to call it, will occur—at the state and federal level," he said, but "it really helps you dig into who you're serving and how you're serving them."
There is a growing belief in higher education that if colleges don’t figure out how to measure the quality and value of their product, lawmakers will do it for them. Eighteen institutions are trying to get ahead of the growing accountability push with the release today of a new set of performance measures.

The Voluntary Institutional Metrics Project was more than two years in the works. It seeks to give a “holistic” view of the performance of private nonprofits, for-profits, community colleges, online institutions and one research university that is a member of the Association of American Universities (see box).

While the 18 institutions cover every sector, most are community colleges or institutions steeped in distance education or other nontraditional forms of instruction.

The metrics include ways to access and analyze data in five areas: repayment and default rates on student loans, student progression and completion, institutional cost per degree, employment of graduates and student learning.

As is often the case with higher education data, the final product includes several gaps. Learning outcomes and employment data proved particularly problematic.

Participating colleges had hoped to play their cards by publicly releasing institutional “dashboards” based on the new metrics, according to several participants in the project. But the holes in the data were too large to take that last step.

Participants in Voluntary Institutional Metrics Project

- Alamo Colleges
- Anne Arundel Community College
- Capella University
- Charter Oak State College
- DeVry University
- Excelsior College
- Ivy Tech Community College
- Johnson County Community College
• Kentucky Community and Technical College System
• Louisiana Community and Technical College System
• Regis University
• Rio Salado College
• Southern New Hampshire University
• University of Maryland University College
• University of Missouri at Columbia
• Walden University
• Western Governors University
• Western Kentucky University

"We couldn't get there," said Ed Klonoski, president of Charter Oak State College, which is a participating institution. Klonoski and others said they were disappointed that group couldn't get past those hurdles to release finalized dashboards. But several colleges plan to do so soon.

"Nobody's dashboard is perfect," Klonoski said. "This is scary stuff for higher education."

A group of five or so institutions first got the ball rolling by approaching the Bill and Melinda Gates Foundation a few years ago with the idea of creating relatively comprehensive, fair metrics without adding new administrative burdens for colleges.

Charter Oak was part of that initial group, which eventually grew to 18. HCM Strategists, a public policy and advocacy firm, helped run the Gates-funded project. HCM today released a report describing the metrics.

The goal of the project was to build on existing databases and other voluntary accountability systems, including those created by the National Association of Independent Colleges and Universities, the Association of Public and Land-grant Universities and the American Association of Community Colleges. This latest set is broader, participants said.

In addition, many of those previous data-driven efforts are aimed at students and their families. This set of common metrics, however, was designed with lawmakers as a primary audience. The reason, according to the report, is because of the often unwieldy nature of data collection that gets handed down from Washington or state capitals.

"Policy makers often seek data on too many variables, resulting in data overload and lack of focus," the report said. "This sometimes leads to decisions based on anecdotal information."

Next Steps

The project's first step was to select five main areas to measure. The group then tapped top subject experts to prepare papers on how to access data and to present metrics.

Several participants said one of the best solutions that emerged in the process was to create measures that take into account the relative advantages and academic preparation of students that colleges serve. This approach – measuring inputs as well as outputs – often is said to be lacking in currently-available measuring sticks of colleges.
By that argument, it is misleading to compare colleges that enroll a small number of students who are at risk of not being able to repay loans — Ivy League institutions, for example — with colleges that serve many low-income or disadvantaged students.

To even the playing field, the metric used here includes a predicted range where an institution’s loan repayment and default rates should fall. Variables that influence that range include the proportion of students eligible for Pell Grants and the percentage who receive federal loans, as well as other publicly available data points.

Each institution is rated against its predicted range on the dashboards, which is a more nuanced and informed way of holding them accountable, according to the report. Federal gainful employment regulations, for example, proposed uniform thresholds for all institutions (although many critics said those thresholds were too low).

To measure efficiency, the dashboards include a cost-per-degree metric. Unlike other data sets, this one included operating costs but stripped out capital expenses, which can cloud the picture of what colleges spend to educate students.

The project also sought to use more comprehensive measures of college completion. It used metrics created by Complete College America and the National Governors Association as a starting point.

The final result includes part-time as well as full-time students. Student transfers also count, as do total credits attempted and time to a credential, which is similar to a measure the Association of Public and Land-grant Colleges recently designed in coordination with other higher-education associations.

However, the burden of collecting the souped-up completion information is substantial, the report said. For example, eight-year graduation rates for bachelor’s-degree programs are labor-intensive to track, particularly for large institutions.

Employment data is even trickier.

The approach was developed in consultation with Tony Carnevale, director of Georgetown University’s Center on Education and the Workforce. It connects higher education data with unemployment insurance information, analyzing wages and employment status one and five years after graduation. Whether students were attending graduate school after completing is also factored in.

However, only a few states and colleges currently connect those sources of data, according to the report. And there is no standardized approach to for reporting employment outcomes.

The project also hit a brick wall with its attempt to set a standard for measuring student learning. It attempted to develop metrics for both core skills and major-specific — or upper-division course equivalent — learning. But the group was unable to adequately match program-level assessments with the current array of available testing.

Higher education should push hard for common standards and measurement tools that can track both employment and student learning, according to the report. In the meantime the group plans to roll the new dashboard out to policy makers and the academy.
“These metrics, considered collectively, present a coherent picture about cost, quality, efficiency, effectiveness, student ability to finance college and student success in employment,” the report said. “They help determine how resources, including public investments, are used and whether credentials offer sufficient value to justify cost.”